

An Australian and New
Zealand Human Resource
Management Guide to Work
Health and Safety

An Australian and New Zealand Human Resource Management Guide to Work Health and Safety

Lynnaire Sheridan

UNIVERSITY OF OTAGO
DUNEDIN



An Australian and New Zealand Human Resource Management Guide to Work Health and Safety Copyright © 2023 by Lynnaire Sheridan is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License, except where otherwise noted.

Dedication

This book is dedicated to those who think “I should do something to improve safety around here” and then decide to do it!

Contents

Acknowledgements	xi
Copyright and accessibility	xiii
Preface	xvii
Introduction	1
Part I. History: Exploring the origins of labour rights and worker safety	
1. The emergence of 'labour': Human subsistence through to the Scientific Revolution	5
2. The British Industrial Revolution 1730 until the early 20th Century	25
3. Industrial Revolution in the United States from 1793 until the early 20th Century	39
Part II. Theory: A systems approach to work health and safety management	
4. What is work health and safety?	65
5. The Swiss Cheese model of safety incident causation	85

6. A systems and safety culture approach to work health and safety management	99
Part III. Practice: Establishing, implementing and closing the loop in a safety management system	
7. Establishing: Leadership commitment, policies, procedures and planning	123
8. Establishing: Compliance competency	141
9. Implementing: Hazard Identification	175
10. Implementing: Risk Assessment	203
11. Implementing: Hazard Control	229
12. Implementing: Emergency response	263
13. Closing the Loop: Measuring, Evaluating, Reviewing and Improving	285
Conclusion	291
Glossary	293
Glossary References	345
Part I References	359
Part II References	373
Part III References	383
Transcript Video 1: An introduction to work health & safety management (Chapter 4)	403

Transcript Video 2: An introduction to work health & safety management (Chapter 4)	407
Transcript Video 3: An introduction to work health & safety management (Chapter 5)	413
Transcript Video 4: An introduction to work health & safety management (Chapter 6)	419
Transcript Video 5: An introduction to work health & safety management (Chapter 11)	425
Transcript Video 6: An introduction to work health & safety management (as excerpts in Part III)	431
Transcript Video: Moving up the Culture Ladder (Chapter 6)	439

Acknowledgements

I would like to acknowledge the Otago University Library for endorsing open publication of this resource via the Open Education Resources Collective of the Council of Australian University Libraries. In particular, I would like to thank Richard White, Manager Copyright and Open Access, and Kate Thompson, Librarian, who are both strong advocates for open educational resources and were practical project managers for the production of this resource. Thank you to Lauryn Hortle, Otago Business School, for her insightful and thorough editorial feedback.

Much appreciation goes to Alyce Mason (Deputy Director Learning, Teaching & Curriculum), the UOW copyright (legal) team and to Professor Ann Rogerson (Associate Dean Education, Faculty of Business & Law) for encouraging, supporting and enabling the use of the *An introduction to work health and safety* animated video series, produced at the University of Wollongong, for this open educational resource.

I would like to thank Ray Stace for choosing to support the initial animated video series project and, more broadly, for always fostering closer collaborations between academics and creatives to enhance student learning. I acknowledge and thank all the University of Wollongong Learning Teaching & Curriculum staff who dedicated their time and expertise to every aspect of the animated video series and live recordings during 2014 to 2018. Thanks also to Sarah Lambert for inspiring ‘open’ as a tool to promote equity in education during her time at the University of Wollongong.

Thank you, Leanne Treadwell, co-author of videos 5 and 6, your expertise in risk assessment and hazard control is exceptional. I am so grateful for all the insights shared from your extensive career in safety management. Likewise, to Cathie Andrew and Neil Logan for choosing to participate in my digital teaching and learning projects which, today, have culminated in this open educational resource.

Finally, both love and appreciation go to J. Guadalupe, Elena and Paloma for affording me the time and support to turn what began as a series of videos into a book.

Copyright and accessibility

Copyright

An Australian and New Zealand Human Resource Management Guide to Work Health and Safety © 2023 by Lynnaire Sheridan is licensed under Attribution-NonCommercial 4.0 International, except where noted.

ISBN 978-0-473-69863-8

The cover uses two images. One is titled “Lathe operator machining parts for transport planes at the Consolidated Aircraft Corporation plant, Fort Worth, Texas,” which has no known copyright restrictions. This image is available from the United States Library of Congress under the digital ID fsac.1a34951. The map of New Zealand and Australia is from Wikimedia Commons by Dylan Ingelby and is licensed CC BY-SA 4.0. The cover as a whole, therefore, is licenced CC BY-SA 4.0.

The following figures were copied under the provisions of fair dealing for the purposes of criticism and review in the New Zealand Copyright Act 1994. If this book is adapted, care should be exercised to preserve the critical context in which these images are used.

- Figure 6.1: AS/NZS 4801:2001, WHS Management System Model
- Figure 6.3: Patrick Hudson’s Safety Culture Change Model
- Figure 7.2: Extract, Air New Zealand 2023

Sustainability Report

- Figure 10.4: A typology of risk

Two images are **used with the permission of the International Labour Organization.**

- Figure 3.5: A Pakistani child worker, photograph taken January 2016
- Figure 8.4: Logo, International Labour Organization

Questions about any of the rights associated with this Pressbook should be addressed to copyright@otago.ac.nz.

Accessibility

The web version of this resource has been designed with accessibility in mind and incorporates the following features:

- Optimisation for people who use screen reading technology
 - Keyboard navigation for all content
 - Links, headings, and tables are formatted to work with screen readers
 - Images have alt tags
- Information is not conveyed by colour alone.

In some cases, this book includes third-party content. In these cases, it is not possible to ensure the accessibility of this content.

In addition to the web version, this book is available in other file formats, including PDF and EPUB (for ereaders). Choose from the selection of available file types from the ‘Download this book’ drop-down menu. This option appears below the book cover image on the landing page.

While we strive to ensure that this resource is as accessible and usable as possible, we might not always get it right. If you have problems accessing this resource, please contact copyright@otago.ac.nz to let us know.

This accessibility disclaimer is adapted from BCampus’s Accessibility Toolkit, licensed under CC BY 4.0.

Preface

This open educational resource is the culmination of my work health and safety (WHS) management teaching and research from 2010 until 2023 spanning two universities; the University of Wollongong (Australia) and the University of Otago (New Zealand). This resource was therefore produced, in part, on Dharawal country (Wollongong, Australia) and in Ōtepoti, Te Waipounamu, Aotearoa (Dunedin, South Island, New Zealand). Please note that when teaching in New Zealand I often use the terms Aotearoa and New Zealand interchangeably, however, for the purposes of this publication I have only used the term New Zealand. This choice has been made as effectively I am solely referring to the WHS jurisdiction established by “the Crown” in the legislation which does not, unfortunately, incorporate mātauranga Māori perspectives on safety management. However, where possible and appropriate, I have sought to proffer insights on how British colonial perspectives on Australia and Aotearoa have impacted modern Human Resource Management practices (see *Past Influencing the Present* in Chapter 1).

As an important, yet emerging field, WHS research will continue to evolve at a rapid pace so this resource is unable to address all currently emerging ideas in this field but, instead, is designed to provide a clear historical context to the approaches (Part I) and processes that contemporary organisations are drawing on today (Part II and Part III); as such this resource is mainly derived from a **Safety**

I perspective but acknowledges, and integrates where possible, the emergence of Safety II.

In Part II, the chapters focus on establishing, implementing, and closing the loop in a WHS system in an attempt to outline what occurs in each phase of the safety management system, rather than exactly how to achieve every aspect, given each organisation, due to its jurisdiction and context, will likely adopt unique approaches. Please do accept my apologies for any oversights on aspects of safety management implementation, as these are likely due to either the innate constraints of publishing or reflect the limitations of my personal knowledge.

Thank you for taking the time to read this open educational resource and I sincerely hope that it enhances your work health and safety practice.

Stay safe!

Lynnaire

Introduction

Worldwide there are an estimated 2.78 million work-related deaths per year (ILO, 2023), with work-related injury and disease impacting on many more surviving workers. The monetary and emotional cost to families, organisations and societies means quality work health and safety management has impact nationally, regionally and internationally. When implemented effectively, workplace health and safety reduces loss of life and injury in organisations worldwide.

An Australian and New Zealand Human Resource Management Guide to Work Health and Safety is designed to:

- Outline the historical and philosophical evolution of the work health and safety theories, principles and approaches used today.
- Delineate Human Resource Managers' work health and safety responsibilities.
- Empower Human Resource Managers to lead work health and safety by providing examples from actual workplace settings.

2 Lynnaire Sheridan

I

History: Exploring the origins of labour rights and worker safety

This section presents a socio-historical review of human ‘labour’. It outlines foundational knowledge on the intertwined origins of worker labour and safety rights while contextualising the formation and role of unions in securing labour rights that, today, are standard in Australian and New Zealand contexts. It will enhance your understanding of the historical origins of the contemporary disciplines of Employment Relations and Work Health and Safety (WHS) to explain why, although today treated as separate domains, there are commonly shared assumptions and principles.

1.

The emergence of 'labour': Human subsistence through to the Scientific Revolution

This chapter presents a brief history of human labour beginning with early human subsistence models and concluding with **western** concepts of 'labour' as emerging during the Scientific Revolution.

Learning Objectives

By the end of this chapter, we will have explored:

- The transition of human activity from subsistence living through to the division of a society's tasks into different roles that, over time, become increasingly specialised and come to be undertaken by specific community members as their 'work'.
- The links between an emerging scientific paradigm and its use in the judgement of some humans as 'lesser' than others, leading to the devaluation of their labour as a justification for

slavery.

For most of human history, people have not worked – they have simply laboured to survive. In early communities, humans hunted and gathered to ensure their daily survival. As agricultural techniques developed in the Neolithic Era (5000–3000BC), some people were freed up from subsistence food production which enabled them to develop role specialisations (Baysal, 2013; Violatti, 2018). As communities divided up the **work**, people took on different tasks, and even some free time was eked out. In Neolithic Greece, beads for decorative necklaces demonstrate a specialised craft activity that emerged when access to raw materials combined with leisure time (Perlès, 2021). Come the end of the Neolithic Era in ancient Egypt, the division of roles was so sophisticated that social hierarchies defined everyone’s place in society determining the **labour** they were eligible to perform and, consequently, the lifestyle they could aspire to (see Figure 1.1).

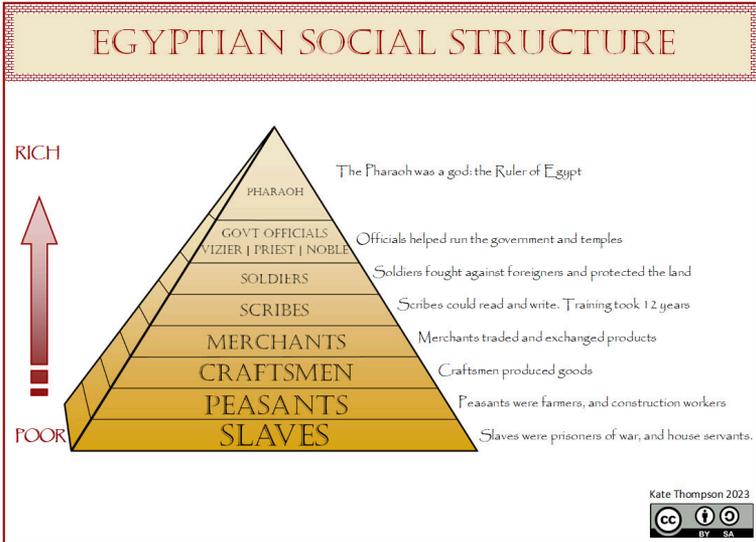


Figure 1.1: Egyptian social structure

Source: Kate Thompson, CC BY-SA

The hierarchical centralisation of power in societies led to the rise of conquests by historical figures including Alexander the Great (Macedonian, b. 356BC, d. 323BC) who conquered Greece then Egypt through to modern day India (Wasson, 2016), Caesar Augustus (Roman, b. 63BC, d. 14AD) who expanded the Roman Empire from the Italian peninsula to Egypt, Central Europe and parts of the Middle East (Appleton, 2022) and Genghis Khan (Mongolian, b. 1162AD, d. 1227AD) who aspired to control the ‘silk road’ trading route between Asia and Europe (Appleton & Willis, 2022). Taking command of other societies enabled the conquerors to seize both natural resources and the labour of the conquered peoples (Spoden, 2019).

Indeed, **slavery** was pivotal to the expansion of the

Roman Empire creating “one of the few ‘genuine slave societies’ in the western experience” (Harper, 2011, p. 3). While war led to some direct enslavement of the enemy, it mainly created conditions that stimulated the **slave** trade such as orphaned children, who could be easily enslaved, and cashed up ‘victors’ (wealthy from the spoils of war) who could afford to buy slaves at markets (Wickham, 2014). Harper concludes that, at the peak between 275 – 425AD, “the top 1.356 percent of Roman society thus owned the bottom 5% of Roman society” (Harper, 2011, p. 59–60) and slaves comprised 10% of the Roman Empire’s population (Harper, 2011). This represented a considerable amount of unpaid **slave labour**, with slaves in rural settings engaged in agricultural production and mining while those in urban areas were household servants, in public service and craft production (Hunt, 2010). Perhaps surprising is that there some were highly educated, for example, being a physician (doctor) was predominantly an occupation undertaken by slaves in Roman times (Mohler, 1940).



Figure 1.2: A tile mosaic depicting two slaves serving wine in the 2nd century AD at Roman settlement Dougga (modern day Tunisia)

Source: “Mosaic of cupbearers” by Pascal Radigue, Wikimedia Commons, CC BY 3.0

Modifications to perspective, framing and lightening by Habib Mhenni.

After the collapse of the Roman Empire in Europe, came the **Middle Ages** (circa 500–1500AD) where social status, and work roles, were organised according to a Medieval feudal system (see Figure 1.3). This ranked King and Church at the top and cascaded through levels of wealth down to independent peasants and serfs (**forced labourers**) at the bottom (Encyclopaedia Britannica, 2023a).

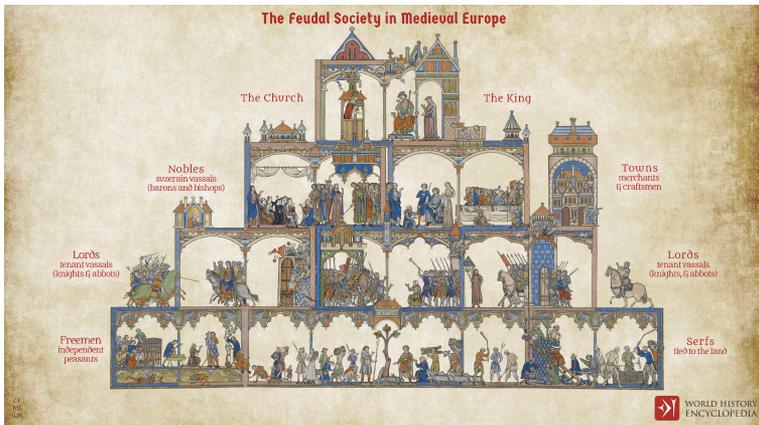


Figure 1.3: The Feudal Society of Medieval Europe

Source: “The Feudal Society in Medieval Europe” by Simeon Netchev, World History Encyclopedia, CC BY-SA

By the time of the Elizabethan period (1558–1603), British social structures had shifted towards a more simplified class system with the nobility, the gentry, the yeomanry and the poor. The nobility held power, while the gentry’s status

was achieved through properties and fortunes; these two groups did not work for a living. The yeomanry strived to improve their lives through improving their lands to generate the necessary savings to buffer them from poverty in difficult times. The poor worked for others, according to their ability and opportunities, but they struggled to secure food and a place to live (Historical Association, n.d.).

Europe's noble class, similar to previous historical empires, came to increase their power and wealth through territorial expansion (Spoden, 2019). The Age of Discovery (1450–1550) began with Portuguese exploration of Africa. Later Christopher Columbus, who was exploring on behalf of the Spanish, reached the Americas. The Dutch, the French and the English were also all striving to establish trade, secure new resources and, over time, colonised new lands (Brown Mitchell, 2023). In Britain, for example, the “transformation of the English mercantile economy from its previous dependence upon a single commodity into a diversified entrepôt [port] that transshipped dozens of domestic and colonial products was one of the most significant developments of the century” (Encyclopaedia Britannica, 2023b, para 3). However the newfound wealth came at a cost to some. In conquering the Americas during the 16th Century, the Spanish “forced the indigenous people to work in exchange for ‘protection’. The system of **forced labour** used by the Spanish in the New World decimated the native population...The Spanish and Portuguese authorities encouraged their traders to use Africans for this work instead” (Mohamud & Whitburn, 2018, para. 4). The British followed suit, buying African slaves from Dutch traders and relocating them to their British colonies (in the Caribbean and America) to work on plantations (Mohamud & Whitburn, 2018).



Figure 1.4: Slaves cut sugar cane in 1823 for the British Empire on the Island of Antigua (Caribbean)

Source: "Ten Views in the Island of Antigua" by William Clark, British Library on Flickr, Public Domain

Interestingly then, European (**Western**) efforts to explore, claim and colonise coincided with the Scientific Revolution (1500–1700): “Since its birth around the same time as Europeans began conquering other parts of the world, modern Western science was inextricably entangled with colonisation, especially British imperialism.” (Deb Roy, 2018, para. 5) Early in the Scientific Revolution, Sir Francis Bacon (b. 1561, d. 1626) challenged the traditional ways of ‘knowing’ established in ancient Greece (Sylvester, 1994) by promoting empiricism: “A conclusion or piece of evidence derived from observation, investigation, or experiment; an empirical result or generalization” (Oxford English Dictionary, 2022, para. 2)

thereby forming the foundations of modern experimental science.

Come the 1700s, natural science had become a popular pastime of the educated British leisure class (gentry). “‘Natural philosophy’ was mainly an amateur activity pursued by English gentlemen during their leisure.” (Sylvester, 1994, p. 1) Some, such as Sir Joseph Banks (see Box 1.1), paid to join large explorative expeditions and use scientific principles to understand, via observation, the plants, animals and peoples of the places they ‘discovered’ (Ministry for Culture and Heritage, 2023). Lawrence (2015, para. 2) reflects:

In the eighteenth century many famous expeditions were despatched from Europe. These were often explicitly colonising enterprises, particularly involving the annexation of various regions in South America, India, Australasia and the Pacific Ocean. Historians now acknowledge that these expeditions mostly appropriated local objects and information in order to enhance Western knowledge.

The geo-political expansion of the British Empire was a source of opportunity for gentlemen to engage in natural science which, Lawrence (2015) suggests, was principally the acquisition and subsequent display of curiosities.

Box 1.1: Joseph Banks the botanist onboard Captain Cook’s *Endeavour* voyage

Joseph Banks came from that enviable class the landed gentry; close enough to the land to draw

common sense from it, and with enough of it to draw from it also a handsome revenue; with brains enough, indeed, unlike some country gentry, to repay education, and with wealth more than enough to allow of a town as well as country existence, and of a standing in society which no mere rural squire could claim. (Beaglehole, 1962, p. 3)

As natural science was a relatively new field of study, Joseph Banks learned Botany at Eton by paying local women to teach him about the plants they gathered for herbal medicines. At Oxford, he wished to continue his study of plants so paid one of Cambridge University's botanists to teach him (Te Papa, 1998). His most famous expedition was on the *Endeavour* with Captain Cook exploring Tahiti, Huahine, Borabora, Raiatea, New Zealand and Australia (Beaglehole, 1974). "The *Endeavour* voyage was his second major field trip...It was estimated to have cost him about £10,000 (worth more than NZ\$1.5 million)." (Te Papa, 1998, para. 4). According to ship records, Banks funded fellow travellers including naturalist Daniel Solander, a secretary, two artists and four servants (Captain Cook Society, 2023). Beaglehole (1962) points out, "It must have been a truly exciting experience for the botanists to find themselves in a land where every species of plant was new to them". Banks' silver fern specimen from the *Endeavour* voyage (Figure 1.5) is part of Te Papa's (Museum of New Zealand) collection.

14 Lynnaire Sheridan



Figure 1.5: A Silver Fern specimen collected by Sir Joseph Banks and Dr Daniel Solander in Aotearoa / New Zealand on the 5th November 1769

Source: Museum of New Zealand Te Papa Tongarewa (P009454/A), CC BY 4.0

However, there was a dark side to this natural science. The artists onboard the *Endeavour* did not simply sketch the plants but, see Figure 1.6, also the peoples of these then remote places. “The drawings and paintings made by the artists during the expeditions formed the basis for dozens of artworks, which brought to life areas of the world that had previously been little known the Europeans.” (Anderson, 2017, para. 1)

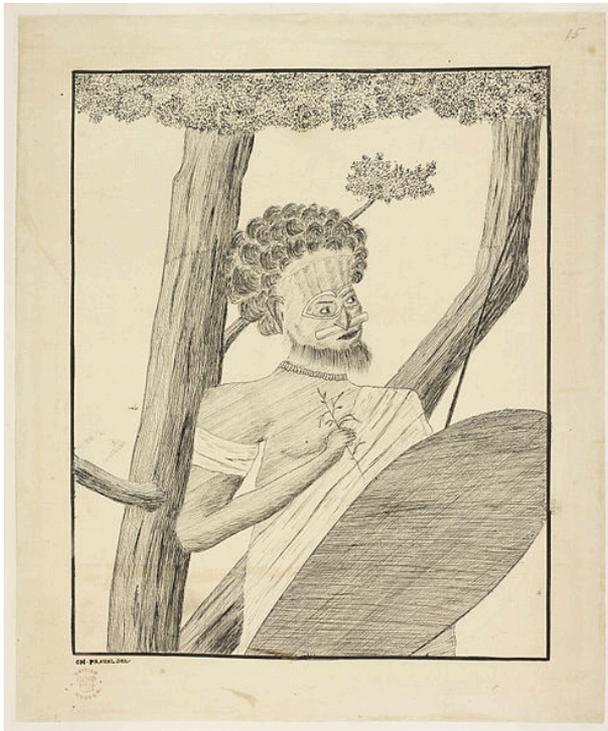


Figure 1.6: A portrait of an Australian Aborigine [sic] circa
December 1770 - January 1771

Source: "Drawings illustrative of Captain Cook's First Voyage" by
Charles Praval, British Library on Flickr, Public Domain

This image depicting an Indigenous Australian, and other similar drawings, would go on exhibition for the British elite and were then made more widely available via their reproduction in publications including *The Gentleman's Magazine*.

They came to shape British perceptions of the peoples encountered (Anderson, 2017).

Activity 1.1

The Grand Tour was “a practice that introduced Englishmen, Germans, Scandinavians, and also Americans, to the art and culture of France and Italy...possible only for a privileged class—the same that produced gentlemen scientists, authors, antiquaries, and patrons for the arts.” (Sorabella, 2003, para. 1)

This ‘tour’ of European cultural highlights occurred from the late sixteenth century for over three hundred years. Visiting Italian cities, with their roman statues and architecture, had a lasting impact on the socially powerful young men of the Grand Tour and thus influenced many aspects of British life at that time (Sorabella, 2003).

Consider then how an artist’s worldview, strongly influenced by their Grand Tour and ancient Rome, might influence how they depict the peoples they encountered on their colonial expeditions.



An interactive H5P element has been excluded from this version of the text. You can view it

online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=101#h5p-2>

When British slavery peaked between 1660 and 1838 (Carey, 2016), the entire British society benefited from slave labour. “The British state, and the nation as a whole, reaped the benefits from the duties collected on slave-produced colonial goods...The consumption of cheap slave-produced colonial commodities was widespread” (Donington et al, 2016, p 1–2) Interestingly, it was these duties (taxes) that led to the American Revolution against the British (1765–1783), with those living in the British Americas perceiving the taxing as signalling the beginning of efforts towards their entire enslavement (Rothschild, 2018).

Past influencing the present

Like the sugar being consumed in English tea rooms – our contemporary society also benefits from slave labour. **Modern slavery** describes the ways in today’s economy that labour or services are being extracted from people, including children, unwillingly and without appropriate compensation. In 2021, World Vision reported that New

Zealanders unknowingly spend approximately NZ\$34 dollars a week on products ‘implicated’ in modern slavery (World Vision, 2021).



Figure 1.7: Modern slaves in Bali, Indonesia

Source: Untitled by Nick Agus Arya, Unsplash, Unsplash licence

Once successfully independent of Britain, citizens of the United States constantly debated the morality of slave labour in their society (Conlin, 2015). The Declaration of Independence, signed by the original 13 states on the 4th July 1776, stated, “all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness” (Jefferson, 1776, para. 2). In 1861, a tipping point was reached between northern states that had abolished slavery in the early 1800s and the southern states that sought to retain it; the American Civil war (1861–1865) was based on the premise of abolishing

slavery in the USA (Conlin, 2015). Abraham Lincoln (16th President of the United States 1861–1865) supported the emancipation (liberation) of America’s slaves and the abolishment of slavery via his Emancipation Proclamation during the American Civil War in 1863 (see Figure 1.8). The emancipation of slaves and the implications for labour markets conditions during the American Industrial Revolution are a focus of Chapter 3.

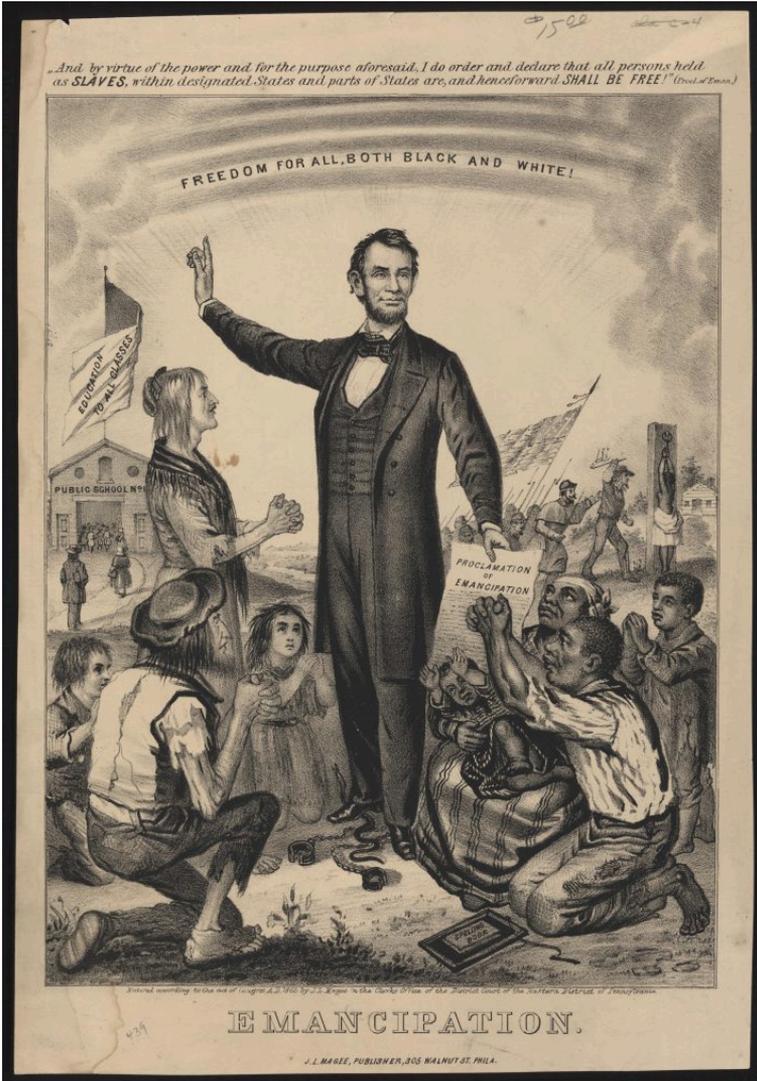


Figure 1.8: An artistic depiction of Abraham Lincoln delivering his 1863 Emancipation Proclamation.

Source: "Emancipation" by J. L. Magee Publisher, Library of Congress, Public Domain

From this chapter, we have learned that human survival tasks evolved into specialised roles undertaken by, and often limited to, particular community members as their **work**. As societies expanded, there was a desire to take over other human settlements and harness their peoples in the further expansion of the conqueror's empire. With this emerged **slavery**; sometimes as ownership of the **slave** or, at least, as **forced labour**.

Past influencing the present

While slavery has been recorded far back in history, the intertwined histories of colonisation with the Scientific Revolution in the 1700–1800s is critical to understanding contemporary cultural and diversity perspectives in Human Resource (HR) management in workplaces today.

Linda Tuhiwai Smith, in *Decolonizing Methodologies: Research and Indigenous Peoples*, writes:

The ways in which scientific research is implicated in the worst excesses of colonialism remains a powerful remembered history for many of the world's colonized peoples. It is a history that still offends the deepest sense of our humanity. Just knowing someone measured our 'faculties' by filling the skulls of our ancestors with millet seeds and compared the amount of millet seed to the capacity

for mental thought offences our sense of who and what we are. (2021, p. 1)

We can now see how science and colonisation frame slavery as:

In the 1700s and early 1800s, scientists in Europe and the Americas studied “race science” —the idea that humankind is divided into separate and unequal races. They tried to explain the contradiction between the belief in human equality expressed during the American and French Revolutions and the emergence of slavery in the United States and several European countries. (Facing History & Ourselves, 2017, para. 1)

Today HR managers are striving to address the legacy of colonisation in HR and Employment Relations practices through initiatives such as equitable recruitment strategies (anti-discrimination) through to proactive strategies to attract, and support, indigenous employees as they overcome years of inter-generational discrimination based on ‘principles’ of natural science that justified their slavery and de-valued their labour.

Chapter 2 will now examine how, parallel to the natural sciences, the scientific fields of physics and mechanics led to machines and new industries during the Industrial Revolution creating the conditions that founded workplace, health and safety from within the unionised ‘labour’ rights movement.

2.

The British Industrial Revolution 1730 until the early 20th Century

As part of the Scientific Revolution, concurrent with the ‘explosion’ of the natural sciences among the British upper class, there were also theoretical scientists such as Isaac Newton (b.1643, d. 1727) who “unified the terrestrial and celestial mechanics...and transformed the mechanical philosophy...by adding to it mathematically expressed laws” (Schuster, 1996, p. 217). These scientific ‘laws’, or perhaps the subsequent emerging scientific paradigm, fostered invention and the ‘labour-saving’ machines of the Industrial Revolution (Dennis, 2017). Machines came to ‘revolutionise’ the production of iron, steel and textiles which had a cascading effect across the British economy and society (Newton, 2021, p. 2366). The **scientific method**, as enacted in a culture of applied science and technology, led to the development of labour-saving machines resulting in the British Industrial Revolution (Jacob, 2014). This chapter will explore British experiences of industrialisation through until the early 20th century.

Learning Objectives

By the end of this chapter, we will have explored:

- How the Scientific Revolution enabled the British Industrial Revolution (1730 – 1850) through the creation of labour-saving machines.
- How rapid industrialisation and a population boom in Britain resulted in low wages for dangerous work and how these poor working conditions became the origins for labour (employment) relations, trade unionism and workplace health and safety.
- The emergence, in the early 20th Century, of the British Labour Party from the trade union movement.

The journey from ancient civilisations to the Scientific Revolution took thousands of years. However, the British Industrial Revolution (1730 – 1850) was a period of accelerated change and, in just over 100 years, remarkable shifts took place that impacted “demographics, politics, social structures and institutions, and the economy” (Newton, 2021, p. 2367). As Zhao explains, “in the 17th century, Britain was still a peaceful agricultural country. However, in the industrial revolution...manufacturing factories rose up along river valleys, canals and railways...[this] greatly changed the face of British towns” (Zhao, 2019, p. 107); thus the British landscape was rapidly transformed (see Figure 2.1).

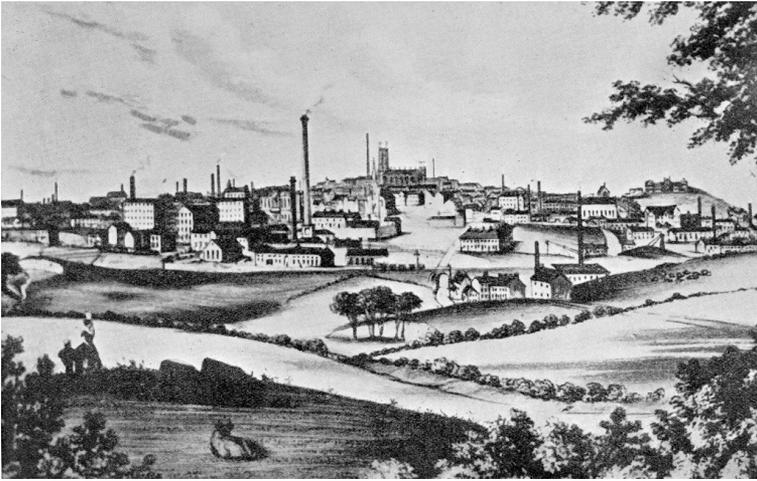


Figure 2.1 Industrialisation 19th century town in Lancashire

Source: Wellcome Collection, CC BY 4.0

However, the large-scale adoption of machines during the Industrial Revolution created a different type of **work**. The craftsmanship developed over many generations, since the division of roles during the Neolithic Era (see Figure 1.1), was replaced by the division of labour “the extent to which jobs in an organization are subdivided into separate tasks” (Heery & Noon, 2017, para. 1). No longer would one craftsperson work from beginning to end on an item, the labour would be divided among many workers most of whom were responsible for only one task in the item’s production.

Box 2.1: English Bobbin Mill

In this video we see machines making mass production a possibility. Machines revolutionised this work as the craftsmen who would have previously handmade timber items, such as the bobbins used to hold thread during textile manufacturing, could be replaced by machines operated by less skilled labourers. This was particularly efficient given the increasing demand for bobbins during the industrial revolution's textile industry boom.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=137#oembed-1>

*Source: "Things to do in the Lake District: Stott Park Bobbin Mill"
by English Heritage, YouTube*

Influenced by Newton's scientific laws, Scottish economist Adam Smith (b. 1723, d. 1790) sought out similar general economic principles (Montes, 2008) and observed that the division of labour "increases production and makes it more efficient by dividing the separate tasks of making an object among different individuals and thereby simplifying the

job each person must perform” (Wolf, 2019, para. 3). Smith then conceptualised production’s fixed costs as raw materials, plant equipment and **human capital** (Spengler, 1977), where human capital was “the economic value of a worker’s experience and skills” (Kenton, 2023a, para 1). Smith perceived there to be an “unnecessary costliness of human capital as well as its suboptimal use” (Spengler, 1977, p. 25). Smith highlighted the considerable economic potential that could be harnessed from the efficient utilisation of raw materials, machines and workers. With this assertion, Adam Smith shifted both economic thought and precipitated the field of **management** (and subsequently **HR management**).

However, the rapid change of **industrialisation** created great challenges; the intensification of production, enabled by machines, often led to terrible conditions for the people operating the machinery. As Newton recounts:

Work places were often poorly ventilated, overcrowded, and replete with safety hazards. Men, women, and children alike were employed at subsistence wages in unhealthy and dangerous environments. Workers were often able to afford no more than the simplest housing, resulting in the rise of urban slums. Stories of the unbelievable work conditions in mines, textile factories, and other industrial plants soon became a staple of Victorian [1837 – 1901] literature. (2021, p. 2368)

Poor working conditions led to the craft guilds, who had protected crafts and trades since the **Middle Ages**, re-organising to raise awareness of the work conditions—this was the beginning of the **trade union** movement (Cartwright, 2023).

However, it is an outbreak of malignant fever at a cotton

mill near Manchester in 1784 that marks the true beginnings of employment relations and workplace health and safety. Dr Thomas Percival determined that, “the epidemic was due to overwork for inordinately long hours, poor food, wretched clothing, bad ventilation, and overcrowding in insanitary houses and factories, especially by children” (Meiklejohn, 1958, p. 2). The absentee factory owner, Sir Robert Peel, was a parliamentarian who was both surprised and devastated by the conditions at his mill; he championed the Health and Morals of Apprentices Act of 1802. The legislation applied to any textile mill or factory with more than three apprentices, or over twenty workers, and required ventilation and cleaning of the workplace. Specific to apprentices was a maximum 12-hour work day, no work between 9pm and 6am, provision of work clothing and an education including reading, writing, maths and Christian religion.

Sir Robert Peel had been particularly concerned about apprentices and made them the focus of the legislation because, at the time, orphans and pauper children were often sent to live and work as apprentices at factories in compliance with the “Poor Law”, an act that ensured they were sheltered, fed and clothed. However, Sir Robert Peel disagreed with the poor conditions of the work they were exposed to in order to earn their up-keep (UK Parliament, n.d.). To contextualise this, it is important to understand that in one facility alone, that of Robert Owen’s New Lanark mill in 1799, 70% of the workforce were under 18 years old but the majority were under 13 (Bolin-Holt, 1989, as cited in Innes, 2002). On average children began working at eight and a half years old, often in cleaning roles that required them to manoeuvre around working machinery, “working for very low pay, performing work

that was dirty and dangerous, and usually working long hours as well” (Griffin, 2014, para. 2).

Box 2.2: Harrowing lives of children sent to work in English mills revealed

Professor Rebecca Gowland has studied the skeletal remains of 154 people buried in a North Yorkshire cemetery, many of whom were children working in a local textile mill. Her team discovered that the children “were forced to sacrifice themselves to conditions that were detrimental to their physical and mental wellbeing, in some instances leading to death within a few years of apprenticeship” (Gowland et. al., 2023, para. 56). Figure 2.2 depicts a rib bone with abnormal bone growth. Such abnormalities on rib bones indicate lower respiratory tract disease (Davies-Barrett, Antonine & Roberts, 2019).



Figure 2.2: Abnormal bone growth on a rib indicating lower respiratory tract disease

Source: Woven bone on the visceral surface of the vertebral end of a left rib of SK 334 by Gowland et al, PLoS One, CC BY 4.0

Like to learn more? A news article on this research is available [here](#) and the original research publication is available [here](#).

The Health and Morals of Apprentices Act of 1802 is the first piece of labour and safety legislation in the world but, unfortunately, it was poorly enforced (Innes, 2002). Preceded by the Combination Acts (1799–1800), which banned collective wage negotiations as any worker “who combined with another to gain an increase in wages or a decrease in hours” could be penalised (Encyclopaedia Britannica, 2017, para. 1), the Health and Morals of Apprentices Act of 1802 also coincided with rapid population growth. Agricultural improvements resulted in greater population health and wellbeing (Komlos, 1990), effectively providing employers with a limitless supply of willing workers (Cartwright, 2023). With no tangible legal consequences for employers, and an inhibition of worker collectives, there was little actual possibility for improved labour and safety outcomes for workers at this time.

Over the following decades, political tolerance for non-compliance by factory owners waned as members of Britain’s parliament, some of whom were also factory owners themselves, took a **paternalistic** view towards their workers. The Health and Morals of Apprentices Act of

1802 signalled an important shift in labour health and safety management with the introduction of factory inspectors who could enforce infringement notices, however, there were too few inspectors to enforce the Act with just four inspectors being responsible for 4000 mills (UK Parliament, n.d.). Political efforts continued with Lord Ashley-Cooper campaigning for the Mines Act of 1842, which banned all women and girls from mining and excluding boys under 10 years of age, and again he championed the Ten Hours Act of 1847 which sought to reduce the workday in mills to ten hours (Encyclopaedia Britannica, 2023c).

In the emerging industrialised environment, legally it was becoming challenging for workers and employers to effectively negotiate wages without being at risk of contravening the Combination Acts. In 1859, Judge Rupert Kettle began advocating for legal mechanisms, such as arbitration, to resolve industrial disputes with a view that laws should “be used to foster negotiation between masters and men, not to quash collective action by either side” (Cornish, 2010, p. 668). The 1868 Royal Commission into Organisation and Rules of Trades Unions and Other Associations followed. It produced a majority report supporting the status quo of unions as illegal while a minority report favoured the regulation of trade unions, the latter came to be adopted by government (Cornish, 2010). This led to the Trade Union Act 1871 which decriminalised the formal association of workers for wage bargaining, however striking was still illegal (Cornish, 2010).

It is important to recognise that these times and events are both shaped by, and influence, societal and government debate. Why, for example, would the government of the day choose to support the minority rather than the majority

report? Historical figures, such as Karl Marx who was based in London during these times, were shaping intellectual debate on **capitalism**, **communism**, and human **labour**. Such societal debates would naturally influence political leaders. Box 2.3 provides a very brief overview of Karl Marx's perspective on labour.

Box 2.3: Karl Marx (b. 1818, d. 1883)

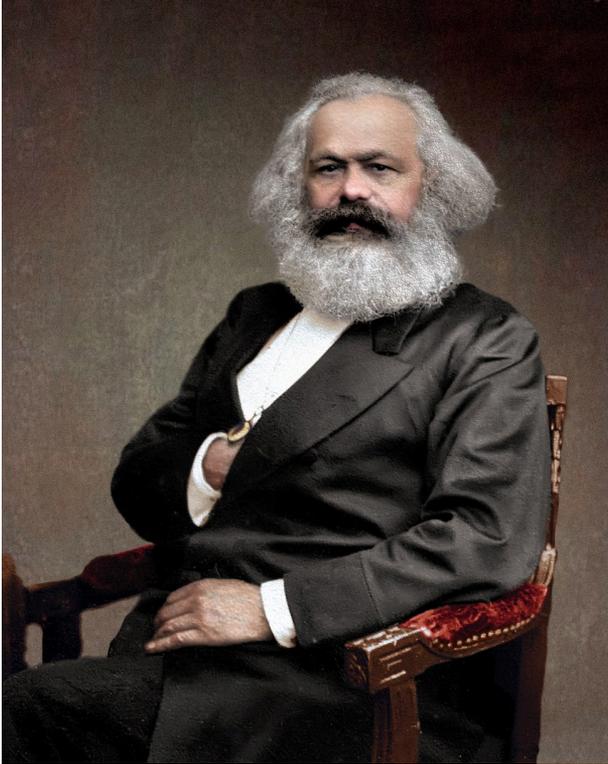


Figure 2.3: Karl Marx (circa 1875)

Source: "Karl Marx 1875" by John Jabez Edwin Mayall colored by Olga Shirnina, Wikimedia Commons, Public Domain

In 1867, while based in London, Karl Marx published *Das Capital*. In critiquing Adam Smith's conceptualisation of production as being solely a capitalist approach, Marx focused specifically on the labour component. He proposed that "there are two major flaws inherent in capitalism that lead to the exploitation of workers by employers: the chaotic nature of free market competition and the extraction of surplus labour" (Kenton, 2023, para. 9). Marx argues that profit is achieved when employers pay staff less than the value of their labour, not by selling items at a higher price (Liberto, 2021). This conceptualisation of the relationship between labour exploitation and employer profit likely shaped the subsequent government decision to establish the Trade Union Act 1871 to counteract the imbalance of power between employers and workers.

In concluding our understanding of the impact of the British Industrial Revolution on labour (employment) relations, unions and safety, it would be remiss not to mention the Fabian Society. The Fabian Society was established in January of 1884 to achieve **socialist** objectives in a slow and methodical manner, as opposed to revolutionary, manner and this non-violent approach to change arguably enabled their positive engagement with

government (Fabian Society, n.d.). In 1900, the Fabian Society became a founding member of the British Labour Party (The Labour Party, n.d.) and in the 1906 elections there were 26 voted representatives who considered themselves to be for ‘labour’. In 1906, the Fabians, together with the ‘labour’ representatives, had successfully lobbied to establish a minimum wage and by 1911, they had established foundations for the British universal healthcare system (Fabian Society, n.d.).

Crucial founders and actors in the Fabian Society were Beatrice and Sidney Webb who wrote many of the Society’s foundational publications, including the *History of Trade Unionism in 1894*. While their contributions in this arena are many, they are renown for having coined the term ‘**collective bargaining**’, in the aforementioned publication (Webb & Webb, 1898, p. 33). At the end of the 19th century “free bargaining between the capitalist and his workmen became the sole method of fixing wages” (Webb & Webb, 1898, p. 77), disadvantaging the workers and creating the aforementioned legal quandaries (Cornish, 2010). The Webbs’ acknowledged that it was approximately 50 years before the Act of 1825 provided the “right of collective bargaining, involving the power to withhold labour from the market by concerted action” in Britain (Webb & Webb, 1898, p. 111).

The British Industrial Revolution, at its conclusion, had led to massification of production, with the assistance of ‘labour-saving’ machinery (see Figure 2.4). Its beginnings saw the most vulnerable of workers labouring in the harshest of conditions. We also saw initial efforts from **paternalistic** owners, some of whom were in parliament, to reduce child labour and increase regulation around the hours of workers. A demographic population ‘boom’, and the associated availability of labour, made achieving better

working conditions, and particularly better wages, particularly difficult throughout this period. Come the turn of the 20th century, however, efforts were underway to enable the collective association of workers, underpinning the formation of the British Labour Party which would, over time, led to the modern British **trade union** movement.



Figure 2.4: Making Bessemer Steel, Edward Frederick Skinner oil painting (1917)

Source: "Making Steel by Skinner," Science Museum London, CC BY-NC-SA 4.0

While the Industrial Revolution began in Britain, it was not geographically constrained and it moved rapidly across Europe. Moreover, it reached the Americas via Britain's colony as approximately 6000 people emigrated from Britain between 1773 and 1776, and "with these immigrants came some textile workers who were familiar with the latest innovations in spinning wool and cotton" (Weightman, 2007, p. 37). Chapter 3 pivots from this

examination of the British context, to consider the impact of industrialisation on the United States (sometimes known as the Second Industrial Revolution) and the uniquely American phenomena that have implications for workplace health and safety today.

3.

Industrial Revolution in the United States from 1793 until the early 20th Century

The beginning of the United States' Industrial Revolution is attributed to an English immigrant opening a textile mill in Rhode Island in 1793 (Weightman, 2007). Like in Britain, mass industrialisation and production followed, but in America, a labour shortage led to more union activity and a greater emphasis on productivity. This, in turn, led to studies of **management** and, more specifically, **scientific management**.

Learning Objectives

By the end of this chapter, we will have explored:

- The unique circumstances within the United States and how these influenced industrialisation in this new nation.
- The role of the American Civil War, and its anti-slavery movement, in generating a labour shortage which enabled worker collectives to

establish.

- The emergence of Taylorism, Scientific Management and Fordism as employer responses to managing worker productivity in the face of labour shortages and labor union movement strikes.

The European master-apprentice model transferred from Britain, via its colony, to America. By 1792, craft guilds, such as the Association of Shoemakers in Philadelphia, were already establish (Freeman, 2020). British craftspeople dominated the British labour market well into the British Industrial Revolution because their collective movements fought to protect skilled (trade or craft) worker rights (Walling, 1905). In America, the labour market transition was swifter and, for example, master craftsmen dominated Boston's labour market in 1790 but were considerably outnumbered by journeymen (unskilled day labourers) by 1815 (Tomlins, 1993).

Walling's (1905) explains that in the American context reduced demand for skilled workers was paired with an inflow of less skilled workers. The emphasis in America came to be on skilled and unskilled workers associating to collectively negotiate better conditions. While initially, displaced skilled craftspeople comprised the membership of worker collectives, by the middle of 1800s unions for everyone were forming in mining, railroads, and factories because "many workers saw the development of these kinds of unprecedented concentrations of wealth as threatening not just their employment situation but the very nature of American democracy" (Freeman, 2020, para. 6).

This said, similar to in Britain, there were also **paternalistic** employers who were innovative in their approaches towards workers, Lowell Mills (see Box 3.1) is one such example.

Box 3.1: Lowell Mills

In 1814, a mill opened in Massachusetts whose operation was to be based in the **Protestant work ethic**. Francis Cabot Lowell and his **Boston Associates** decided to overcome potential labour shortages by offering work to women. “For many of the mill girls, employment brought a sense of freedom. Unlike most young women of that era, they were free from parental authority, were able to earn their own money, and had broader educational opportunities” (Gilder Lehrman Institute, 2023, para. 3). Lowell insisted that, in addition to housing, the young women be provided with an education. However, it is also important to recognise that hiring an all-female workforce was good financial decision with their lower wages.



Figure 3.1: The Lowell Mill

Source: "Mills in Lowell, Massachusetts" by Timothy Dexter, Wikimedia Commons, CC BY-SA 3.0

When conditions changed in the 1830s, a drop in the price of textiles meant that the Lowell Mills sought to cut wages. The 'mill girls' successful went on strike against the decision and, as a result,

sustained their wage. They came to form the First Union of Working Women (American Federation of Labor, 2023). The Lowell Mill girls are also renowned for reducing their six day, 75 hour week, down to a ten-hour day (see Figure 3.2) as part of the ten-hour day movement (Nicholson, 2004).

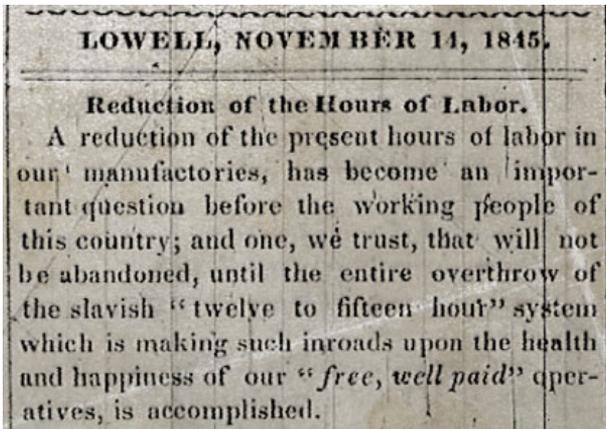


Figure 3.2: Lowell 'mill girls' lobby for a ten hour day

Source: Voice of Industry Project, Public Domain

To contextualise this, by 1835 **Boston Artisans** were lobbying against long work hours with **paternalist** employers (likely the **Boston Associates** who were also involved in the Lowell Mill). These skilled craftspeople fought for the ten-hour day by refuting arguments of **Protestant-ethic** employers that these workers would "spend all our hours of leisure in drunkenness and debauchery if the hours of labor are reduced" (cited in Irving & Schwaab, 1952, p. 342–343). Some success came

in 1840 when President Martin Van Buren, by executive order, “directed the observance of the ten-hour system for laborers and mechanics employed on the [federal] government’s public works” (Kelly, 1950). However, it took until 1847 for the first state legislated ten-hour day for non-government workers and this took place in the State of New Hampshire. The New Hampshire legislation, although not strictly enforced, demonstrates the influence of Lowell Mill girls on their geographical region and overall on the United States Labor Movement (American Federation of Labor, 2023). Interestingly, 1847 is when the British Ten Hours Act was introduced (Encyclopaedia Britannica, 2023).

Past influencing the present

Have you ever considered how the Industrial Revolution impacts on our lives today?

When a school bell rings, it seems normal and timeless that school students will collect their belongings and move on to their next class. However, many facets of modern life are, in fact, based on practices established by the Industrial Revolution. For example, using a school bell to signal a shift in activity or the start of a lunch break, is based on a *factory model* of education (Shaw, 2016, para. 1).

In response to the tight control of their working hours

(and lives) women of the Industrial Revolution wrote poems of protest, such as *The Factory Bell*, as “The bells woke the operatives up, called them into the mills; they rang at breakfast, called them back into the mills, again at lunch, at closing time, and finally at curfew” (Voice of Industry Project, 2012, para. 3).

The power of the collective in America was strengthened by a labour shortage induced by the emancipation of slavery. In 1803, as calls to emancipate slaves increased in the northern states:

The United States [federal government] abolished the international slave trade [importation of slaves], creating a labor shortage. Under these circumstances, the domestic slave trade increased as an estimate one million enslaved people were sent to the Deep South [southern states of the United States] to work in cotton, sugar and rice fields.” (Elliott & Hughes, 2019, para. 14)

The American Civil War (1861–1865), fought on abolishing slavery altogether (see Abraham Lincoln’s Emancipation Proclamation, Figure 1.8), stimulated manufacturing which then required more workers (Clinton, 2008) but concurrently removed males from the labour force, as they became soldiers (or even casualties), therefore reducing the available working population (Clinton, 2008). Increased taxes, taken by government to pay for the war, led to inflation which, in turn, encouraged workers to organise to increase their wages to protect their standard of living (Commons, 1918). The conclusion of the war then abruptly removed slave labour, leading to a complete restructuring of economies in the southern states (Ransom, 1989), which exacerbated the existing labour

shortage and would, post-war, empower the union movement. Notably these uniquely American conditions were quite a distinct from the British Industrial Revolution experiences given their rapidly growing British population had provided a ready source of workers thereby thwarting attempts by workers to collectively negotiate better wages and conditions.

Collective worker groups, even those devastated by the Civil War, rapidly reformed when subsequent peace-time industrialisation occurred. In 1865, William Sylvis had high ambitions for these newly formed collectives to combine into a national union so as to influence government laws on labour (Commons, 1918; Foner, 1947). As leader of the National Union of Iron Molders, he wrote to the Ship Caulker's union saying, "what we need is a Department of government attending exclusively to Labor matters, with its head in the president's Cabinet to speak for us" (cited in Lombardi, 1942, p. 19). Union lobbying for this cause appears to have been somewhat successful as, in 1867, Congress established the Committee on Education and Labor (Committee on Education and the Workforce, 2023). However, this committee had a wide gamut, ranging from addressing the emergence of industry, through to post Civil War developments, such as the establishment of an education system as a means to integrate former African American slaves into mainstream society, particularly for the employment *options* education could afford them (McKinney, 2013). When Sylvis headed the National Labor Union (1866–1873) he "placed its reliance primarily on legislative action" as opposed to the "economic coercion" of traditional labour unions (Lombardi, 1942, p. 17). When he died in 1869, however, the legislative approach discontinued as he'd been its driving force (Lombardi, 1942).

Despite their existence, **unions** were not formally endorsed and their economic coercion approach (strikes) led to a period of violent clashes between organised workers and those who sought to quell their ‘illegal’ activities. “Between 1875 and 1910, state militias – which is what today we would call the National Guard – were called out nearly 500 times to deal with labor unrest” (Freeman, 2020). In response, in 1883, the Committee on Education and Labor was specifically charged with addressing labour unrest across the country (McKinney, 2013). One outcome of that year’s sitting of the Committee was the establishment of the Bureau of Labor Statistics, and this was followed in 1888 by a Bureau of Labor (U.S. Bureau of Labor Statistics, 2023). Notably, neither of these entities reach Sylvis’ aspirations; they were not directly overseen by the U.S. President (Lombardi, 1942).

In the context of a labour shortage, and strengthening union activity, employer approaches to the ‘management of labour’ emerge—these are the origins of the modern discipline of **management**. As a “result of the rapid and chaotic growth of many organizations, it became clear that a more systematic approach to management was needed” Witzel (2011, p. 6–7). Henry Towne was an American engineer who, in 1886, wrote:

The organization of production labour must be directed and controlled by persons having not only good executive ability, and possessing the practical familiarity of a mechanic or engineer with the goods produced and the processed employed, but having also, and equally, a practical knowledge of how to observe, record, analyze and compare essential facts in relation to wages, supplies, expense accounts, and all else that enters into or affects the economy of production and the cost of the product. (Towne, 1986)

While echoing Adam Smith's assertion that efficiency could further unlock the economic potential of industrial production, this statement was designed to validate the role of industrial engineers in the 'management' of production workers and was a call to action, to which American engineer Frederick Taylor responded via his conceptualisation of **Scientific Management**.

Scientific Management may be defined as:

An approach to management, based on the theories of F.W. Taylor, dealing with the motivation to work. It sees it as a manager's duty to find out the best way to do a given job, by a process of work measurement, then give each worker individual instructions which have to be strictly followed. The individual is thus seen as the extension of his or her machine, and his or her rewards are also to be allocated mechanically, with more pay expected to produce more output regardless of any other factors. (Statt, 1999, p. 150)

It is the practical use of scientific methods, gained from the Scientific Revolution, to enhance production outcomes amidst the rapid changes derived from industrialisation.

Frederick Taylor read Henry Towne's 1886 article and, after garnering considerable workplace experience, presented his own perspective in 1895 focused on rewarding employees based on the work performed, rather than the hours worked. He justified his stance with scientific data derived from undertaking:

Time trials with a stopwatch, measuring how long it took workers to perform tasks, and set up a small department to record and analyse the results. By creating a run of data through these time studies, Taylor was able to arrive at optimum times for each task. (Witzel, 2011, p. 85)

Taylor felt paying workers for the work they achieved

was the fairest way to compensate their labour while maximising production.

However, unions had long advocated “A fair day’s wages for a fair day’s work”—a popular slogan used by worker collectives since philosopher Thomas Carlyle coined it in 1843 (Carlyle, 1843, p. 17). Taylor was arguing that what comprises a fair day’s work should be determined through Scientific Management as he felt that many unions deliberately had their members work slower on day pay rates (McKelvey, 1952, p. 15). Around the same time, public awareness on the conditions of workers was increasing due to the efforts of people such as sociologist Lewis Hines who, using a camera (see Figure 3.3), sought to capture the experiences of the working class, including the plight of child labourers, to create awareness among the general population on the human cost behind the increasingly affordable products they were purchasing (Sutherland, 2012).



Figure 3.3: Spinners and doffers in Mollahan Mills, Newberry, South Carolina,

December 1908

Source: "Spinners and doffers in Mollahan Mills. Many others as small. Newberry, S.C." by Lewis Hine, Wikimedia Commons, Public Domain

While Taylor's pay-per-piece did incentivise the worker to produce more (Thompson, 1913), unions continued to raise concerns about the injuries to workers caused by fast, repetitive, work. At the 1911 American Federation of Labor convention, their President Samuel Gompers stated, "organized labor would always be hostile...to any system which ruined the worker's health and lowered wages by substituting unskilled for skilled operatives" (McKelvey, 1952, p. 17). However, Taylor's approach to timing staff, and paying the most efficient workers more, was popular with business owners and production supervisors as it provided a credible and logical response to collective (union) pay claims—you get paid for what you do—but, from this point, The International Association of Machinists and the American Federation of Labour became "implacable enemies of Scientific Management" (Nelson, 1992, p. 9)—more money per piece did not redress their concerns.

In fairness to Taylor, it is important to note that his perspective was influenced by the **Protestant ethic**, "the value attached to hard work, thrift, and efficiency in one's worldly calling, which, especially in the Calvinist view, were deemed signs of an individuals' election, or eternal salvation" (Encyclopaedia Britannica, 2020, para. 1). In the current day, it is difficult to understand Taylor's view on work as 'Godly' and that his desire to ensure employees worked to their fullest capacity was linked to everyone receiving a righteous reward in Heaven. Indeed, timing worker outputs in today's world, with greater awareness

of the risks of repetitive work under pressure, seems inappropriate but Taylor saw it as a noble pursuit:

The principle objective of management should be to secure the maximum prosperity for the employer, coupled with the maximum prosperity for the employe [sic]...throughout the industrial world, a large part of the organisations for employers, as well as for employes [sic], is for war rather than peace, and that perhaps the majority on either side do not believe it is possible so to arrange their mutual relations so that their interests become identical. (Taylor, 1911, p. 9–10)

Essentially, maximum prosperity was associated with maximum efficiency, and this was a Godly pursuit that Unitarists (**unitarism**) such as Taylor believed, this should not be interfered with by unions (Boddwyn 1961). Taylor's work culminated in 1911 with the publication of his book *The Principles of Scientific Management* (Taylor, 1911).

Given he was credible, with experience designing machinery and in industrial supervisory roles, "Taylor's imagery evoked an enthusiastic response from engineers and factory managers and from a larger group whose interested extended to virtually every institution" (Nelson, 1992, p. 6). He certainly appears to have influenced Henry Ford (b. 1863, d. 1947), of the Ford Motor Company, as Ford used time and motion studies to reduce the complexity of making a car into many steps that could take advantage of the efficiency of the **division of labour** (Hounshell, 1988). Subsequently, in 1913, Ford became known for revolutionising manufacturing by innovating assembly line production – with work being brought to the worker rather than the worker going to the object being built. The assembly line, together with the overall division

of labour, significantly reduced the cost of the cars Ford was producing and made these a widely available consumer item (Ford Motor Company, 2020). However, Nyland asserts that an important point of difference between Taylor and Ford exists; Ford actively de-skilled workers as a wage reducing mechanism, whereas Taylor sought worker efficiency (Nyland, 1998).

As its implementation evolved, **Scientific Management** and **Fordism** (as Henry Ford's manufacturing system came to be known) was not without its critics because of the expectations it placed on workers. The fast and repetitive nature of work at the Ford Motor Company initially led to high worker turnover because "workers found the assembly line work boring as they were now doing only one or two task(s)...workers did not like the strict timing that the moving assembly line required" (Ford Motor Company, 2020, para. 3). To address this, Ford increased his wages to double the average wage (\$5 an hour) which made the pace more attractive to existing workers and incentivised others to seek work at Ford Motor Company; this provided Ford with a constant source of replacement labour (Ford Motor Company, 2020). This 1914 wage increase was designed to ensure unions could not establish themselves in Ford's premises and to ensure the cost of human capital would not keep going up indefinitely (Cwiek, 2014). The division of labour, established early in the British Industrial Revolution, enabled Ford to exert considerable control over his workers as anyone could do the unskilled work required on the Ford production line. Box 3.2 contains a video outlining relationship between Taylor's Scientific Management and Henry Ford's development of the assembly line.

Box 3.2: Taylor and Ford: Scientific Management and the assembly line.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=329#oembed-2>

Source: "Ford and Taylor Scientific Management (Edited)", Ryngoksu, YouTube

So why this push for **productivity**? To Taylor it was ‘Godly’, to Marx (see Box 2.3) it was profit driven with employers cashing in on the gap between the cost and value of labour, and, for others, it was simply because of the labour shortage. One ‘solution’ to the labour-shortage issue was to introduce immigration, President Lincoln endorsed this strongly in his third address to Congress in 1863:

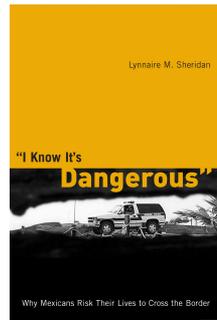
I again submit to your consideration the expediency of establishing a system for the encouragement of immigration...there is still a great deficiency of laborers in every field of industry, especially in agriculture and in our mines, as well of iron and coal as of the precious metals. (Lincoln, 1863, para. 18)

He was successful in his lobbying. The Immigration Act of 1864 established a Commissioner of Immigration to facilitate employment-centric immigration (Migration Policy Institute, 2013). The resulting migrants were welcomed until the 1880s when anti-immigrant sentiments began to emerge, one example being the Alien Contract Labor Law of 1885 whereby employers could not contract foreign labour (U.S. Citizenship and Immigration Services, 2020), however overall immigration from Southern Europe continued in large numbers until World War I (Wittke, 1949). This very briefly contextualises what would come to form the United States' historical narratives around being built on migrants and, by working hard, these migrants too would be able to achieve economic prosperity offered by the **American Dream**, "a better, richer, and happier life for all our citizens of every rank" (Adams, 1931, Preface, para. 2).

Mexican Labour in the United States

Mexicans have a long labour history in the United States, however, this is not discussed here. If you are interested to find out more about Mexican workers and immigrants, you may be interested in reading my previous publication.

Lynnaire Sheridan (2009), *"I Know Its Dangerous" Why Mexicans risk their lives to cross the border*, University of Arizona Press.



However, the reality for these migrants was harsh working conditions with few safety provisions. The New York

Triangle Shirtwaist Factory fire in 1911 impacted mainly recent Italian and Jewish migrant women with 123 women/girls and 23 men dying when exits were blocked in order to prevent workers taking unauthorised breaks (Trasciatti, 2022). Public pressure led to the establishment of a State of New York Factory Investigating Commission which heard reports from field agents, and directly from a variety of related stakeholders, including workers about conditions in manufacturing (Golding, 1989). Resulting from this investigation, in 1913 a federal Department of Labor was established “to foster, promote and develop the welfare of working people, to improve their working conditions and to enhance their opportunities for profitable employment” (MacLaury, 1988, para. 2, citing the legislation). Finally, Sylvis’ aspirations for a Department of Labor that would truly represent the voice of the worker directly to the President were realised (Lombardi, 1942).

Box 3.3: “Can’t Take No More”, excerpt from the 1979 film produced by the Occupational Safety and Health Administration (OSHA).

This video provides a good overall summary of the interwoven origins of labour rights, unions and workplace health and safety in the United States, as resulting from their industrialisation.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=329#oembed-1>

Source: "Workplace Health and Safety History, to the 1920s", markdcaitlin, YouTube

The industrialisation of the United States saw craftsmen displaced by low-skilled workers, but the unique conditions, including a labour shortage, resulted in quite different outcomes than in Britain. From its beginnings, the United States had a culture of worker collectives (such as the Lowell Mill girls), which tended to adopt economic coercion methods to achieving labour rights (such as strikes) more than the political approaches seen in Britain with the establishment of the Fabian Society and, subsequently, the British Labour Party. A number of factors, including the tight labour market, then led to employers seeking the maximum productivity from the few workers they had; this became the impetus for Taylorism. **Scientific Management** then emerged as America's response to 'managing' the rapid change that industrialisation brought and making the best 'use' of the interaction between workers and machines.

Past Influencing the present

The cost savings achieved by replacing craftsmen with unskilled labourers benefited those producing the goods, but also the consumers. The Industrial Revolution sowed the seed for a growing middle class who could aspire to own products they had never previously imagined possible. Henry Ford, for example, reduced his cost of labour and increased his efficiencies through adopting a moving assembly line to make cars that were affordable to middle class Americans (see Figure 3.4).

these items are manufactured there is still child labour, long hours, low wages and threats to everyday health (Min et al., 2019). So, while we live the legacies of the Industrial Revolution in our daily lives through school bells in our educational system, others are still more immediately impacted on a daily basis by realities of industrialisation in their countries today. A photograph of a Pakistani child removing dust from a cotton production machine (see Figure 3.5), is uncannily similar to images by Lewis Hines of children working in the American cotton mills in 1916 (see Figure 3.6).



Figure 3.5: A Pakistani child worker, photograph taken January 2016

Source: "Cotton and textile industry, Tirupur," © International Labour Organization, used with permission



Figure 3.6: American Linen Co. spinning room cleaner, photograph taken June 1916

Source: "American Linen Co. Cleaner—Spinning room. Location: Fall River, Massachusetts" by Lewis Hine, Library of Congress, Public Domain

This section of the book, *History: Exploring the origins of labour rights and worker safety*, was designed to highlight the historical origins of modern day perspectives on Work Health and Safety by seeing how the development of the concept of 'labour' has evolved into domains: labour (employment) relations, the union movement and workplace health and safety. Worker entitlements, worker safety and the right to collective representation of workers

to employers, exist in contemporary NZ and Australian legislation as longer-term consequences of the British and American industrial revolutions. It is a period in history that fundamentally shaped our current perspective. Having now established key links between the past and the present, the following section will specifically focus on workplace health and safety from the perspective of HR managers.

II

Theory: A systems approach to work health and safety management

This section defines key concepts for work health and safety (WHS) management. It explains James Reason's Swiss Cheese Model of safety incident causation as a **systems-based** approach to WHS management; a model proposing that it is the combining of **active failures** (human errors) and **latent conditions** that lead to the WHS **incidents** that harm workers. Subsequently, safety management systems are proposed as a mechanism to identify, and actively resolve latent factors, before introducing safety culture as fundamental to effective WHS management.

4.

What is work health and safety?

Understanding how to achieve effective work health and safety (WHS) management is complex. Also, when we start to think about WHS, it could mean many different things to different people. This chapter is designed to help you understand some key concepts in WHS by exploring some of its complexities and defining important terms. This will set you up to explore theories that try to explain why certain approaches are useful, while others lead to serious injuries for workers.

Learning Objectives

This chapter introduces:

- Key work health and safety (WHS) concepts and definitions.
- The purpose of, and motivations behind, undertaking WHS management.
- The concepts of incident versus accident to define human resource (HR) manager boundaries for their 'duty of care' when engaged in WHS.

Defining WHS

What is WHS management? In it's simplest sense, WHS management comprises the actions employers undertake to ensure a safe workplace for workers.



Figure 4.1: Workplace health and safety terminology

Source: Lynnaire Sheridan, CC BY-SA 4.0

There is a lot of technical terminology involved in WHS management (see Figure 4.1); let's cover the basics. The World Health Organization defines work (occupational) health and safety as “all aspects of health and safety in the

workplace...[with a] strong focus on primary prevention of hazards” (World Health Organization, n.d., para. 1) where, health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (World Health Organization, 1946, p. 1). What then is a hazard? A hazard may be defined as “anything with the potential to harm life, health or property” (Dunn, 2012, p. 53).

WHS management is then any action taken by responsible parties to ensure a healthy and safe workplace. This means protecting the people, plant, and environment from hazards that potentially could cause harm. In simple terms, it can be considered to be the approaches, processes, tools and techniques used by organisations to keep their workers safe so they can achieve their work. Notably, taking into account the World Health Organizations definition of ‘health’, WHS is not just preventing illness or injury, but proactively helping workers to be, and stay, well.

What then does ‘safety’ mean in this WHS management context? Safety is a “state in which the risk of harm (to persons) or damage is limited to an acceptable level” where risk is defined as the “likelihood and consequence of injury or harm occurring” (Standards Australia & Standards New Zealand, 2001, p. 5). This means that an employer is only expected to manage health and safety to an ‘acceptable level’ of risk for injury or harm to occur to their workers—that which is **reasonably practicable** or “reasonably able to be done” (Safe Work Australia, 2023, part 18).

While WHS has traditionally been about health and safety in a ‘workplace’, the notion of ‘workplace’ is changing and evolving over time. To address this, the focus and responsibility is placed on a **PCBU**, a person

conducting a business or undertaking (NZ Parliament, 2015; Safe Work Australia, 2023). WorkSafe New Zealand explains, “a PCBU may be an individual person or an organisation. This does not include workers or officers of PCBUs, volunteer associations, or home occupiers that employ or engage a tradesperson to carry out residential work” (WorkSafe, 2019, p. 4). This shift towards PCBUs being responsible for workers, rather than a workplace, means PCBUs are responsible for managing worker health and safety wherever workers are engaged in work.

Who then is a ‘worker’? A worker is a person undertaking **work** for a PCBU (Safe Work Australia, 2023). Notably, a worker does not have to be an employee—contractors, sub-contractors, interns and, in certain situations, volunteers are all considered workers (NZ Parliament, 2015; Safe Work Australia, 2023).

Note: While notionally the same, there are some nuanced differences between Australia and New Zealand legislated definitions of a worker so it is important to follow the legislation that applies in your **jurisdiction**.

In summary, WHS management is designed to keep workers (people who undertake **work** for a **PCBU**) in good **health** (not just unharmed) and **safe** (to an acceptable, **reasonably practicable**, level) from any foreseeable **hazards** that could present as they undertake their work. However, what should a PCBU actually manage?

Managing WHS

What WHS management comprises for a PCBU, in any given context, is determined by the **legislation** that applies in that **jurisdiction**, the existence or adequacy of **WHS**

regulators and, very importantly, the attitude of the organisation and its people towards WHS (**safety culture**).

Managing worker health

In most legal contexts, PCBU WHS responsibilities extend to occupational diseases (health) and workplace incidents (safety). Let's start with occupational disease which is "any illness associated with a particular occupation or industry. Such diseases result from a variety of biological, chemical, physical, and psychological factor that are present in the work environment or are otherwise encountered in the course of employment" (Kazantzis, 2022, para. 1). From a WHS perspective, these diseases are preventable through the control of employee exposure to the hazards that cause disease (Kazantzis, 2022).

While some **occupational disease** can occur through immediate exposure, detection of most occupational disease is done via **occupational epidemiology** which is the investigation of the occurrence of disease and clusters of impacted people having their exposure linked back to specific workplaces or industries (Merletti et al., 2014). It can take many years to identify the hazard associated with an illness, given it requires accumulated exposure over time before it presents as disease in a worker. For example, asbestos was first industrially manufactured in the 1880s with the first recorded case of asbestosis disease being documented in 1906. Many deaths subsequently occurred before, in the 1970s, there was enough epidemiological evidence to conclude that asbestos was a carcinogen (cancer causing) and that those working with asbestos were at most risk (Lemen et al., 1980). The need for long-term, epidemiological evidence, means that occupational disease identification is often beyond what is **reasonably**

practicable for an individual HR practitioner or their organisation; to identify and control these hazards requires collaboration between **public health** agencies, **WHS regulators** and specialists in occupational health (Ahrens et al., 2014). The United State’s Centers for Disease Control and Prevention (CDC), “the nation’s leading science-based, data-driven, service organization that protects the public’s health” (CDC, 2023a, para 1.), is a public health entity that incorporates worker health in its remit. The CDC’s National Institute for Occupational Safety and Health (NIOSH) operates through partnerships with employers to enhance worker health outcomes (CDC, 2023b).

Past influencing the present

Occupational health, as a specialisation within WHS, has its modern-day origins in the **Industrial Revolution**. In Chapter 2, we saw that Dr Thomas Percival identified the crucial link between the congested, unsanitary, conditions at a cotton mill and the outbreak of malignant fever (Meikeljohn, 1958) which, in turn, led Sir Robert Peel to introducing Britain’s first WHS legislation, the Health and Morals of Apprentices Act of 1802 (UK Parliament, n.d.).

Occupational health had its modest beginnings in first aid and disease controls for high risk heavy industry workplaces, such as mines. It gained greater recognition in the 1970s when the World Health Organization acknowledged its contribution to the identification of workplace-derived factors causing occupational illness, suggesting its remit be broadened to encompass public health. As such, many occupational health specialists now

have more of a public health, rather than ‘occupational’, focus (Schilling, 1989).



Figure 4.2: Occupational nurse, Sharnice Johnson, checks a patient's vital signs.

Source: "Naval Branch Health Clinic Albany occupational health 210525-N-QA097-201" by Navy Medicine, Flickr.com, Public Domain

Schilling (1989) notes that historical WHS occupational health challenges are simply repeating themselves today in **developing economy** contexts:

The health problems arising from industrial progress in developing countries today are, in many aspects, similar to those during industrialization in the nineteenth century; these countries also have to face major threats from endemic

disease and generalized poverty. Weakly organized labour with a large work force available places little pressure on employers to provide anything more than wages and basic services. (Schilling, 1989, p. 4)

If you have ever had a workplace medical examination, or you schedule these regularly for your employees, these are likely part of a health monitoring initiative designed to identify any early-onset symptoms of occupational disease but may also be seeking to identify repetitive strain injuries (WorkSafe, 2022). In this aspect of occupational health, you would be likely to work with ergonomists, “someone who studies the design of furniture or equipment and the way this affects people’s ability to work effectively” (Cambridge Dictionary, 2023a, para. 1), to ensure office set up avoids the poor posture or unnecessary movements leading to strain injuries. However, if someone incurs a workplace illness or strain injury, or you wish to employ someone already living with a **disability**, you will likely collaborate with an occupational therapist who will make **reasonable adjustments**:

The concept of reasonable adjustments reflects the understanding that a worker with an injury, ill health or disability can often perform tasks if adjustments are made to accommodate the effects of their injury, ill health or disability. The aim of any reasonable adjustment is to minimise the impact of the injury, health problem or disability to enable the worker to fully take part in work-related programs and effectively undertake the inherent requirements of their job. (ComCare, 2013, para. 1)

Where an illness or injury is temporary, **return to work**

plans will be designed with occupational therapists to enable the worker to return to work in a reduced or different capacity that, over time, ideally will see them return to good health and their full original work role (Canadian Centre for Occupational Health and Safety, 2022). Reasonable adjustment is also important when employing a person already living with a disability:

Reasonable adjustments are changes an employer makes to remove or reduce a disadvantage related to someone's disability. For example: making changes to the workplace, changing someone's working arrangements, finding a different way to do something, providing equipment, services or support. Reasonable adjustments are specific to an individual person. They can cover any area of work. (Advisory, Conciliation and Arbitration Service, 2022, para. 1)

Considerations for this cohort of workers is often also addressed in **legislation** relating to disability **discrimination** (Mason, 2017).

As you can see, occupational injury tends to involve HR managers more than occupational disease control. Often it is these WHS practitioners who become embedded, or at least quite closely affiliated, with HR departments within organisations. The following *Contemporary WHS challenge* explores how HR and occupational therapists can collaborate together to address the transition to retirement for workers who experience the emergence of dementia symptoms in the workplace.

Contemporary WHS Challenges: Dementia in the workplace

What is dementia? According to the World Health Organization, “dementia is a term for several diseases that affect memory, thinking, and the ability to perform daily activities” (n.d., para. 2). The occurrence of dementia increases with age (Dementia Australia, 2022). Workforce participation by Older Australians (65+ years) has doubled from 6.1% in 2001 to 15% in 2021 (Australian Institute of Health and Welfare, 2023). The aging of the Australian workforce increases the likelihood that some employees will have dementia. However, as Alzheimers New Zealand points out, “although dementia tends to affect older people, for younger people with dementia or those who choose to stay in the workforce at older ages, dementia can affect their capacity to work” (Alzheimers New Zealand, 2017, p. 45). So, no matter the age of the worker, if they have dementia it will impact on their work performance.



Figure 4.3: In a multi-generational workplace, you might be surprised which worker is living with dementia.

Source: "Business people" by Direct Media, StockSnap, CCO

The challenge with dementia in a workplace is that it generates risks, particularly when the worker is expected to undertake a highly skilled role such as driving (Andrew et al., 2015) but, at the same time, it can present to a manager simply as poor **work performance** (Andrew et al., 2018). When identified and managed effectively by an **occupational therapist**, people with dementia can continue to work and generate great outcomes for the business while having their own lives positively enhanced through the financial and social benefits that work generates (Andrew et al., 2018). Finally, when it is time for a person with dementia to finish up at work, it can be incredibly beneficial that they have access to a **medical retirement**, compared to being managed out of an organisation via a **disciplinary processes**, as medical retirement can enable access to critical retirement savings at the very time they need and can enjoy these funds (Ministry for Business, Innovation and Employment, n.d.). Quite simply, as New Zealand's Ministry for Business, Innovation and Employment explains, "medical retirement allows an employee to leave an organisation with dignity" (Ministry for Business, Innovation and Employment, n.d., para. 21).

Box 4.1: Catherine Andrew *Dementia Research*

In the following video, Catherine Andrew discusses the important role that WHS (and HR) staff should play to ensure that organisational **performance management** processes and disciplinary procedures capture all potential causes of performance decline in employees and to ensure that illnesses, such as dementia, are managed according to WHS **legislation**, and not **employment relations** policy.



*One or more interactive elements
has been excluded from this version
of the text. You can view them online*

*here: [https://oercollective.caul.edu.au/
conceptual-guide-whs-hr-managers-nz-
au/?p=2015#oembed-1](https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=2015#oembed-1)*

*Source: Sheridan, L. (Producer). (2016). Dementia concepts
for business curricula. Learning, Teaching and Curriculum,
University of Wollongong, Australia. YouTube*

Reflect:

Imagine you're an HR professional and one of your organisation's managers approaches you about a clear case of performance decline in a middle-aged, long-term, employee. *How would you determine if this issue should be managed in accordance*

with employment relations or WHS legislation and policy?

Interested to find out more? In the following video Catherine Andrew explains dementia before providing insights and models derived from her research into dementia in the workplace and management of the transition to retirement.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=2015#oembed-2>

Source: "Dementia Symptoms While in Paid Employment" by Catherine Andrew for the Work Wellness Institute, YouTube

Further reading:

Andrew C., Phillipson, L. & Sheridan, L. (2018). What is the impact of dementia on occupational competence, occupational participation and occupational identity for people who experience onset of symptoms while in paid employment? A scoping review. *Australian Occupational Therapy* 66(2), 130–144.

Evans, D., Murray, C., Berndt, A., & Robertson, J. (2021). Supporting people with dementia in employment. In D. Evans, L.-F. Low, & K. Laver (Eds.), *Dementia Rehabilitation: Evidence-based interventions and clinical recommendations* (pp. 149 – 170). London, United Kingdom: Academic Press.

Managing worker safety

Prevention of workplace incidents of any scale is a strong focus of day-to-day WHS management in organisations. In the WHS context, “an incident is an unplanned event or chain of events that results in losses such as fatalities or injuries, damage to assets, equipment, the environment, business performance or company reputation” (Wolters Kluwer, n.d., para. 1). It is important to distinguish an incident from an accident which is defined as “something bad that happens that is not expected or intended and that often damages something or injures someone” (Cambridge Dictionary, 2023b, para. 1) or “something that happens by chance or without expectation; an event that is without apparent or deliberate” (Oxford English Dictionary, n.d., para. 6). Both appear very similar, but what distinguishes them is that, under the law, accidents are considered Acts of God: “The operation of uncontrollable natural forces, an instance or result of such forces, frequently in the context of insurance” (Oxford Dictionary, n.d., para. 3)—they are uncontrollable—whereas incidents, with effective WHS management, are considered potentially controllable (and therefore potentially makes

organisations legally liable for **negligence** for poor WHS practice).

Box 4.2: Video 1, An introduction to work health and safety management

The following video is a useful summary and further contextualisation of this discussion around key definitions in WHS management.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=2015#oembed-3>

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator). (2019). Video 1: An introduction to work health and safety management.

Preston, A. (audio engineer); Orvad, A., (artist) and Franks, R., (animator), Learning, Teaching and Curriculum. University of Wollongong, Australia. YouTube

Now technically understanding what comprises WHS management, it is useful to understand how different organisations, and even regions of the world, approach it.

Differing perspectives on WHS and its management

As mentioned earlier, the World Health Organization defines work (occupational) health and safety as “all aspects of health and safety in the workplace and has a strong focus on primary prevention of hazards” (World Health Organization, n.d., para. 1). So, at the organisational level, why might one organisation be very proactive about WHS, to the extent of doing worker wellbeing activities, and another may only do the minimum or try to avoid any focus on worker safety? Some factors to consider might be:

- Size – the number of employees and/or financial capacity.
- Danger – some jobs might be physically or psychologically more dangerous than others. So some businesses – just to get the job done – may need a stronger safety focus than others.
- Legislation – different parts of the world have different laws, so WHS requirements might be different.

As such, there may be some scenarios where an employer could get the job done more cheaply without safe work practices (perhaps in **developing economies** without legislation and with many available workers; a similar situation to Britain during the **Industrial Revolution** in Chapter 2), alternatively, in a **knowledge economy** (where employees are valued for thoughts and ideas) an employer might want to support **wellbeing** as they require relaxed

and thriving employees to achieve the company's aims. Every situation, and response to WHS, will be different depending on historical and contemporary contexts.



Figure 4.3: Workers without safety equipment patching the roads in Metro Manila, Philippines.

Source: "Dangeous jobs" by Wayne S. Grazio, Flickr.com, CC BY-NC-ND 2.0

Likewise, employees come to work with different attitudes towards health and safety. Together employer and employee values—the attitudes and beliefs towards WHS—will either prioritise or deprioritise it in a particular business. Values and goals are a combination of **top-down**, employer, values but also **bottom-up**, worker, behaviours. Hopkins & Palser (1987) suggest that organisations and their workers either **blame-the-victim**, and believe that the worker causes the situation and/or injury, or **blame-the-system**, and believe that the situation and/or injury occurred because of a series of workplace errors. Every decision from then on is based on which of

these two approaches an organisational has towards WHS management and, subsequently, creates a proactive or reactive **safety culture**. We will address the concept of safety culture in more depth in Chapter 6.

Box 4.3: Video 2, An introduction to work health and safety management

The following video discusses the differing worker and employer perspectives on WHS.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=2015#oembed-4>

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator). (2019). Video 2: An introduction to work health and safety management.

Preston, A. (audio engineer); Orvad, A., (artist) and Franks, R., (animator), Learning, Teaching and Curriculum. University of Wollongong, Australia. YouTube

Take this ten question quick quiz to review your understanding of key concepts introduced throughout Chapter 4 and see how your learning is progressing.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=2015#h5p-3>

WHS management is not applied consistently between organisations or in different regions of the world. Organisational and worker values will prioritise or de-prioritise safety management. This is because there are different philosophical perspectives towards WHS management. At this point you may be asking yourself, as an HR manager, how can I possibly manage WHS in my organisation? In the next chapter you will be introduced to conceptual models, together with practical know-how, that will help you prepare to embark on safety management.

5.

The Swiss Cheese model of safety incident causation

In the previous chapter, we learned that **PCBUs** are responsible for the health and safety of workers, wherever they undertake this work. **Occupational health** was identified as a specialist field requiring PCBUs to stay engaged with **public health, WHS regulators**, and to hire occupational health expertise as needed, ranging from consulting **ergonomists** through to **occupational therapists**. We also learned the difference between **accidents**, which we cannot control, and **incidents** which we, as HR managers involved in WHS management, seek to control to a **reasonably practicable** level. This chapter will specifically focus on incidents and their potential prevention through adopting James Reason's theoretical **Swiss Cheese Model** of safety incident causation.

Learning Objectives

This chapter introduces:

- The characteristics of large-scale WHS incidents and the lessons learned.

- James Reason’s Swiss Cheese Model of safety incident causation.

A WHS incident is “an unplanned event or chain of events that results in losses such as fatalities or injuries” (Wolters Kluwer, n.d., para. 1), however, incidents (lost time injuries/disease events) are only one of three types of potential WHS events:

- Lost time injuries/diseases: Those occurrences that resulted in a fatality, permanent disability or time lost from work of one day/shift or more.
- Injuries without lost time: Those occurrences that were not lost time injuries and for which first aid and/or medical treatment was administered.
- Near-misses: Unplanned incidents that occurred at the workplace that, although not resulting in any injury or disease, had the potential to do so.(Archer et al., 2015, p. 86)

Injuries without lost time and near misses, as we will learn across this chapter, can be useful indicators of the functionality and effectiveness of WHS management in your business.

Notably, most WHS theory has emerged from in-depth analysis of large-scale WHS incidents. These critical incidents may be defined as a “sudden, unexpected and overwhelming event, that is out of the range of expected experiences” (UNHCR, 2019, para. 1); these are low probability–high risk events that unfold rapidly across a specific point of time (Reason, 1997a).

James Reason is a preeminent WHS scholar who has

examined the role of human factors in large-scale WHS incidents. He noted that most WHS managers were focused on human errors, the “errors and violations committed at the ‘sharp-end’ of the system...likely to have a direct impact on the safety of the system and, because of the immediacy of their adverse effects, these acts are termed active failures” (Reason, 1997a, p. 10). Reason, and other scholars such as Hopkins & Palser (1987) and Hudson (2007), identified that critical incidents were never just one person’s fault, there were different issues in and around organisations that affected the people involved and led to the incident. Reason wanted to prove that we really should not **blame-the-victim** for **system** failures.

Reason then observed that every workplace has hazards, but they are not injuring workers all the time or at the same rate – some organisations have catastrophes while others have low rates of injury even when workers are doing the very same job with exposure to the same hazards.

Reason concluded that it depends on the effectiveness of the organisation to identify the **hazard**, assess its **risk**—the actual potential for injury to occur to a worker—and undertake measures to reduce the risk to the workers through **hazard control** (Reason, 1997a). This led him to him conceptualising the Swiss Cheese Model of safety incident causation to explain this phenomenon (Figure 5.1).

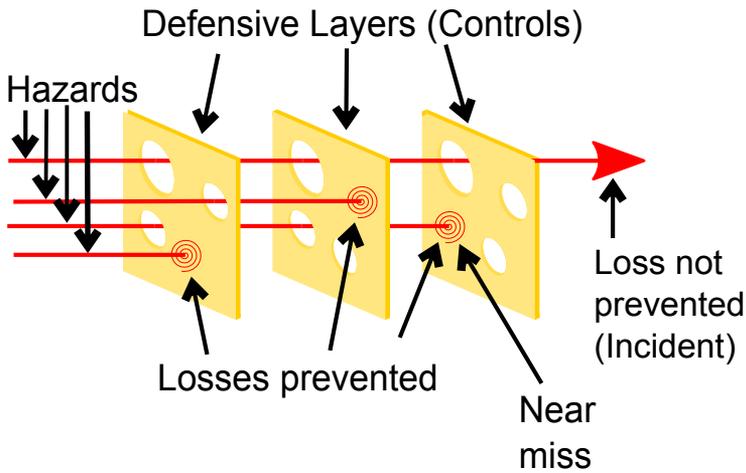


Figure 5.1: Swiss Cheese Model of safety incident causation (after Reason, 1997a)

Source: "Swiss Cheese Model" by Ben Aveling, Wikimedia Commons, CC BY-SA 4.0

Reason proposes that safety in a workplace may be conceptualised as a block of cheese comprised of slices that act as layers of defence against hazards. Given the internal and external factors putting pressure on organisations and their workers, weaknesses will develop in these defence layers. These weaknesses, 'holes', are not always predictable or static; they pop up when safety issues arise and disappear when safety issues are resolved. Weaknesses can occur in different defence layers, within different parts of the organisation. As such, Reason argues, work safety looks more like Swiss cheese (Reason, 1997a).

In the model, we can visualise a hazard as an arrow. If the arrow is able to pass through holes in all the safety defence layers, an incident occurs leading to worker injury or harm. Essentially, when multiple layers of safety defences are weak, there are more holes in the cheese

and a greater probability that the hazard arrow can shoot straight through to cause more incidents (Reason, 2000). In contrast, a **near miss**, “an event that could have potentially resulted in...losses, but the chain of events stopped in time to prevent this” (Wolters Kluwer, n.d., para. 1), is when at least one of the safety defence layers stops the hazard passing through, therefore preventing the hazard from having contact with worker or at least minimising the harm. Ideally, as depicted in Figure 5.1, most hazards would be stopped and losses prevented.

Returning to consider Archer’s definition of **WHS events** (Archer et al., 2015), injuries without lost time and near misses can then be re-conceptualised as **key performance indicators** (KPIs) measuring the effectiveness of an organisation’s safety defence system. Reason’s Swiss Cheese Model infers that the more incidents you have, the weaker your safety defences, and that the more near misses you have, the greater the likelihood of an incident occurring, unless interventions are adopted to strengthen the safety defences (Reason, 1997a). Measuring WHS events, even the low impact ones, then becomes useful to effectively managing WHS (National Safety Council, 2013). Notably, organisations striving for good safety management would try to repair the holes in the Swiss cheese as promptly as possible to minimise the probability of all the holes lining up and the hazard arrow shooting through.

What comprises the defence layers? Reason (1997a, p. 7) states that the defences in the model are designed to:

- create *understanding* and *awareness* of the local hazards
- give clear *guidance* on how to operate safely
- provide *alarms* and *warnings* when danger is

imminent

- *restore* the system to a safe state in an off-normal situation
- *interpose* safety barriers between the hazards and the potential losses
- *contain* and *eliminate* the hazards should they escape this barrier
- provide the means of *escape* and *rescue* should hazard containment fail.

Clearly this model is based on a **blame-the-system**, rather than a **blame-the-victim**, approach as the defence layers are comprised of more than solely addressing the errors made by individual workers.

A key assumption of the Swiss Cheese Model of safety incident causation is that:

Fallibility is an inescapable part of the human condition, it is now recognized that people working in complex systems make errors or violate procedures for reasons that generally go beyond the scope of individual psychology....poor design, gaps in supervision, undetected manufacturing defects or maintenance failures, unworkable procedures, clumsy automation, shortfalls in training, less than adequate tools and equipment...may be present for many years before they combine with local circumstances and active failures to penetrate the system's many layers of defences. (Reason, 1997, p. 10)

Workers are not to blame, according to Reason, because it is the latent conditions that fail to protect workers and lead to incidents.

So perhaps we could consider managing **active failures**, the human errors, as only one layer of safety defences—a people layer—whereas the majority of safety defence

layers may seek to uncover and resolve the **latent conditions**, issues that otherwise would lay dormant in the system until the active error occurs. If we reconsider Reason's (1997) latent conditions, these might cluster around engineering (poor design, clumsy automation, less than adequate tools and equipment), procedural (gaps in supervision, unworkable procedures) and administrative (shortfalls in training). For our purposes, in an HR context, we might reconfigure these to think about an organisation's internal systems as potential overarching safety defence layers:

- **A people layer** – safety focused workers with relevant values, behaviours and safe decision making (we will discuss **safety culture** in Chapter 6).
- **An engineering layer** – with alarms, physical barriers and automatic shutdowns.
- **A procedural layer** – with instructions on safe work practices.
- **An administrative layer** – ensuring people are hired with the right skills and provided the right training to perform tasks safely and are also, for example, given a safe work uniform.

Avoiding human error then only corresponds to only one layer of safety defences because, as Reason observed via his investigations of large-scale WHS disasters, you cannot **blame-the-victim** and achieve better organisational safety outcomes (Reason, 1997a). His Swiss Cheese Model illustrates that when there are weaknesses (latent conditions) in the safety defences layers (such as the engineering, procedural and administrative systems within

an organisation) and these converge with human error, an **incident** will occur. Taking this view means that the Swiss Cheese Model of safety incident causation can see that it can be used two different ways:

- After an incident has occurred to help understand what went wrong, to learn from mistakes and improve the health and safety defences.
- Before an incident occurs to help us identify any weaknesses in our safety defences, to intervene and fix these before an incident occurs.

For example, we can now understand the preceding discussions of occupational health (Chapter 4)—particularly health monitoring—as being situated in the people safety defence layer and striving to reduce the risk of human errors (active failures), but clearly there are many other safety imperatives in our organisations that require a **blame-the-system** philosophy in order to manage them.

Box 5.1: Video 3, An introduction to work health and safety management

The following video reviews and conceptualises James Reason’s Swiss Cheese Model of safety incident causation.



One or more interactive elements has been excluded from this version of the text. You can view them online here:
<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=79#oembed-1>

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator). (2019). Video 3: An introduction to work health and safety management.

Preston, A. (audio engineer); Orvad, A., (artist) and Franks, R., (animator), Learning, Teaching and Curriculum. University of Wollongong, Australia. YouTube

Activity 5.1

Take this five question quick quiz to review your understanding of key concepts introduced throughout Chapter 5 and see how your learning is progressing.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=79#h5p-4>

When used proactively, the Swiss Cheese Model presents opportunities to examine the unique **latent conditions** that exist within our workplaces that, if we simply **blamed the victim**, we would not be able to identify, learn from and address in order to reduce the risk of hazards inflicting harm on workers. The following *Contemporary WHS challenge*, considers a culture of care leading to aged care staff incurring injuries. This was only discoverable by adopting a **blame-the-system** approach to understand why care workers were deliberately putting themselves at risk of harm when undertaking their duties of care towards the elderly.

Contemporary WHS Challenges: Aged Care work



Figure 5.2: Aged care as work

Source: pxhere.com, CCO

Due to the demographic aging of Australia, the demand for aged care services has, and will continue, to increase (Australian Government, 2023). The same trend is occurring in New Zealand (StatsNZ, 2022). The 2021 Australia Royal Commission into Aged Care Quality and Safety revealed serious concerns about the quality of care being provided to elderly people in aged care facilities, in part, because of the increased casualisation of work, the ‘**gig economy**’, and a lack of oversight of these workers with regards to their education and training (Royal Commission into Aged Care Quality and Safety, 2021). This lack of training, as a latent condition, has potential serious implications for managing WHS in aged care.

The aged care sector is, by its very nature, a challenging workplace with hazards and risks including “lifting, supporting and moving patients, moving and handling equipment such as beds, mattresses, trolleys and

wheelchairs, occupational violence, work-related stress and bullying and harassment” (WorkSafe Victoria, n.d.). Ensuring adequate training for staff to manage these hazards, and their risks, is a challenging but important task. However, the nature of care work presents other, less obvious, challenges that still need to be managed.

Box 5.2: Neil Logan *WHS in aged care*

In the following video, Neil Logan discusses the conundrum of workers who injure themselves when striving to provide quality care to the elderly.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=79#oembed-2>

Source: Sheridan, L. (Producer). (2016). Dementia concepts for business curricula. Learning, Teaching and Curriculum, University of Wollongong, Australia. YouTube

Reflect:

Imagine you are an HR manager for an aged care organisation. *How would you address the moral*

conundrum of ensuring care workers provide optimal care to your elderly residents while sustaining their compliance with your organisation's WHS policies?

Further reading:

Sheridan, L. & Agim, T. (2014). Aged care safety dilemma: Caring for self versus caring for residents. *Australian Journal on Aging* 33(4), 283–285.

In conclusion, active failures are complex human-centric factors which makes them difficult to predict and control. However, latent conditions can be identified and fixed before an incident occurs. It is here that HR managers have a pivotal role to play in WHS management; in supporting all the policies, procedures, training and performance management that leads to effective identification of the pre-determinable hazards and the fortification of safety defences that prevent the occurrence of incidents. Keeping latent conditions under control is key to effective safety management. To achieve this, most organisations will come to choose a coordinated, cyclical, approach; they will adopt a **safety management system** —and these are the focus of the next chapter.

6.

A systems and safety culture approach to work health and safety management

In Chapter 4, we learned that some organisations will adopt a **blame-the-victim** approach and will place little importance on WHS management. In Chapter 5, we came to understand that it is only through **blaming the system** that organisations can move beyond examining human error (**active failures**) to uncover the **latent conditions** that, according to James Reason's **Swiss Cheese Model** of safety incident causation, increase the risk of a hazard causing harm to workers via a WHS **incident**.

James Reason's model then explained why WHS incidents occur but, most importantly, indicated that through addressing latent conditions, incidents can be prevented. However, achieving this concept in practice is complex as notionally each safety defence layer must be unpacked to identify **hazards**, interventions must be implemented to reduce the **risk**, and then ongoing monitoring is required to ensure that existing weaknesses (holes in the Swiss cheese) do not recur or new ones do not emerge before they can be rectified.

The goal of this chapter is to give you the systems-based approaches that enable the best possible safety outcome, within the limits of what is **reasonably practicable**. We will then explore how a safety culture can both embed the safety management system within the organisation, and

help avoid, as much as possible, the active human errors associated with poor safety attitudes and behaviours at work.

Learning Objectives

This chapter introduces:

- Systems-based standards for workplace health and safety management.
- The components of a WHS system framework and what each is designed to achieve.
- Safety culture theory.

A system-based approach to WHS

While there are many ways to implement WHS management, we adopt a **systems-based** approach aligned with James Reason's **Swiss Cheese Model**. As WHS management is complex, and WHS incidents expose organisations to **business risk**, many businesses choose to adopt a standardised framework to assist them in establishing their organisation-specific WHS management system. There are many standardised frameworks used by businesses and they cover different aspects of their operations (environmental management, quality, WHS etc.). These are known as **standards**.

Box 6.1: What are standards?

In the following video, the International Organization for Standardization (ISO) explains what a standard is and their approach to producing international standards.



*One or more interactive elements has been excluded from this version of the text. You can view them online here:
<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=83#oembed-3>*

Source: "What ISO standards do for you" by the International Organization for Standardization, Vimeo

Standards are agreed to principles and approaches established by panels of experts (International Organization for Standardization, 2023; European Agency for Safety and Health and Work, n.d.). The organisations that establish the standards can then accredit experts to independently audit businesses against these standards and, in turn, businesses that demonstrate compliance with the standards can be certified (United Kingdom Accreditation Service, n.d.). This independent certification can be valuable to businesses who need to demonstrate their effort towards good practice to their stakeholders, such as

organisations up or down-stream in their supply chains, because, as Jenks explains, “companies that are able to, at a glance, display brand and strategic value, are more appealing to collaborate with” (2017, para. 20). Certification is also useful as “standards often align with regulatory requirements, and certification can help...demonstrate compliance and avoid potential legal or financial penalties” (Best Practice Certification, 2023, para. 5). At a minimum, adopting standards encourages a coordinated approach to addressing WHS issues and generate the documentation that legal authorities may draw upon in audits or investigations to determine if **due diligence** requirements have been met.

There are different standards bodies operating in different regions of the world. For example there is the ISO, with its origins in establishing uniform adoption of the **Metric System** (International Organization for Standardization, 1997), but there is also the European Union’s standards that underpin trade agreements (European Agency for Safety and Health and Work, n.d.). The standards framework a business chooses to adopt may be based on common practice in their industry, what is required to supply the product to a market (i.e. meeting European Union standards) or the cost and/or the practicability of implementation and certification.

In Australia and New Zealand, many businesses will be familiar with WHS management standard is AS/NZS ISO 45001:2018 (*Occupational health and safety management systems – Requirements with guidance for use*) and its predecessor AS/NZS 4801:2001. Endorsed by regional standards bodies, Standards Australia and Standards New Zealand, this particular standard is identical to the international-level ISO 45001:2018 standard (Standards Australia & Standards New Zealand, 2018, p. ii). This

means that Australian and New Zealand businesses that achieve AS/NZS ISO 45001:2018 certification, have met international expectations as set by the experts via the ISO.

No matter the WHS standards framework, a safety management system should be designed to “continuously improve safety performance through the identification of hazards, the collection and analysis of safety data and safety information, and the continuous assessment of safety risks” (Civil Aviation Authority of New Zealand, 2023, p. 12). Standardised systems help develop a common language that enable a shared understanding of WHS within the business, and across industries (International Organization for Standardization, 2021). Through fostering collaboration, WHS standards seek to reduce workplace illness, injury and the associated financial, and social costs, of workplace incidents.

Components to a safety management system

At its core, AS/NZS ISO 45001:2018 provides guidance to organisations on how to set up a safety management system, how to ‘build in’ continual improvement mechanisms and, finally, it helps businesses identify the resources they will need to achieve effective safety management (Standards Australia, 2018). However, in trying to understand current approaches to WHS management systems, it is useful to step back to the prior AS/NZS 4801:2001 to understand what worked and what developments had to take place to establish AS/NZS ISO 45001:2018 as current ‘best practice’. AS/NZS 4801:2001 helped organisations break down the complexity of a safety management system by approaching it in five steps:

1. Commitment and policy
2. Planning
3. Implementation
4. Measurement and evaluation
5. Review and improvement

Rather than being linear, as presented in the list above, it was proposed as a series of repeatable phases (see Figure 6.1) that organisations would continue to undertake over and over again, with the outcome being continuously improved safety outcomes for their business.

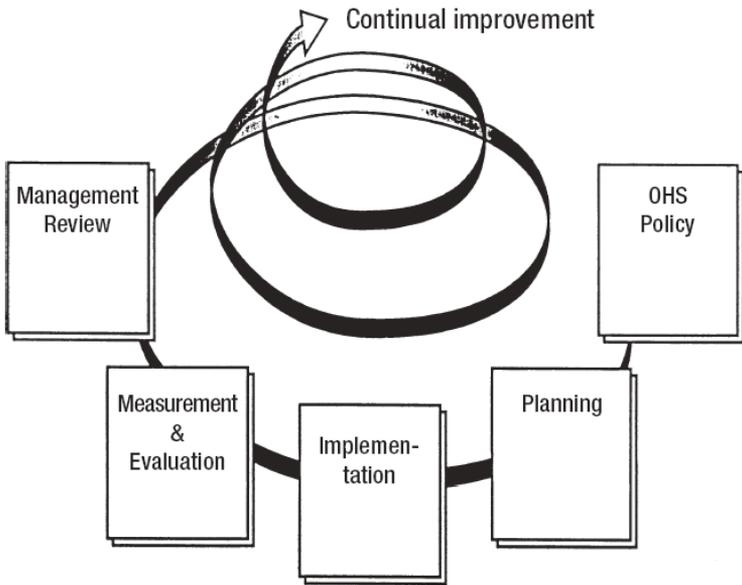


Figure 6.1: AS/NZS 4801:2001, WHS Management System Model

Source: AS/NZS 4801:2001

What does each step comprise? Standards Australia & Standards New Zealand (2001) explain simply that safety management starts at the top. Commitment and policy: Senior leadership teams must commit to safety management and support it's undertaking through policy and resourcing. Planning: A safety management system's processes, procedures and measures (**key performance indicators** (KPIs), **lead** and **lag indicators** etc.) must be designed in consultation with key stakeholders *before* they can be enacted. Implementation: The operationalisation of the planned activities encompassed in the safety management system. Measurement and evaluation: This phase requires reporting from the safety management system on safety outcomes, as measured by the **KPIs**. Review and improvement: Senior leadership must be informed of the actual safety outcomes, positives and negatives, to determine what improvements must be made to safety management to enhance safety outcomes by the end of the following safety management cycle.

The conundrum for AS/NZS 4801:2001 was that it was heavily focused on the latent, specifically system-based, factors outlined in James Reason's **Swiss Cheese Model** (see Figure 5.1). Many businesses became so focused on the administration of the safety management system (the administrative and procedural safety defence layers) that they became "remote from the processes they manipulate and, in many cases, from the hazards that potentially endanger their operations" (Reason, 1998, p. 296). In essence, safety management systems were becoming very bureaucratic and burdensome for the employees, this discouraged reporting of **near miss** incidents which

inevitably diminished the quality of the decision making data (Hudson, 2007). The very high risk-low probability **critical incidents** that safety management systems were designed to avoid, were still occurring despite safety management system documentation making it appear like the organisation was effectively blocking the holes in their **Swiss Cheese Model** (Reason, 1998).

This likely occurred because, even today, WHS is a rapidly developing field with practice informing theory, often before theory can inform practice. To address this conundrum scholars, including James Reason, sought to understand the critical role of worker attitudes, beliefs and behaviours (**safety culture**) in safety management (Hudson, 2007). While active human errors are known to be associated with poor safety attitudes and behaviours at work, these researchers additionally identified that latent conditions were not resolving unless the organisation had a positive safety culture that genuinely sought to enact change.

Components of a safety culture

Reason conceptualises a safety culture as comprising “a reporting culture, a just culture, a flexible culture and a learning culture” (Reason, 1997b, p. 196). By focusing on the development of these individual subcomponents, he believed that a safety culture would emerge via a process of “collective learning...ways of doing, thinking and managing that have enhanced safety health as their natural byproduct” (Reason, 1997b, p. 192).

A *reporting culture*, where employees report incidents (including **near misses**), is important to attaining the necessary data to determine which safety defence layers

in the **Swiss Cheese Model** (see Figure 5.1) need actions taken to reduce the probability of a repeat incident. However, organisations notoriously make reporting hazards and incidents difficult, with time-consuming paperwork and processes. Businesses can also be **punitive** with negative consequences for anyone who reports an incident that was, in part, due to their error. In contrast, organisations that have a functioning *reporting culture* make reporting easy, provide confidentiality to those who report, and separate business functions that undertake **disciplinary processes** in the organisations, from those that action WHS continuous improvement. Essentially a *reporting culture* is based on trust (Reason, 1997b).

A *just culture* requires workers to “share the belief that justice will usually be dispensed” (Reason, 1997b, p. 205). As outlined by Hopkins & Palser (1987), in a systems-based approach, **blaming the victim** is rejected. Reason argues instead that a *just culture* will be lenient towards unforeseen human error, yet provide consequences for “reckless, negligent or even malevolent behaviour of particular individuals” (Reason, 1997b, p. 205).

A *flexible culture* means the organisation is “able to shift from centralized control to a decentralized mode in which the guidance of local operations depends largely upon the professionalism of first-line supervisors” (Reason, 1997b, p. 218). Reason argues that high quality day-to-day leadership (including usually hierarchical leadership) will often enable a quick and effective transition to those who have the expertise when having to “perform complex and exacting tasks under considerable time pressure” (Reason, 1997b, p. 214). This would, of course, include scenarios such as **emergency responses** (see Chapter 12).

Finally, a *learning culture* is where WHS observations, reflections and actions take place. Reason argues that

while embedding learning can be easy, achieving actions based on authentic learning derived from observations and reflections is difficult in practice (Reason, 1997b). Theoretically, it is this component of the safety culture that would underpin the continuous improvement aspired to in safety management systems (such as step 5 “Review and Improvement” in AS/NZS 4801:2001).

While Reason’s Safety Culture theory was useful, as it outlined the behaviours of businesses with an effective safety culture, it did not provide organisations with guidance on *how* to achieve this ideal safety culture. For example, Agim & Sheridan (2013) investigated the subcomponents of Reason’s safety culture in practice and found that *just culture* is an enabler of a *reporting culture*. This alone demonstrates that this safety culture theory is useful, but has not yet been fully conceptualised as a working model.

Other scholars therefore examined the characteristics of culture specific to **high reliability organisations**—those organisations that had implicitly dangerous work but very few incidents. Weick & Sutcliffe identified that these organisations are ‘mindful’ and their safety culture can be understood as a “preoccupation with failure, reluctance to simplify interpretations, sensitivity to operations, commitment to resilience and deference to expertise” (Weick & Sutcliffe, 2001, p. 30). This is a very useful insight but difficult to operationalise without examples from practice, and guidelines on the steps that must be taken to achieve it.

Patrick Hudson progressed this field by proposing a diagnostic tool; a safety culture ladder model (see Figure 6.2) that organisations can use to critically reflect and determine the current status of their safety culture (Hudson, 2007). Ideally, the safety culture would become so

embedded that it would be ‘how we do business round here’ but could start from lower levels, such as being reactive, and progress towards becoming ‘generative’.

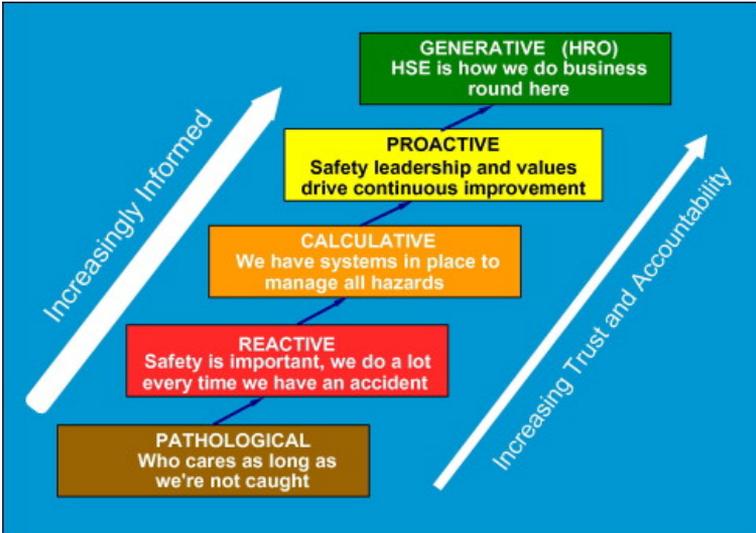


Figure 6.2: Patrick Hudson's Safety Culture Ladder

Source: Safe Work Australia on YouTube, CC BY

Box 6.2: Patrick Hudson's *Moving up the culture ladder*

The following video provides an in-depth explanation by Patrick Hudson of the conundrums facing safety management systems and his safety culture ladder model.



One or more interactive elements has been excluded from this version of the text. You can view them online here:
<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=83#oembed-1>

A transcript of this video is available here.

*Source: "Professor Patrick Hudson: Moving up the culture ladder",
Safe Work Australia, CC BY*

Importantly, Hudson identified that his diagnostic tool (the ladder) needed to be matched with an improvement tool (based on Prochaska and DiClemente's transtheoretical model, see Figure 6.3) to ensure that, "the culture ladder and the change model, define (i) where an organisation might go and (ii) how it might go there" (Hudson, 2007, p. 705).

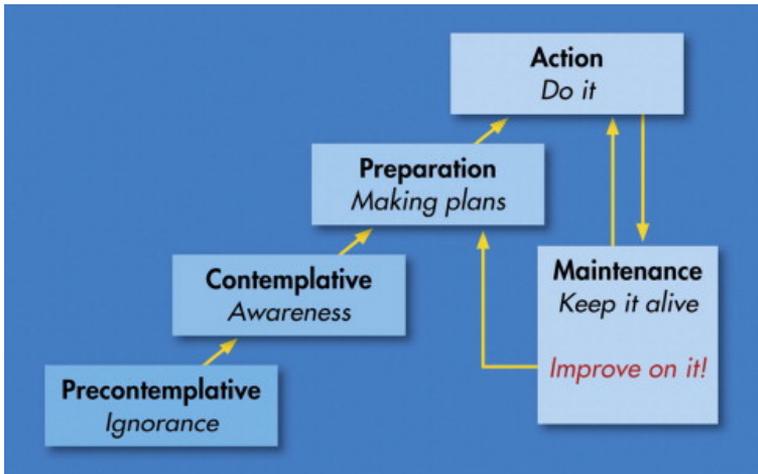


Figure 6.3: Patrick Hudson's Safety Culture Change Model

Source: "The change model based on the transtheoretical model of Prochaska & DiClemente (1983)" by Patrick Hudson, *Safety Science*

While today it is common to read statements such as:

Organisations with an effective SMS typically show genuine management commitment, creating a working environment where staff are encouraged to engage in and contribute to the organisation's safety management processes. These organisations benefit from having an active **Just Culture** policy, supported by regular feedback on what has been done in response to staff reports, and from effective controls to manage the identified risks. Hazard identification, risk assessment, evaluation, and control have therefore become an integral part of day to-day business. Managers and staff understand that supervision of the operations, and therefore safety, is the responsibility of all, not just the Safety Manager. (Civil Aviation Authority of New Zealand, 2023, p. 12)

Acknowledgment of the importance of safety culture, and

its integration into a safety management system, is clearly relatively recent.

Returning now to consider AS/NZS ISO 45001:2018 (see Figure 6.4), the essence of a safety management system remains similar to that outlined in AS/NZ 4801:2001 but the five phases of a safety management system are now reduced to four (*planning, support and operation, performance evaluation and improvement*), all enabled through *leadership and worker participation* which exists within the context of the organisation (*external and internal issues as well as the needs and expectations of workers and other interested parties*). In the diagram below, the shaded area external to the system's activities represents these internal and external factors that are constantly acting on the organisation.

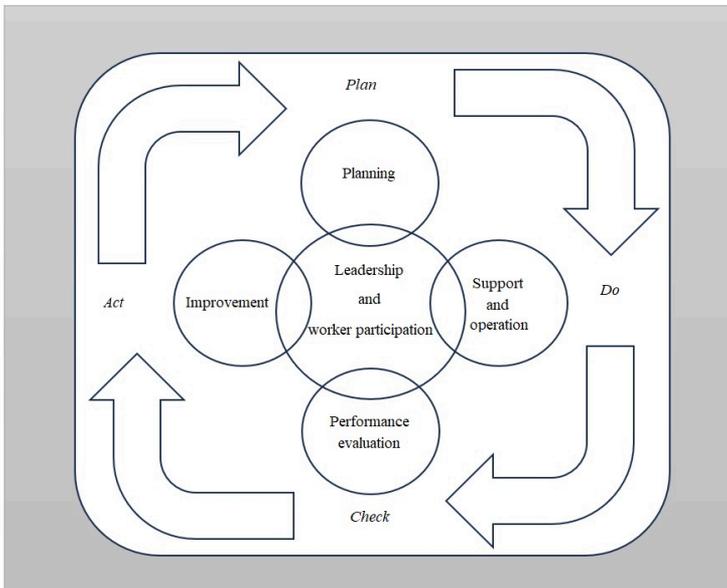


Figure 6.4: ISO 45001:2018 conceptualisation of a safety management system

Source: Lynnaire Sheridan, modified from ISO45001:2018, CC BY 4.0

Notably, safety culture is still not explicitly integrated into the Plan-Do-Check-Act (PDCA) cycle of ISO 45001:2018 but it is referred to in its guidance for use:

A culture that supports an organization’s OH&S [WHS] management system is largely determined by top management and is the product of individual and group values, attitudes, managerial practices, perceptions, competencies and patterns of activities that determine commitment to, and the style and proficiency of, its OH&S [WHS] management system. (Standards Australia and Standards New Zealand, 2018, p. 27)

ISO 45001:2018 still only focuses on only the *reporting culture* and *just culture* sub-components of James Reason’s safety culture theory, as seen in the standards where they state “An important way top management demonstrates leadership is by encouraging workers to report incidents, hazards and risks [*reporting culture*] and opportunities and by protecting workers against reprisals [*just culture*], such as the threat of dismissal or disciplinary action, when they do so” (Standards Australia and Standards New Zealand, 2018, p. 27). In the standards, however, we do see elements of Hudson’s (2007) *making the plans, do it and improve on it* reflected through the integration of PDCA into the diagram (see Figure 6.4). Overall, this suggests that WHS safety management system standards are still only coming to grips with how to embed safety culture into the operationalisation of a safety management system.

At this point, it is important to acknowledge that there is a movement among some scholars to abandon the systems

approach to WHS because of the innate challenges of sustaining a data-driven system, while enacting it via a safety culture. One example is Sidney Dekker, who wrote the book *The Safety Anarchist: Relying on human expertise and innovation, reducing bureaucracy and compliance* (Dekker, 2018). He argues for anarchy, rather than hierarchy. He advocates for horizontal coordination of WHS focused on ‘doing’ rather than reporting. He suggests that the “novelty, diversity and complexity” of WHS **incidents** are least effectively managed by the bureaucracy that safety management systems create (Dekker, 2018, p. iv). *Past influencing the present* considers the influence of the **Industrial Revolution** on contemporary WHS management and the limitations this may present.

Past influencing the present

According to Sidney Dekker, many present-day approaches to WHS (sometimes referred to as **Safety I**) emerged in response to Industrial Revolution conditions but today constrain our capacity to effectively implement safety management:

For sure, bureaucratic initiatives from the last century—regulation, standardization, centralized control—can take credit for a lot of the progress on safety we’ve made. Interventions by the state, and by individual organizations, have taken us away from the shocking conditions of the early industrial age. We had to organize, to standardize, to come together and push back on unnecessary

and unacceptable risk. We had to solve problems collectively; we had to turn to the possibility of coercion by a state or other stakeholders to make it happen...Bureaucracy and compliance may well have taken us as far as they can. (Dekker, 2018, p iv)

If we consider that Scientific Management emerged during the American Industrial Revolution (see Chapter 3), it makes sense that contemporary workplaces—those now heavily influenced by **Human Relations School** approaches to management—might imagine new ways of organising safety practices that acknowledge the expertise of the worker and seek to harness their intrinsic motivation. Indeed, the opening of Dekker’s film *Safety Differently* features a worker emphasising the importance of autonomy. If we consider this in the context of the Self-Determination Theory which “proposes that all human beings have three basic psychological needs—the needs for competence, autonomy, and relatedness” (Deci & Ryan, 2015, para. 1), we can see that this modern theoretical lens, derived from the **Human Relations School**, is influencing contemporary approaches to safety management.

Another worker questions why efforts to enhance safety outcomes focus on failure, rather than success. This perspective aligns with a related contemporary WHS approach known as **Safety II**. Safety II shifts from blocking the holes in the Swiss cheese, to examining what works in the organisation and replicating that success (Hollnagel et al., 2015).

Box 6.3: Sidney Dekker's *Safety Differently*



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=83#oembed-4>

Source: "Safety Differently | The Movie", Sidney Dekker, Vimeo

As an important, yet emerging field, WHS research will continue to evolve at a rapid pace. Most businesses either directly, or indirectly, will be engaging in practices derived from James Reason's **Swiss Cheese Model** and **safety culture** theories. Many will be adopting standards-based approaches to developing safety management systems. However, in many ways, Weick & Sutcliffe's (2001) observations are correct; being vigilant and taking safety seriously is perhaps the only way to achieve effective safety management. We now know that employees internalising personal and collective responsibility towards safety, is vital to achieving this. While progress has been

made on *how* to achieve a safety culture we've learned here that it is very much still under development.

Box 6.4: Video 4, An introduction to work health and safety management

The following video is a useful review and further contextualisation of WHS systems and safety culture.

NOTE: Australian and New Zealand Standard 4801:2001 has now been replaced with AZNZ 45001:2018



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=83#oembed-2>

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator). (2019). Video 4: An introduction to work health and safety management.

Preston, A. (audio engineer); Orvad, A., (artist) and Franks, R., (animator), Learning, Teaching and Curriculum. University of Wollongong, Australia. YouTube

Activity 6.1

Take this 10 question quick quiz to review your understanding of key concepts introduced in Chapter 6 and see how your learning is progressing.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=83#h5p-5>

This section of the book, *Theory: A systems approach to work health and safety management*, introduced key WHS concepts, adopted a systems-based theoretical approach to safety management and outlined how organisations can use standards to establish their safety management systems. James Reason's **Swiss Cheese Model** of safety incident causation was used to conceptualise the relationships between hazards, risk, and safety defence layers in organisations. Safety culture was identified as pivotal to embedding a safety system within a business, and enacting the change required to resolve latent conditions. The next section unpacks each component of safety management systems to understand their enactment in practice.

III

Practice: Establishing, implementing and closing the loop in a safety management system

This section examines the leadership commitment, policies, procedures, planning, and compliance competency required before a safety management system can begin. It explains the implementation of hazard identification, risk assessment, and hazard control procedures before outlining the importance of emergence response procedures as a final safety defence layer. It concludes with ‘closing the loop’, effectively using measurement and evaluation data to ensure adequate commitment to, and resourcing of, the next iteration of the safety management system cycle.

7.

Establishing: Leadership commitment, policies, procedures and planning

Organisations that **blame-the-victim** will not prioritise safety management (see Chapter 4); they only consider the **active failures** (human error) within their businesses and will not genuinely adopt systems-based approaches to address **latent conditions**. As James Reason would explain it through his **safety culture theory**, a *learning culture* will not exist within these businesses; as Patrick Hudson would explain it, they are likely *pathological* or, at best, *reactive* (see Figure 6.2). In contrast, this chapter takes the perspective of a business that has adopted a **blame-the-system** philosophy and is now seeking to establish a safety management system.

Learning Objectives

As outlined in ISO 45001:2018, this chapter introduces:

- Leadership commitment as an enabler of safety management.
- The role of policy and procedures in

establishing safety management in an organisation.

- The vital importance of planning *before* establishing a safety management system.

Leadership Commitment

In ISO 45001:2018, leader commitment to safety is fundamental to achieving safety management system success because it ensures the resourcing required to enact the system and establish the **safety culture** (Standards Australia & Standards New Zealand, 2018). However, even when taking a **blame-the-victim** approach, organisational levels of commitment to safety do vary. As a WHS professional, it is vitally important to determine the extent to which your organisation's leadership team values, and is committed to, safety otherwise you may face "tensions and burdens due to...general management not embracing ethical values, and safety being regarded as a value while facing financial and economic constraints" (Lindout & Reniers, 2021, p. 8518). If your leaders are not committed to safety, your ability to enact safety and develop a safety culture, is limited (Hudson, 2007).

So how can you determine an organisation's level of commitment to safety? Patrick Hudson's Safety Culture Ladder (see Figure 6.2) is one tool (Hudson, 2007). Discussions with staff are likely to reveal if a **blame-the-victim** or **blame-the-system** approach prevails within the business. Reviewing an organisation's safety record would likely position the organisation on one rung of the ladder

(*pathological, reactive, calculative, proactive* and *generative*) and would highlight any pathological recidivism (repeat offending).

So how do organisations make decisions regarding their commitment to safety? Again, analysing Hudson’s Safety Culture Ladder it appears that *pathological* and *generative* organisations make moral choices, whereas *reactive, calculative* and *proactive* organisations adopt a risk-centric, cost-benefit analysis, approach. Examining the moral versus business risk approach is therefore useful.

A moral commitment to safety

Morality may be defined as “what is right?” ...respect for autonomy, non-maleficence, beneficence and justice” (Lindout & Reniers, 2021, p. 8515). The decision by senior leaders to commit to safety is a moral judgement, the “evaluation of actions with respect to moral norms and values established in society” (Thoma et. al. 1991 cited in Li et al., 2017, p. 122). In making their choice, some senior leaders will take a relativistic stance; they will make their judgement based on the situation or individuals involved. In contrast, those who “value moral principles of harm/care and fairness/reciprocity more highly...are more likely to experience distress toward harm and outrage toward injustice” (Li et al., 2017, p. 135) and would support safety as a moral impetus.

HR managers engaged in safety management likely have little influence over a senior leader’s moral commitment to safety. Depending on your moral stance, the value placed on safety may be an important consideration in selecting your place of work. This said, moral decision-making is not the only driver for the implementation of WHS

management, often the impetus is business risk avoidance enabling a **business case** to be made for safety.

A business-risk derived commitment to safety

Not to be confused with safety-specific **risk**, business risk may be defined as the “exposure a company or organization has to factors that could lower its profits or lead it to fail” (Kenton, 2022, para. 1). Kenton (2022) suggests that business risk is comprised of four principal risks: **strategic**, **compliance**, **operational** or **reputational**. Safety management, at least in its early stages within many organisations, is likely prioritised according to the risk poor safety management presents in the each of these four domains. However, WHS management also presents good business opportunities, as effective safety practices should mitigate:

- compliance risk: averting prosecution for negligence.
- operational risk: with continuous safety improvement enhancing productivity through design efficiencies (better **ergonomics**), better control of maintenance regimes etc.
- reputational risk: averting WHS incidents.

Up until this point, we have viewed WHS management as a people-centric HR business function. This is because the origins of safety management are derived from the **Industrial Revolution** concurrent with **employment relations** (**labour** rights) and **unions** (see Chapters 1–3). However, the subsequent evolution of WHS management theory (see Chapters 4–6) has led to a systems-based

philosophy which, increasingly, aligns WHS with **environmental** and **quality risk management** approaches (Kauppila et al., 2015). This risk-centric response recognises that businesses need a social licence to operate, an “ongoing acceptance of a company or industry’s standard business practices and operating procedures by its employees, stakeholders, and the general public” (Kenton, 2023, para. 1). WHS is being drawn into an alternate philosophical frame grounded in sustainability and the triple bottom line, there is now an expectation that business should be reporting on “their social and environmental impact—in addition to their financial performance—rather than solely focusing on generating profit, or the standard ‘bottom line’” (Miller, 2020, para. 5). WHS management, and its performance outcomes, through this lens are then perceived as a social good sustaining an organisation’s social licence to operate, rather than a worker entitlement.

Box 7.1: John Berry, *Social licence to operate*

In this video John Berry, an expert in sustainable investing, discusses the implications of the concept of a social licence to operate on contemporary business.



One or more interactive elements has



been excluded from this version of the text. You can view them online here:
<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1101#oembed-1>

Source: Leckie, T. & Sheridan, L. (producers) (2023). Business for Good: John Berry.

Molloy, J. (video and audio), Pearce, J. (coordinator), Hortle, L. (assistant), Media Production Unit, the Otago Business School. University of Otago, New Zealand. YouTube

Sustainability reporting is one approach taken by organisations to foster their social licence to operate. Sustainability reporting requires businesses to provide “an overview of the economic, environmental, social and cultural impacts, caused by an entity’s activities” (External Reporting Board, 2023). Compiling these reports, usually undertaken for compliance and reputational reasons, can be exceedingly complex. One strategy to simplify their operationalisation is to have the **key performance indicators** (KPIs) aligned and managed across business functions within management systems.

Similar to safety management systems (Chapter 6), there are standards used to manage the business risks associated with the natural environment (ISO 14001) or product quality (ISO 9001) (International Organization for

Standardization, n.d.). Again, these standards are likely to be operationalised via environmental or quality systems before they are audited and certified to independently demonstrate an organisation's fulfilment of the **social licence to operate**. One organisation adopting the combined systems approach to safety management is Unilever (see Box 7.2).

Box 7.2: Unilever, a systems-based approach to managing business risk



Figure 7.1: Unilever's brand logo

Source: Unilever on Flickr.com, CC BY-NC-ND 2.0

Unilever is a large multinational organisation operating in more than 190 countries (Unilever, n.d.-a). Given their cross-border operations, they use a **standards**-based approach to ensure compliance in all jurisdictions where they operate (Unilever, n.d.-b). Ideally, they would be adopting

practices from their most demanding **legislative jurisdictions** and applying these across the entire business.

The sustainability performance data collected by Unilever is categorised into *environmental and occupational [work] safety* (emissions, waste, water, and occupational safety incidents), *planet* (climate action, waste, water, and environmental fines), *society* (safety at work, nutrition, community investment), and *people* (recruitment, workforce composition, gender diversity, learning and development, and retention). All these **KPIs** are verified through independent auditing and certification. Management of quality is implied across their business indicators with references to being a good employer (Unilever, .n.d-c) and their focus on producing high quality consumer products (Unilever, n.d.-d).

Further reading:

Unilever (n.d.-b) Sustainability reporting standards. Available at: <https://www.unilever.com/planet-and-society/sustainability-reporting-centre/reporting-standards/> (accessed 12/10/2023).

Seeing safety through the business risk lens—rather than solely through the HR lens—explains why safety management is showcased on the international stage via initiatives such as the **United Nations Sustainable Development Goals** where safety is implicit in *Goal 3: Good Health and Well-being* and *Goal 8: Decent Work and Economic Growth* (United Nations Department of

Economic and Social Affairs, n.d.). As explained by the Institution of Occupational Safety and Health (UK):

Workplace health and safety is all about sensibly managing risks to protect your workers and your business. Good health and safety management is characterised by strong leadership involving your managers, workers, suppliers, contractors and customers. In a global context, health and safety is also an essential part of the movement towards sustainable development. (2021, para. 1)

Box 7.3: Air New Zealand, Sustainability Reporting

In its sustainability reporting, Air New Zealand is attempting to communicate all its **KPIs** in one table that encapsulates environmental, safety and quality risk management at the local level (New Zealanders) through to a global level (UN Sustainable development Goals).



Figure 7.2: Extract, Air New Zealand 2023 Sustainability Report

Source: Air New Zealand (2023, p. 11).

In this holistic sustainability framework, the first column ‘Caring for New Zealanders’ positions caring for workers as the top priority. This care is to be achieved, in part, through organisational and staff alignment with the key values of diversity and equity. There is no specific mention of WHS, but it does infer that Air New Zealand is promoting a *just culture* which, in turn, can foster a positive **safety culture** according to James Reason’s Safety Culture theory (Reason, 1998).

The **KPI** for care towards New Zealanders (employees) is a staff engagement score (**output indicator**) that is benchmarked against a global measure (Glint’s Global Top Engagement Index with 750+ organisations surveyed) together with **input indicators** including employee uptake of their

Employee Assistance Programme. The latter metric demonstrates proactive mental health support for workers to address issues, including those outside of work, and is then paired with bullying / harassment prevention programmes (likely input indicators, i.e. number of training attendees) to reduce work-based issues. Beyond employees, the organisation's care extends to customers and New Zealand communities, each with their own respective metrics (see Figure 7.2).

Air New Zealand's local-level care for New Zealanders is then linked to **United Nations Sustainable Development Goals** to demonstrate a contribution towards global collective efforts: *Goal 3: Good Health and Wellbeing, Goal 4: Quality Education, Goal 5: Gender Equality, Goal 8: Decent Work and Economic Growth plus Goal 10: Reduced Inequalities*. These goals are all WHS related directly (Goal 3 and Goal 8), or indirectly (Goal 4, Goal 5, and Goal 10) as they support positive workplace environments.

The second column "Climate Action" reflects Air New Zealand's environmental performance commitments. The focus is clearly on the de-carbonisation of their business activities together with offsetting them, via forestry inputs, as a form of climate impact mitigation. First, they outline how they will create scientifically developed measures to evaluate any carbon reduction followed by a net zero 2050 target and a 10% uptake of sustainable aviation fuel by 2030. Likewise, the third column is environment-centric "Driving

towards a circular economy” and focuses on the potential good that can be achieved through procurement supply chains, from an environmental and social perspective. The final column “Sustainable Tourism” seeks to balance the environmental impacts of tourism, including their impacts in providing air travel, with the socio-economic benefits that tourism can offer. Air New Zealand links these aspirations to United Nations Sustainable Development *Goal 7: Affordable and Clean Energy, Goal 9: Industry, Innovation and Infrastructure, Goal 12: Responsible Consumption and Production, Goal 13: Climate Action and Goal 15: Life on Earth.* *Goal 8: Decent Work and Economic Growth* is also mentioned, and is likely associated with Sustainable Tourism’s potential positive socio-economic outcomes.

Overall, the Air New Zealand Sustainability Framework identifies both global and local sustainability priorities. As an organisation that operates across national and regional boundaries, this dual perspective is fundamental to its social license to operate; domestically it will be critiqued for its positive or negative impacts on local communities, and, internationally, its environmental performance will be evaluated relative to other global airlines.

Further reading:

Air New Zealand (2023) 2023 Sustainability Report. Available at: <https://p-airnz.com/cms/assets/PDFs/2023-Air-New-Zealand-Sustainability-Report-Final.pdf> (accessed 14/10/2023).

While some organisational leaders adopt a **relativistic** moral stance towards safety and decide “who cares as long as we’re not getting caught” (Hudson, 2007, p. 704; see Figure 6.2), the strategic, compliance, operation and reputational business risks can make a compelling **business case** for safety management. Surely even those who take a **relativistic** stance would see the potential benefits that effective safety management might generate (see pro-safety management arguments as presented in Box 7.4).

Box 7.4: Creating a business case for safety

The Institution of Occupational Safety and Health (UK) motivates **PCBUs** to undertake safety management by explaining that safety is important to their business because:

1. It is morally right to ensure your workers return home safe and healthy at the end of every working day.
2. By protecting your workers, you reduce absences, ensuring that your workplace is more efficient and productive.
3. Research shows that workers are more productive in workplaces that are committed to health and safety.
4. Reducing down-time caused by illness and accidents means less

disruption – and saves your business money.

5. In some countries, health and safety legislation is criminal law and you are legally obliged to comply with it. Legal breaches can result in prosecution, fines and even imprisonment of senior executives.
6. To attract investors and partnerships you may need to demonstrate your commitment to sustainability and corporate social responsibility, which will include how you protect your workers.
7. Increasingly, customers want to buy products and services that are produced ethically – so you also need to think about the work practices throughout your supply chain and deal only with ethical suppliers that protect their workforce.
8. More and more, job hunters—particularly Millennials and Generation Z—seek roles with employers who share their values, so without strong corporate responsibility and sustainability practices you may struggle to attract or retain the best employees.
9. A good health and safety record is a source of competitive advantage: it

builds trust in your reputation and brand, while poor health and safety performance will directly affect profitability and can result in loss of trade or even closure of the business.

10. Good health and safety at work secures long-term benefits for you, your business and the wider community. (2021, para. 2)

Point 1 adopts a moral stance whereas points 2–10 justify safety management using business risk as the motivator.

However, we should be cautious in judging an organisation as *reactive* if they adopt a business-risk based approach to safety management, as it be a methodological approach to safety that co-exists with a strong moral commitment to safety. Dubbink & Van Liedekerke (2020) suggest we should not to misconceive an organisation's sense of duty as purely being **relativistic**, in this case as solely being compliance driven. Fundamentally, what is important here is that you understand that safety management cannot happen without leadership commitment, but also that you consider your moral stance towards safety because this will define how you enact safety management.

Policies and procedures

Once senior leadership commitment is secured, it is time

to establish the policies and procedures that will outline the organisation's interpretation and boundaries for safety management. These will then establish the behavioural parameters that will underpin the organisation's safety culture. Policies may be defined as "rules and guidelines that define and limit action, and indicate the relevant procedures to follow" (Heery & Noon, 2017, para. 1); policy takes a **top-down approach**. In contrast, procedures are "step-by-step sequences of actions that should be taken to attain particular objectives" (Heery & Noon, 2017, para. 1), and should take a **bottom-up approach**, as they will only be adopted if are actionable in practice.

While safety concepts may be integrated into broad business policy documents, procedures should be very specific to the safety activity, for example outlining the responsibilities and expected actions of staff during an **emergency response**. Policy should set the tone of the organisation's expectations around safety, while the procedures are how, in practice, to get it done.

Note: At this stage, the procedures being discussed are focused on how to operationalise the safety system, not to be confused with **standard (safe) operating procedures** that can only emerge via **worker consultation** when undertaking **hazard control** (see Chapter 11).

Planning

Once policy is in place, formally establishing the organisation's intention to enact safety management, the planning (P in the **Plan-Do-Check-Act**) stage of the systems-based safety management cycle begins; often this requires recruitment of staff into key safety-specific roles.

These organisational safety pioneers must have knowledge and experience in the comprehensive end-to-end planning of safety management systems; to evoke success these practitioners begin with the end in mind—the requirements of management reporting that enables continuous safety improvement—and work backwards identifying what is **reasonably practicable** to achieve. These staff principally design and manage the system: compliance with the **standards**, determine the measurable **KPIs** to adopt, set up internal and external **audit** cycles to facilitate safety **certification**, and also continue to engage with senior leadership to ensure the ongoing commitment to safety management and its improvement within their organisation.

Importantly, these safety professionals recognise that it is easy to worry and immediately seek to identify hazards and manage their risks, however, they know that a lack of a coordinated approach quickly turns this into an overwhelming task. Moreover, they understand that taking this approach could damage the emerging **safety culture** of the business; by not figuring out how to involve staff in determining what is **reasonably practicable** and communicating this, workers may become disillusioned when their safety expectations are not met.

Planning comprises designing literally every component of the system, from determining who is responsible for which parts of the organisation's policy and procedures, through to the specific tools and techniques that workers are to adopt to reduce the possibility of active failures (human errors) combining with latent conditions. Planning identifies everything required to reduce worker exposure to **occupational health** and safety (**incident-centric**) hazards. While coordinated by systems safety staff, specialist roles may also be established to enable this, such

as hiring in **occupational health** specialists or **hazard** and **risk** assessment experts.

Once the plan for how to operationalise the safety management system has been established, the organisation must begin by reviewing the legislative requirements applicable to their **jurisdiction**; the next chapter focuses on achieving the compliance competency necessary before establishing a safety management system.

8.

Establishing: Compliance competency

Identifying the WHS-related **legislation** and **regulations** that organisations must comply with in their **jurisdiction**, is a critical step in establishing a safety management system. While legislation is “a law or set of laws suggested by a government and made official by a parliament” (Cambridge Dictionary, n.d., para. 1), regulations “are rules made by a government or other authority in order to control the way something is done or the way people behave” (Collins Dictionary, n.d., para. 1). It is the regulations that establish the role of any **WHS regulator**, as an enforcer of WHS legislation.

Learning Objectives

This chapter introduces:

- The objectives of the Australian *Model Work Health and Safety Bill*, which underpins both Australian and New Zealand WHS legislation.
- PCBU obligations specific to managing hazards and risks, worker consultation and worker education.

- Regulation and the role of the WHS regulator.
- Worker compensation rights in Australia and New Zealand.

Legislation

In Australia, since the 1970s, there have been calls for a uniform approach to WHS legislation between all states and territories, with unions seeking to ensure equitable nation-wide safety benchmarks for workers, and all levels of government seeking to enhance business productivity through streamlining of WHS expectations for companies (Windholz, 2013). In 2009 a national review, involving extensive consultation with employer groups, WHS regulators, legal experts, and worker representatives (unions), recommended an “optimal structure and content of a model OHS [WHS] Act that was capable of being adopted in all [Australian] jurisdictions” (Safe Work Australia, n.d.-a, para. 9).

By April 2010, a committee comprised of workplace relations ministers from federal and state jurisdictions endorsed a model bill—a prototype draft—that could be presented in each jurisdiction and, in due course, be passed legislation. This collaborative piece of work became known as the *Model Work Health and Safety Bill*. At October 2023 all jurisdictions, except the State of Victoria, have implemented legislation fundamentally derived from the Model Act (Department of Employment and Workplace Relations, 2023). Table 8.1 summarises each Australian

jurisdiction's WHS legislation, WHS regulator, and workers' compensation entity.

Table 8.1: Summary of WHS legislation and regulators across Australian jurisdictions

	Act	Regulations	Code
Australian Capital Territory	Work Health and Safety Act 2011 (ACT)	Work Health and Safety Regulation 2011 (ACT)	ACT Codes of Practice
New South Wales	Work Health and Safety Act 2011 (NSW)	Work Health and Safety Regulation 2017 (NSW)	NSW Codes of Practice
Northern Territory	Work Health and Safety (National Uniform Legislation) Act 2011	Work Health and Safety (National Uniform Legislation) Regulations (NT)	NT Codes of Practice
Queensland	Work Health and Safety Act 2011 (Qld)	Work Health and Safety Regulation 2011 (Qld)	Qld Codes of Practice
South Australia	Work Health and Safety Act 2012 (SA)	Work Health and Safety Regulations 2012 (SA)	SA Codes of Practice
Tasmania	Work Health and Safety Act 2012 (Tas)	Work Health and Safety Regulations 2012 (Tas)	Tas Codes of Practice

Victoria	Occupational Health and Safety and Other Legislation Amendment Act 2021 (replaces Occupational Health and Safety Act 2004 (Vic))	Occupational Health and Safety Regulations 2017 (Vic)*	Vic Compliance Codes and codes of practice*
		WHS (General) Regulations 2022	
Western Australia	Work Health and Safety Act 2020 (WA)	WHS (Mines) Regulations 2022 WHS (Petroleum and Geothermal Energy Operations) Regulations 2022	WA Codes of Practice
Commonwealth	Work Health and Safety Act 2011 (Cwth)	Work Health and Safety Regulations 2011 (Cwth)	Commonwealth Codes of Practice

Source: AIMS Industrial (n.d., para. 15).

As each Australian jurisdiction is different, nuanced changes—distinct from Model Act— have been made when it has been legislated. Box 8.1. contains resources that enable comparison of legislation between Australian

jurisdictions with regards to their implementation of key elements of the Model Act.

Box 8.1: Safe Work Australia’s comparative legislation resources

Safe Work Australia summarises WHS Acts across Australia’s jurisdictions, these can be obtained by visiting their *Law and Regulation* website.

Safe Work Australia compares interpretations of the Model Act between state and territory legislation, it is available via a downloadable file on their *Model WHS Laws* website.

In New Zealand, a 2013 WHS taskforce concluded that “New Zealand’s work health and safety system was failing” (WorkSafe, 2019a, para. 3). This timing coincided with Australia’s WHS legislative reformation and harmonisation efforts. New Zealand adopted many elements from Australia’s *Model Work Health and Safety Bill* in its Health and Safety at Work Act 2015, with careful adaptations for the New Zealand context (WorkSafe, 2019a). To this end, Australia and New Zealand safety legislation share a common objective which is articulated in Box 8.2.

Box 8.2: The objective of the Work Health and Safety Act 2011 (Cth) s3

3.(1) The main object of this Act is to provide for a balanced and nationally consistent framework to secure the health and safety of workers and workplaces by:

(a) protecting workers and other persons against harm to their health, safety and welfare through the elimination or minimisation of risks arising from work; and

(b) providing for fair and effective workplace representation, consultation, co-operation and issue resolution in relation to work health and safety; and

(c) encouraging unions and employer organisations to take a constructive role in promoting improvements in work health and safety practices, and assisting persons conducting businesses or undertakings and workers to achieve a healthier and safer working environment; and

(d) promoting the provision of advice, information, education and training in relation to work health and safety; and

(e) securing compliance with this Act through effective and appropriate compliance and enforcement measures; and

(f) ensuring appropriate scrutiny and review of actions taken by persons exercising powers and performing functions under this Act; and

(g) providing a framework for continuous improvement and progressively higher standards of work health and safety; and

(h) maintaining and strengthening the national harmonisation of laws relating to work health and safety and to facilitate a consistent national approach to work health and safety in this jurisdiction.

Note: As replicated in Health and Safety at Work Act 2015 (New Zealand) s.3.

In practice, PCBUs responding to the legislative requirements are mostly involved in:

1. **Managing hazards and risks:** Keep workers, and other persons, safe from work or workplace derived harm (subsection a)
2. **Consulting on health and safety:** Ensure worker consultation within the business is fair and effective (subsection b) and that engagement with employer and worker representative bodies (unions) is constructive (subsection c)
3. **Educating on health and safety:** Ensure workers are informed and capable (education and training) to undertake their WHS responsibilities, as corresponding to their roles (subsection d)

Subsection (e) refers to the establishment of a WHS regulator to enact compliance with the Act, and subsection (f) builds in checks and balances to ensure the appropriate enactment of legislation by regulators so they do not breach

their powers. Subsection (g) states that continuous improvement is imperative (this supports a systems-based approach to safety management). Finally, and only specific to Australia, is the goal expressed in subsection (h) of unifying national WHS legislation through adoption of the Model Act.

PCBU obligations to manage hazards and risks will be the focus of Chapter 9: Hazard Identification, Chapter 10: Risk Assessment, Chapter 11: Hazard Control, and Chapter 12: Emergency Response, as compliance with subsection (a) comprises the majority of an organisation's WHS management activities. Consulting and educating on health and safety will be explained briefly here but, more importantly, will be contextualised within Chapters 9 to 12, given this is when these interventions would roll out. Subsequent to this, the discussion will explain the role of regulations and, specifically, the WHS regulator and any legislated or regulated bodies that enact worker compensation rights.

Consulting on Health and Safety

What comprises **worker consultation** that fulfils the legal and moral requirements of WHS management? Good safety consultation:

Enables workers to respond and contribute to issues that directly affect them, and provide valuable information and insights. It's a two-way process where information and views are shared between PCBUs and workers. PCBUs can become more aware of hazards and issues experienced by workers, and involve them in finding solutions or addressing problems. (Safe Work South Australia, n.d, para. 8)

Consultation can range from extensively planned strategies

for complex organisations, through to hazard and risk-based chats in smaller, lower risk, settings. The extent of worker consultation that is **reasonably practicable** is determined by factors such as:

- the size of the business and how it is structured,
- the way work is arranged and where workers are located,
- what suits workers – ask your workers how they would like to be consulted and consider their needs, and
- the complexity, frequency and urgency of the issues that require consultation. (Safe Work Australia, n.d.-b, para. 1)

For **due diligence** purposes, the terms of reference and composition of any committees should be documented along with minutes of meetings that capture any safety concerns raised and, in subsequent meetings, how these were addressed in a **reasonably practicable** manner. As such, staff need to be aware that they are fulfilling an obligation under the WHS **legislation**, so the PCBU and workers should take this responsibility seriously.

Businesses should consult with workers regarding safety because “workers often notice issues and practices, or foresee consequences, that might otherwise be overlooked” (Safe Work South Australia, n.d, para. 8), leading to better overall hazard identification (see Chapter 9), risk assessment (see Chapter 10), and hazard control (see Chapter 11) i.e. safety outcomes. As Reason (1997) points out, when endorsing a ***flexible culture***, it is

important that the people who do the task, and know it well, are those who are most empowered to control its safety management. From Dekker's perspective, it is only through having worker-driven WHS that safety can actually ever be achieved (Dekker, 2018).

So genuine attempts to consult with workers will ensure representation of workers from all parts of the business and across all work shifts (Safe Work Australia, n.d.-b); this will be further explored across Chapters 9–12 in examples, such as, *Risk Assessment Example 1: Exposure to sunlight (and Glastonbury Festival!)* in Chapter 10.

Educating on Health and Safety

Organisations have a legislated (legal) responsibility to inform, educate, and train workers regarding their safety rights and responsibilities; it is useful to understand the obligations of inform, educate and train specifically.

To inform is to “impart knowledge of some particular fact, occurrence, situation, etc.” (Oxford English Dictionary, n.d.-a, part 1.2). This communication is likely in one direction, from the organisation to the worker. The inform-ation will predominantly be **top-down**, generated centrally and broadly across the organisation (see Figure 8.1). From an HR perspective, *informing* can occur when:

- Inducting a worker to a workplace, including when they change roles or sites, to ensure they are aware of relevant organisational policies and procedures as part of **due diligence**.
- Keeping workers up to date on safety initiatives or safety outcomes. This supports an

organisation's *learning culture* but also reinforces its *reporting culture* as workers will see how their reporting of data generates safety initiatives.



Figure 8.1: An informational communication

Source: "Lightning Safety infographic" by State Farm, flickr.com, CC BY 2.0

To educate is to “help or cause (a person, the mind, etc.) to develop the intellectual and moral faculties in general; to impart wisdom to; to enlighten” (Oxford English Dictionary, n.d.-b, part 5). The goal of *educate* is ambitious as it seeks to establish awareness to evoke cognitive and behavioural change (Arlinghaus & Johnson, 2018). In the WHS management context, education will predominately involve adults, which likely requires two-way engagement between the educator, as an organisational representative, and workers, the participants

in the course, to enable learning that encourages individuals to change their perceptions or perspectives. This moral and behavioural aspect is particularly important if the educational intervention seeks to establish or align workers with the organisation's desired **safety culture** (see Box 8.3). From an HR perspective, *education* is likely to take place:

- Prior to hiring an employee, if formal studies are required to be eligible for recruitment into a specific role.
- As part of a worker's continuing professional development by an external tertiary education provider, or run internally if tailored to address organisational issues or work conditions.

Box 8.3: Educating workers on the importance of safety

This video uses humour to educate workers that a poor attitude towards safety management practices leads to incidents. Cleverly, it leads the viewer to expect one type of hazard to be a potential source of harm but swaps it out for a less expected one.



One or more interactive elements has



been excluded from this version of the text. You can view them online here:
<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1693#oembed-2>

Source: “Funny Workplace Safety Training Video” by Chanel 1 Creative Media, YouTube

To train is to “subject to discipline and instruction for development of character, behaviour, or skill” (Oxford English Dictionary, n.d.-c, part 11.10). Training is developing a specific skill to achieve targeted competency. From an HR perspective, *training* can include:

- Familiarising a worker with machinery to ensure their competency (**due diligence**). A new recruit may have used a different model at their prior workplace or training institution, or, if the organisation upgrades machinery, all operators will require re-training.
- Familiarising a worker with a new job role to ensure competency (**due diligence**), such as when they transition to become a supervisor.

Legislative requirements to inform, educate and train

are designed to pre-emptively strengthen an organisation's safety defence layers (see **Swiss Cheese Model**, Figure 5.1). To achieve this, every worker must be, and stay, informed. Education can happen without training, for example this publication is an educational, not a training, resource. While training can occur without education, this is strongly cautioned against. A worker who has the skill to operate a machine, without any intellectual or moral understanding of safety, is vulnerable to an **incident**. Only *pathological* and *reactive* businesses (see Figure 6.2; Hudson's Safety Culture Ladder) would train without educate, whereas *generative* businesses would never separate safety education from training.

Box 8.4: Why a safety education is important

The following video demonstrates workers who competently know how to operate a piece of machinery (they are trained) but clearly have not been educated on its use.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual->

*guide-whs-hr-managers-nz-
au/?p=1693#oembed-1*

*Source: "1st go around on the excavator" by QuickSilver7537,
YouTube*

To achieve subsection (a), protecting workers and others from harm (see Box 8.2), the potential role of information, education and training in an organisation is embedded in further discussions of hazard identification (Chapter 9), risk assessment (Chapter 10) and hazard control (Chapter 11), and is central to the enactment of and emergency response (Chapters 12). The effectiveness of inform, educate and train should be evaluated, as required by subsection (g), as part of continuous improvement (Chapter 13).

Regulation and the WHS regulator

Legislation is delegated as regulations to a minister or government department. These entities are then responsible for monitoring and, when necessary, updating the regulations (Parliament Counsel Office, n.d.). Legislation establishes the **WHS regulator**, an entity

responsible for implementation of fines and penalties as specified in the regulations (see Box 8.5, where the role of a WHS regulator is defined in Australia). Essentially, WHS regulators are responsible for ensuring an organisation's **due diligence**.

In New Zealand, the WHS regulator is WorkSafe who consider that their job:

Isn't just about compliance with the rules. We also aim to promote and embed positive health and safety practices around the country, and to do this, we collaborate with persons conducting a business or undertaking (PCBUs), workers, health and safety representatives, and industry bodies." (WorkSafe, 2018, para. 3)

This educative, versus **punitive**, approach recognises the innate challenge that WHS regulators face; there is always likely to be more businesses requiring inspection than inspectors available to conduct visits. This was even the case during the British Industrial Revolution when the Health and Morals of Apprentices Act of 1802 was introduced, but only four inspectors were employed to inspect over 4000 mills (see Chapter 2). Moreover, it makes sense that regulators would be more effective if they focus on shifting *reactive* or *calculative* organisations up Hudson's Safety Culture Ladder (see Figure 6.2), rather than solely focusing on *pathological* businesses. Box 8.5 defines the role of the WHS regulator, as implemented in full from the *Model Health and Safety Bill*, in the Australian federal legislation.

Box 8.5: Establishment of a regulator's role in the Work Health and Safety Act 2011 (Cth) S 152.

In Australia, a WHS regulator is a legally established government body whose functions are:

- (a) to advise and make recommendations to the Minister and report on the operation and effectiveness of this Act;
- (b) to monitor and enforce compliance with this Act;
- (c) to provide advice and information on work health and safety to duty holders under this Act and to the community;
- (d) to collect, analyse and publish statistics relating to work health and safety;
- (e) to foster a co-operative, consultative relationship between duty holders and the persons to whom they owe duties and their representatives in relation to work health and safety matters;
- (f) to promote and support education and training on matters relating to work health and safety;
- (g) to engage in, promote and co-ordinate the sharing of information to achieve the object of this Act, including the sharing of information with a corresponding regulator;
- (h) to conduct and defend proceedings under this Act before a court or tribunal;
- (i) any other function conferred on the regulator by this Act.

In practice, PCBUs will engage with their WHS regulator in some of the following ways:

1. **Collaborating:** Working together to enhance worker safety through exchanging information on occupational health issues (see Chapter 4) or best practice hazard and risk assessment.
2. **Inspecting:** Receiving a site visit and this can include unannounced workplace inspections if potential safety breaches have been reported by a **whistle-blower** (see Box 8.6).
3. **Notifying:** Reporting on scheduled or completed work as required by legislation; or reporting on their hazardous substances; or notifying illnesses, injuries or incidents (see Box 8.7).
4. **Investigating:** Receiving a site visit specifically designed to investigate **active failures** and **latent conditions** (causes) of a WHS **incident** to determine if safety management was **reasonably practical** or **negligent**.
5. **Prosecuting:** Defending **due diligence** against accusations of negligence in a court of law.

Box 8.6: Oregon Occupational Safety and Health work site inspection

In this video, a WHS regulator site inspection coincides with an incident.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1693#oembed-3>

Source: "Trench Cave In | Oregon OSHA compliance officer caught cave in on tape" by Oregon Occupational Safety and Health, YouTube

Box 8.7: What is a notifiable incident?

A notifiable incident is an **incident** that must be reported to the **WHS regulator** and are usually "occurrences that resulted in a fatality, permanent disability or time lost from work of one day/shift or more" (Archer et al., 2015, p. 86). For example, WorkSafe in New Zealand expects to be informed of a death, serious illness or injury, or any incidents

associated with work, and defines a notifiable incident as “where someone’s health or safety is seriously endangered or threatened” (WorkSafe, n.d., para. 4). Notification is for serious situations including amputation, serious head injury, serious eye injury, a serious burn, skin separating from tissue, a spinal injury, loss of a bodily function, serious lacerations, exposure to an injury or illness requiring treatment within 48 hours, contracting a serious infection (particularly if associated with a known workplace biological hazard), and illnesses for specific work sites (i.e. mining), as scheduled in regulations. Note: Different legislations can have different jurisdictions. In New Zealand, incidents related to work aboard ships are reported to Maritime New Zealand, that industry’s safety regulator rather than WorkSafe.

Both WHS regulators and PBCUs should strive to engage via collaboration. Investigations and prosecution are very undesirable given it likely involves a tragic incident and, from the organisation’s perspective, is associated with considerable **business risk**. Box 8.8 contains a short news podcast on an investigation undertaken when two port workers died within a week of each other at two different ports in New Zealand.

Box 8.8: Regulatory non-compliance at NZ ports

This Radio New Zealand news podcast discusses the findings of a Transport Accident Investigation Committee report into the deaths of Atiroa Tuaiti (Port of Auckland) and Don Grant (Port of Lyttelton) in 2022 which identified poor regulatory compliance and a need for industry-wide safety standards.



Figure 8.2: Lyttelton Port

Source: "Port Lyttelton. NZ" by Bernard Spragg, flickr.com, CCO



Select image to listen (opens in a new tab)

Source: "Investigation into deaths of port workers finds industry safety issues" by Krystal Gibbens, Radio New Zealand Checkpoint, 21st October 2023 (see Checkpoint, 2023)

While poor regulatory compliance does exist, there are businesses that choose to go above and beyond compliance and adhere to **voluntary compliance** initiatives, such as those endorsed by the **United Nations** as is now discussed in *Past Influencing the Present*.

Past influencing the present

The International Labour Organization was created by the **Treaty of Versailles in 1919**, but is now a specialist organisation of the **United Nations**, devoted to "advancing opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity" (International Labour Organization, n.d.-a). They achieve their goals through alliances with member-states (national governments) who sign conventions that governments then uphold through **voluntary compliance** demonstrated via voluntary

reporting. In this way, the International Labour Organization strives to influence national legislation to protect worker rights, including their safety, and therefore indirectly influence organisations.



Figure 8.4: Logo, International Labour Organization

Source: © International Labour Organization, used with permission

New Zealand was a founding member of the International Labour Organization and, by passing the first legislation enabling women to vote in 1893 and later laws to restrict working hours, is recognised as critical to establishing a foundational international Hours of Work (Industry) Convention, 1919 (International Labour Organization, n.d.-b). As the Ministry of Business, Employment and Innovation explain, International Labour Organization conventions are ratified by the New Zealand

government and a “tripartite partnership of government, employers and workers is fundamental to New Zealand’s ILO activities. A tripartite delegation attends the annual International Labour Conference and all reporting to the ILO is undertaken on a tripartite basis” (Ministry of Business, Employment and Innovation, n.d.-a, para. 3); enactment of international conventions is via national-level collaboration between government, industry/employer professional bodies and unions. All actions are, however, voluntary.

While Australia and New Zealand have both ratified the International Labour Organization’s Protocol 2014 to the Forced Labour Convention of 1930, only Australia has implemented a corresponding piece of **modern slavery** legislation. Even then, the Modern Slavery Act 2018 [Australia] only requires compliance by organisations with revenues over \$100 million per year and, for most businesses, reporting is voluntarily.

In New Zealand, non-governmental organisations continue to advocate for **modern slavery** legislation using the convention as a lever, for example World Vision’s report *Risky Goods: New Zealand Imports* (World Vision, 2021). The Ministry of Business, Employment and Innovation suggests that future legislation would:

Require all organisations to take action if they become aware of modern slavery or worker exploitation; Medium and large organisations would be required to disclose the steps they are taking; Large organisations and those with control over New Zealand employers would be required to undertake **due diligence.**” (Ministry of Business, Employment and Innovation, n.d.-b, para. 3)

So, again, different levels of organisations will have different requirements to either comply, or voluntarily comply, with modern slavery initiatives.

Overall, the International Labour Organization has an important role in highlighting issues and trends associated with worker labour and safety rights worldwide. Together with broader United Nation initiatives, including the United Nations Sustainable Development Goals (with *Goal 3 Good Health and Wellbeing* and *Goal 8 Decent Work and Economic Growth* being specific to WHS management), this organisation creates a social impetus for legislative and voluntary compliance and sets expectations for organisations' **social licence to operate**.

Worker Compensation Rights Regulation

In many jurisdictions, legislation will afford workers the right to be compensated for any work-derived injury or illness. This 'workers' compensation' emerged as a response to limitations in British common law that previously required employees to sue for compensation (see the following *Past Influencing the Present* for more details). The goal of most modern workers' compensation schemes is to ensure that workers, who offer their labour to an employer, are compensated for the costs of any illness or injury associated with the provision of their labour.

In turn, employers pay levies into a scheme that should seek to fairly compensate worker costs, without exposing the business to safety liability (Safe Work Australia, 2011). The WHS regulator, rather than workers, retains the capacity to prosecute businesses for safety negligence (see Box 8.5). Moreover, levies can incentivise good safety practice as payments can be reduced according to "a good record of managing worker safety and recovery at work" (Icare, n.d.).

Where possible, the goal for all parties in workers' compensation schemes is that the worker return to work because this is good for business but, importantly, for workers as "work is one of the most effective ways to improve wellbeing" because it supports "participation, independence and social inclusion" (Comcare, 2023a, para. 2).

Past influencing the present

In early 20th Century Britain, the unions formally became involved in the political system through the Fabian Society founding the British Labour Party (Fabian Society, n.d.). In the United States this was not the case and this fragmented efforts towards achieving workers' compensation rights (Guyton, 1999). The British government established the Employer's Liability Act 1880 whereby the "employer had a general duty to take reasonable care to select competent employees and not to expose workers to unreasonable risks such as directing the use of a dangerous machine or unsafe work conditions" (Veljanovski, 2021, p. 661). This was followed by the Workmens' Compensation Act 1897, a 'no-fault' approach to managing compensation (Guyton, 1999). Subsequently, the Fabian Society—through the British Labour Party—enacted a universal healthcare system in Britain (Fabian Society, n.d.) which now works alongside workplace compensation schemes that today ensure British workers are compensated for work injuries (UK Parliament, n.d.-a).

In the United States, this 'care' for workers was achieved

through lobbying for **Worker's Compensation** and emerged as the Federal Employee's Compensation Act 1916 (Norlund, 1991). "All U.S. workers' compensation programs are the products of the American Industrial Revolution" (Norlund, 1991, p. 3). Historically caring for injured workers, or the families of deceased workers, was undertaken by the local communities, most often through their churches. The scale of the Industrial Revolution, and the migration of workers away from their communities, meant this was no longer a tenable approach (Norlund, 1991). After observing European efforts to ensure the welfare of workers and their families (particularly that of Germany which set up the first scheme), in 1916 the United States established an act for federal employees to include "compensation for all civil employees of the Federal Government injured or killed in the performance of duty" (Norlund, 1991, p. 7). It compensated work-derived injury and disease. However, it exempted employers from being sued for negligence and poor safety conditions (Guyton, 1999).

Even today, as influenced by their histories, different countries' jurisdictions will tend more towards a universal health approach or adhere strictly to workers' compensation schemes. As we will now find out, New Zealand has a more universal health approach and Australia has a workers' compensation scheme.

Worker compensation rights in New Zealand

New Zealand has a universal coverage approach to injury:

If someone in New Zealand has an accident and we cover

their injury, we use this money to help pay for and support their recovery. This includes treatment, health, rehabilitation and support services, loss of income or financial help and injury prevention in the community. (Accident Compensation Corporation, 2018, para. 2)

This coverage applies to anyone who incurs an injury, including visitors, within New Zealand (see Box 8.9). This compensation is administered via the Accident Compensation Corporation (ACC).

Box 8.9: ACC New Zealand: Who we are

This video outlines the role of the ACC in administering New Zealand’s universal accident coverage scheme.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1693#oembed-4>

Source: "ACC New Zealand: Who we are" by ACC New Zealand, YouTube

Unlike overseas workers’ compensation schemes, where levies may be solely collected from businesses, in New Zealand the accident compensation scheme is funded via a broad base including business, income, fuel and vehicle levies, and broader government funded via tax. However, like in other workers’ compensation schemes, business premiums are linked to business safety performance with a poor claims record leading to higher levies (Accident Compensation Corporation, 2018). While having universal accident cover can be considered positive, in the context of workplace health and safety it is noted by

WorkSafe that “New Zealand has high rates of workplace fatalities, serious harm injuries, and work related illness compared to other OECD [Organisation for Economic Co-operation and Development] member countries” (WorkSafe, 2023, para. 2). This infers that the accident compensation scheme may be so (cost) effective that it may inadvertently be leading to an over-reliance on **prosecution** to address business safety negligence.

In contrast to worker’s compensation schemes, there is no coverage provided for worker illness and “every year, more than 100,000 New Zealanders are made redundant, laid off, or have to stop working because of a health condition or a disability” (Ministry of Business, Employment and Innovation, 2022, p. 4). Those who lose their jobs can experience considerable disadvantage if not eligible for redundancy payments or welfare therefore, in 2022, the New Zealand Government put out a discussion document to consider if an income insurance scheme might be viable to introduce (Ministry of Business, Employment and Innovation, 2022).

Worker compensation rights in Australia

In Australia, workers receive compensation for “medical treatment, rehabilitation or time off to recover after being injured at work” (Health Direct, 2021, para. 2). It also provides compensation for those who have a work-acquired **occupational disease** (Health Direct, 2021). Notably, “to be eligible, workers only have to prove that their injuries were work related—they do not need to prove negligence on the part of an employer” (Safe Work Australia, 2011, p. 5). This means it only addresses *workplace* illness or injuries (unlike the accident cover in

New Zealand), but still embeds a ‘no fault’ (no **blame-the-victim** or **blame-the-system**) approach.

Australian-based workers’ compensation are managed as insurance schemes and “under Australian law, employers must have insurance to cover their workers in case they get sick or injured because of work” (Safe Work Australia, n.d.-c, para. 1). Businesses pay levies that are calculated according to the risk their industry poses to workers and worker compensation claims are linked to the specific business (Icare, n.d.). The compensation to workers can include some wages while recovering, medical costs (including those associated with rehabilitation or care being provided), lump sums for permanent disability (to enable reasonable adjustments around home), or compensation to families in the case of a fatality (Safe Work Australia, 2011).

PCBU engagement with compensation schemes

In practice, PCBUs will engage with the compensation regulator, or their delegated insurer, in some of the following ways when an employee is injured:

1. **Registering:** Confirm that the effected worker is registered with the scheme to ensure their medical care is sufficient and all costs are compensated.
2. **Administrating:** Provide any required details, and process any relevant documents, to enable the worker’s care.
3. **Monitoring:** Engage with the compensation body to monitor the progress of recovery and stay engaged with your worker(s) to enhance

their wellbeing.

4. **Collaborating:** Working together with the compensation body, **occupational health** professionals and the worker to develop a **return to work plan** to make **reasonable adjustments** so they can work until their full, if possible, recovery.

This chapter has broadly outlined the compliance expectations established by the *Model Work Health and Safety Bill* (Safe Work Australia, n.d.-a), which has subsequently been brought into law via legislation in all jurisdictions, except for the State of Victoria, and in New Zealand. This chapter is not designed to replace the ‘compliance’ checking phase of any organisation’s safety management system but, instead, it seeks to explain the rationales behind the act, some of the implications for practice and to cite reliable information sources that could be accessed and further considered.

With compliance notionally understood, implementation will be the focus on the next five chapters which will move step-by-step through **hazard identification**, **risk assessment**, and determining what **hazard controls** are **reasonably practicable** before, finally, designing emergency responses enabling workers to escape safely as a final safety defence layer.

9.

Implementing: Hazard Identification

This is the first of three chapters focused on managing **hazards** and the **risks** they pose to workers. In this implementation phase, safety professionals are required to enhance organisational capacity, by ensuring adequate resourcing of activities and should foster a positive **safety culture**, while building-up individual worker capacity through training and engagement.

In this chapter, the focus is on effective **hazard identification** as some hazards will be obvious, but some will be very specific to a particular task undertaken at a particular time of day, or even time of year. It is vital that organisations seek to identify hazards because they can lead to **occupational disease** or a WHS **incident**. Identifying hazards is the first step towards strengthening an organisation's safety defence layers (see **Swiss Cheese Model**, Chapter 5).

Learning Objectives

This chapter introduces:

- The concept of hazard identification.
- Common hazard classifications; chemical, ergonomic, biological, physical, psychosocial, safety, and workplace.
- Strategies to identify work-related hazards and scenarios that uncover unanticipated hazards.

A hazard may be defined as “anything with the potential to harm life, health or property” (Dunn, 2012, p. 53) and, in WHS management, risk is the “likelihood and consequence of injury or harm occurring” (Standards Australia & Standards New Zealand, 2001, p. 5) due to an interaction between a hazard and a worker. Hazard identification, risk assessment and hazard controls attempt to make an organisation’s safety defence layers as strong as possible, mitigating everyday occupational health risks while reducing the likelihood of a WHS safety incident occurring. According to the **Swiss Cheese Model** of safety incident causation (Chapter 5), this requires management of human factors to avoid “active failures” and system-based factors, to proactively identify and address any “latent conditions”.

In **blame-the-system** approaches, some people are not considered innately more hazardous than others (Hopkins & Palser, 1987). Instead, it is recognised that there are situations (conditions) that increase the likelihood of human error (active failures), see Box 9.1. These conditions have been extensively researched in different fields including clinical psychology, experimental psychology, organisational psychology, educational

psychology, medical science, anthropometric science, cognitive science, industrial engineering, safety engineering, and computer science (Federal Aviation Administration, n.d.). Scholars, such as Reason (2000) and Hudson (2007), have undertaken empirical studies on human factors in practice.

Box 9.1: WHS Human Factors

The following video provides a brief overview of human factors as a WHS concept.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1191#oembed-2>

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator) & Treadwell, L. (producer). (2019). Excerpt from Video 6: An introduction to work health and safety management.

Preston, A., audio engineer; Orvad, A., artist and Franks, R., animator, Learning, Teaching and Curriculum, University of Wollongong, Australia. YouTube

In an effective safety management system, human error would not lead to a serious incident because other safety defence layers will protect workers. Human factors mainly correspond to the ‘people’ layer of the Swiss Cheese Model (including safety culture) but require consideration of the interactions between workers and the other safety defence

layers (see Figure 9.1). Just like for the other safety defence layers, human factors need be identified and controlled, however, Reason (1997) suggests this is challenging because human-centric factors are difficult to predict and control.

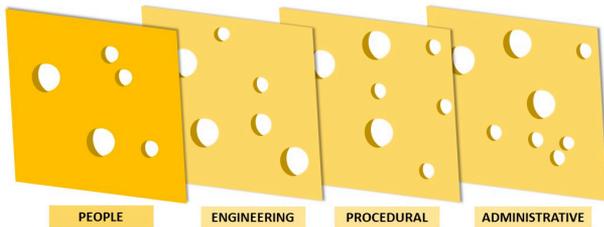


Figure 9.1: Swiss Cheese Model safety defence layers

Source: “Swiss Cheese Model” by Kate Thompson, CC BY 4.0

In contrast, management of latent conditions involves identifying “poor design, gaps in supervision, undetected manufacturing defects or maintenance failures, unworkable procedures, clumsy automation, shortfalls in training, less than adequate tools and equipment” (Reason, 1997, p. 10) which notionally corresponds to engineering, procedural and administrative safety defences (see Figure 9.1).

Hazard Identification

The first step in reducing the risk of a hazard to workers is

to identify it. It is not possible, or appropriate, to present all possible WHS hazard identification tools and techniques here, instead, the focus will be on providing a conceptual overview.

As general rule, when establishing hazard identification processes and procedures in a business, it is advisable to:

1. **Use industry-specific hazard identification resources:** Often available from WHS regulators or professional industry bodies, these resources identify the most common hazards associated with an industry or type of work.
2. **Employee engagement and consultation:** First, get workers to identify hazards known to them that are specific to their role and, secondly, have them collaborate with other workers to discover the less obvious hazards that **inattentional blindness** or **change blindness** may not enable them to identify.
3. **Hazard identification auditing:** Hire professionals, or establish mutually beneficial arrangements with suitably qualified industry peers, to independently review your work site for hazards. This strives to enact a greater level of accuracy, again seeking to avoid biases such as **inattentional blindness** or **change blindness**, and takes hazard identification to a more sophisticated level.

Note: Avoid allocating hazard identification to an **accreditation** body who is auditing your safety management system for two reasons; firstly, it will identify that you have weak hazard identification practices in place putting your **certification** in

jeopardy and, secondly, these audits tend to be at a higher level and focused on system-function rather than undertaking the systematic hazard identification that is actually required for effective safety management.

Note: **WHS regulators** may undertake a hazard audit as part of a spontaneous site visit to your business or as part of an incident investigation; neither of these two options should be relied upon as an effective hazard identification measure as they expose the business to **compliance risk**. However, WHS regulators that take an educative approach (see Chapter 7 discussions on WorkSafe New Zealand as an educative WHS regulator) may genuinely support you in establishing your safety management system by undertaking a hazard audit once you have demonstrated genuine attempts at hazard identification. These WHS regulators recognise the innate vulnerability of a business at the start-up phase of safety management, where hazard controls are not yet in place, but seek to encourage an organisation's pro-safety stance. Furthermore, your proactive engagement with the WHS regulator can be one way to demonstrate efforts towards **due diligence** during this challenging period.

If you are joining an established safety management system it will be important to learn both the tools that your businesses use, but also to understand why they have adopted those methods. This enables you to question if the existing tools are the best possible ones for the task.

Although definitions do vary, as a starting point, hazards may be categorised into:

Chemical Hazards

Chemical hazards “can be a solid, liquid or gas. It can be a pure substance, consisting of one ingredient, or a mixture of substances. It can harm the health of a person who is exposed to it” (Comcare, 2021, para. 1). The International Labour Organization ranks the risk of these hazards in priority order as: “1. Asbestos, 2. Silica, 3. Heavy metals, 4. Solvents, 5. Dyes, 6. Manufactured nanomaterials (MNMs), 7. Perfluorinated chemicals (PFAS), 8. Endocrine disrupting chemicals (EDCs), 9. Pesticides, 10. Workplace air pollution” (ILO, 2021, p. v). The types of diseases that workers suffer as a consequence include respiratory illnesses, toxicity reactions, and cancer. Box 9.2 outlines the global scale and consequence of chemical hazard exposure to workers.

Box 9.2: Global perspectives on chemical hazards



Figure 9.2: A worker in full personal protective equipment handling chemicals

Source: pix4free.org, CCO

The International Labour Organization's *Exposure to hazardous chemicals at work and resulting health impacts: A global review*, found that:

Workers around the world are facing a global health crisis due to occupational exposure to toxic chemicals. Every year more than 1 billion workers are exposed to hazardous substances, including pollutants, dusts, vapours and fumes in their working environments. Many of these workers lose their life following such exposures, succumbing to fatal diseases, cancers and poisonings, or from fatal injuries following fires or explosions. We must also consider the additional burden that workers and their families face from non-fatal injuries resulting in

disability, debilitating chronic diseases, and other health sequela, that unfortunately in many cases remain invisible. All of these deaths, injuries and illnesses are entirely preventable.” (ILO, 2021, p. v)

Further reading:

ILO (2021) *Exposure to hazardous chemicals at work and resulting health impacts: A global review*. International Labour Organization.

The impact on workers of **Inorganic dust** can be difficult to identify due to its prolonged, rather than acute, presentation. Identifying these chemical hazards usually are a specialist activity requiring **occupational epidemiologists** and guidance from **public health agencies** and **WHS regulators** (see Chapter 4). Workers are involved as they may be required to participate in health monitoring, would be expected to report exposure events and, importantly, should be involved in continuous improvement of **safe work procedures**.

Canadian Centre for Occupational Health and Safety reflections for practitioners: “Access chemical information with substance. Find resources on chemical hazards, product safety;

WHMIS [Workplace Hazardous Materials Information System], (M)SDSs [Material Safety Data Sheets], transport of hazardous materials, toxicity, and safe work practices” (2023, para 1).

Ergonomic Hazards

Ergonomic hazards are “physical factors in the environment that may cause musculoskeletal injuries” (ComCare, 2022, para. 1). **Occupational therapists** and **ergonomists** are useful in the re-design of work layouts to prevent ergonomic-related injuries (Capodaglio, 2010). In *Past influencing the present* we see how ergonomics for productivity has shifted to ergonomics for health.



Figure 9.3: Safe manual handling can involve team work.

Source: "Team lifting" by California Department of Industrial Relations, Wikimedia Commons, CC BY-SA 4.0

Past influencing the present

Frederick Taylor used scientific principles (**Scientific Management**) to change the positioning of workers and machines in the workplace to enhance productivity and Henry Ford built on this by designing the assembly line,

which brought the task to the worker rather than the workers to the task (see Chapter 3).

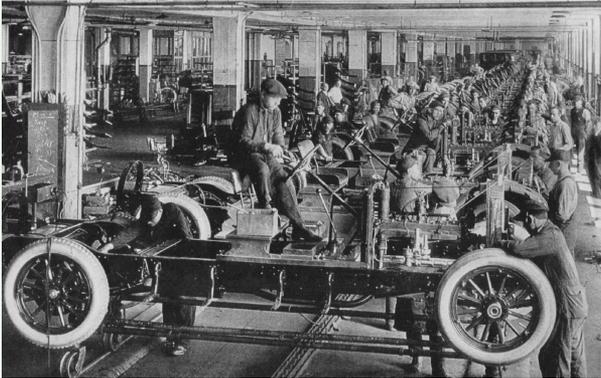


Figure 9.4: An automobile assembly in from 1923 in the United States.

Source: "The Automobile Industry - 1923" via Jasperdo, flickr.com, CC BY-NC-ND 2.0

Today **industrial engineers** continue the traditions of Scientific Management by striving to identify efficiencies through industrial design (U.S. Bureau of Labor Statistics, 2023) but **ergonomists** and **occupational therapists** focus on designing work for workers, including personalising the workplace (see Figure 9.5), particularly if a person is returning to work after illness or injury (Ammendolia et al., 2009).



Figure 9.5: John Pentikis undertakes a work station adjustment

Source: Fort George G. Meade Public Affairs Office, flickr.com, CC BY 2.0

Canadian Centre for Occupational Health and Safety reflections for practitioners: “Ergonomics is

matching the job to the worker and product to the user. Access information and resources on workplace design and considerations, work-related musculoskeletal disorders, related risks, and helpful exercises” (2023, para. 2).

Biological Hazards

Biological hazards “are organic substances that present a threat to the health of people and other living organisms. Biological hazards include “viruses...toxins from biological sources, spores, fungi, pathogenic, micro-organisms, bio-active substances” (ComCare, 2023, para. 1). These types of hazards can be acute, and have an immediately obvious impact on health, or lead to chronic conditions (Centers for Disease Control and Prevention, 2022) which are “defined broadly as conditions that last 1 year or more and require ongoing medical attention or limit activities of daily living or both” (Centers for Disease Control and Prevention, 2022, para. 1).

In an Australian survey, 19% of workers had biological hazards present at their workplace; 75% of these workers were exposed to human biological hazards and 30% to animal biological hazards. Less was known about exposure of workers to less obvious hazards such as plants or mould (Safe Work Australia, 2020).

Canadian Centre for Occupational Health and Safety reflections for practitioners: “Many workplace hazards have the potential to harm workers’ short- and long-term health, resulting in diseases, disorders and injuries” (2023, para. 3).

Physical Hazards

America’s Centers for Disease Control and Prevention define physical hazards as “workplace agents, factors, or circumstances that can cause tissue damage by transfer of energy from the agent to the person” (2022c, para. 1). If only thinking about the **Swiss Cheese Model**, workers might only identify physical hazards with acute impacts on workers, such as an object striking a worker and breaking their arm, but the *transfer of energy* aspect of the above definition can refer to many other situations. One example (see Figure 9.6) is workers operating tools or machinery that vibrate as “excessive exposure can affect the nerves, blood vessels, muscles and joints of the hand, wrist and arm causing Hand-Arm Vibration Syndrome” (Health and Safety Executive, n.d.-a, para. 17).



Figure 9.6: Two workers jackhammering a hard floor

Source: pickpik.com, pikipik free licence

Physical hazards comprise a broad range of hazards including “loud noises, extreme pressures, magnetic fields, radiation, fire, poor lighting, unsafe machinery, misused machinery, obstructions in walkways, [and] slippery floors” (National Association of Safety Professionals, 2018, para. 11). They can be challenging to identify at times because piece of workplace machinery might always pose a physical safety risk but slippery floors are a temporary physical hazard.

Canadian Centre for Occupational Health and

Safety reflections for practitioners: “Physical hazards are substances or activities that threaten your physical safety. They are the most common and are present in most workplaces at one time or another. These include unsafe conditions that can cause injury, illness and death” (2023, para 4).

Psychosocial Hazards

Psychosocial hazards are “aspects of work which have the potential to cause psychological or physical harm” (ComCare, n.d., para. 1). The Australian Government has classified 14 types of psychosocial hazards (see Figure 9.7) and these are important to manage because:

Psychological injuries have longer recovery times, higher costs, and require more time away from work. Managing the risks associated with psychosocial hazards not only protects workers, it also decreases the disruption associated with staff turnover and absenteeism, and may improve broader organisational performance and productivity. (Safe Work Australia, 2022, p. 5)

Essentially, while overlooked until recently, psychosocial hazards represent an important business risk that must be addressed.



Figure 9.7: Psychosocial hazards

Source: Safe Work Australia (2022, p. 5), CC BY-NC 4.0

What makes psychosocial hazards so harmful that their recovery is prolonged? Safe Work Australia explain the biochemistry behind the physical harm triggered by psychological harm:

How do psychosocial hazards cause harm?

Psychosocial hazards can create stress. Stress is the body's reaction when a worker perceives the demands of their work exceed their ability or resources to cope.

Stress creates a physiological and psychological response in the body by releasing adrenaline and cortisol, raising the heart rate and blood pressure, boosting glucose levels in the bloodstream and diverting energy from the immune system to other areas of the body.

Stress itself is not an injury but if it becomes frequent, prolonged or severe it can cause psychological and physical harm.

Some hazards cause stress when a worker is exposed to the risk of that hazard occurring as well as when they are directly exposed to the hazard itself. For example, workers exposed to workplace violence are likely to experience stress if they perceive that the risk has not been controlled, even if the violence does not occur again. In this situation, despite the hazard rarely occurring, the stress itself may be prolonged.

Source: Safe Work Australia (2022, p. 5), CC BY-NC

Different industries expose workers to different types of psychosocial hazards. WorkSafe Queensland highlight manufacturing, transport, agriculture, construction, retail and wholesale, and healthcare as particularly 'at risk' industries.

In healthcare, for example, workers have low job control as their work comprises shiftwork and the provision of care to patients in challenging circumstances. There are high job demands, with considerable emotional control required to enable service delivery. There can be poor levels of support with care staff working very independently. Low role clarity can emerge because of the autonomy of the role and limited opportunities for supervisory guidance and feedback. Workplace change is constant as each shift changes the care team and allocated patients. There can be poor perceptions of institutional justice around shift allocations or inconsistent implementation of procedures. Finally, poor relationships can develop, with conflict not being resolved between shifts, or the line between professional and personal being blurred in patient care (WorkSafe Queensland, 2020). In Chapter 5, Neil Logan (Box 5.1) spoke of the psychosocial hazards of aged care, including personal attachment to elderly people who will inevitably pass away.

In addition to industry-based differences, distinct segments of worker population can be disproportionately exposed to psychosocial hazards (Lovelock, 2019). In 2021 a national survey of the New Zealand working population ($n = 3612$) identified on average that 35% had been exposed in the prior year to 'offensive behaviour' including bullying (23%), cyberbullying (16%), violent threats (14%), sexual harassment (11%), and physical violence (11%). Colleagues and/or customers could be perpetrators of psychosocial hazards. However, within this same survey, Māori and Pacific workers reported higher levels of exposure to psychosocial hazards comparable to the entire New Zealand worker population. For example, bullying was experienced by Māori and Pacific at a rate of 28%, compared to 23%, and physical violence was

reported by 17%, versus 11% of respondents (Khieu et al., 2021). Global populations experience psychosocial hazards at different rates as well, for example violence at work is more likely to be experienced by women than men (see Box 9.3).

Box 9.3: Violence and harassments in the workplace



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1191#oembed-1>

Source: "Violence and Harassment in the Workplace" by the International Labour Organization via Soundcloud

Canadian Centre for Occupational Health and Safety reflections for practitioners: “Learn about stress, violence, bullying, and other behaviours in the context of a workplace environment” (2023, para 5).

Safety Hazards

Safety hazards comprise hazards that may not easily fall into the above categories but do create conditions that lead to safety incidents, and according to America’s National Association of Safety Professionals are:

Tripping and slipping hazards, including spilled liquid, cords running across the floor and blocked aisles. Working from any raised work area, including roofs, scaffolding and ladders. Moving machinery parts and unguarded machinery that a worker can accidentally touch. Electrical hazards, including improper wiring, missing ground pins and frayed cords. Confined spaces. Hazards related to machinery, including boiler safety and the improper use of forklifts. (National Association of Safety Professionals, 2018, para. 22)

One safety hazard that requires particular attention is working alone which is “work is done in a location where the employee can’t physically see or talk to other staff members” (Ministry of Business, Employment and

Innovation, n.d.c, para. 1). This can occur both within a workplace (see Working Alone Example 1) and outside of workplace, given PCBUs are responsible for work wherever it is being undertaken (NZ Parliament, 2015; Safe Work Australia, 2023). Identifying hazards in potentially unknown worksites poses significant challenges (see Working Alone Example 2).

Working Alone Example 1: In a workplace setting

In Australia in 2013, Mr Vijay Singh died from organ failure, caused by hypothermia, after being trapped in a commercial freezer. He was inadvertently working alone when his co-workers all went on lunch break without him (Coroner NSW, 2015). The **Swiss Cheese Model** of safety incident causation is applied to this **incident** below.

Active Failure:

- Mr Singh has poorly manoeuvred the forklift truck when moving stock into a freezer, leading to him being trapped in the freezer by products and the forklift truck.



Figure 9.7: Loading stock into confined spaces, particularly if chilled, requires training and personal protective equipment

Source: "Man Riding a Yellow Forklift lifting Boxes" by Elevate, pexels.com, CCO

Latent conditions:

- Mr Singh was hired via a labour hire company to pack products. A job change led to him using a forklift and working in the commercial freezer without additional training.
- While the company had a forklift policy, Mr Singh did not have a forklift licence. Different staff members assumed that another had checked that Mr Singh had a forklift licence.
- The incident occurred on a Saturday. The site did not usually operate on a Saturday, there were fewer staff than usual, and the main supervisor left the site at 12.30pm.

- Mr Singh became a lone worker, but this was unintentional. The three other packers on site went on a lunch break together at approximately 1.30pm and returned to work at 2pm.
- The other workers decided to finish for the day at 2.30pm and realised they had not seen Mr Singh. It was at this point that they discovered Mr Singh trapped in the freezer and called emergency services. They tried to turn off the freezer but did not know how and the company was not answering their phones (as it was a non-standard workday).

In this case, there are administrative errors, such as not checking for a valid forklift truck licence, through to procedural ones around working in freezers. Moreover, the emergency response procedures were lacking also with the workers being unable to turn off the freezer and the company not being available by telephone to advise them how.

Ironically, less than an hour earlier there had been a **near miss**. Mr Singh had poorly manoeuvred the forklift truck and called for help. All the workers then collaborated to re-align and free-up the forklift, which had become stuck in the freezer. Sadly, once working alone, that one remaining layer of safety defence (access to the other workers) was not available and Mr Singh's calls for help went unheard, leading to his death.

Working Alone Example 2: Outside of a workplace setting

The disappearance of real estate agent Yanfei Bao, on the 19th July 2023 in Christchurch New Zealand, has raised

concerns for lone workers undertaking work outside of workplace settings.



Figure: A real estate agent is showing a property to a client

Source: RDNE stock project, pexels.com, pexels free licence

Ms Bao was door-knocking to expand her client base. Unfortunately, while undertaking this work activity, she was abducted and, after some hours, her car was found abandoned in a suburb different to where she was doing her work. A person was arrested for murder despite her still being missing (Radio New Zealand, 2023).

Off-site client engagement is common in real estate work, according to the Real Estate Institute's Jen Baird, it is "a fairly standard part of real estate, and lots of people still do it and do it perfectly safely. It's a great way to meet people and engage with their communities" (Radio New Zealand, 2023, para. 5). The challenge is then how to ensure a workers can undertake this activity safely and, if

not, whether a PCBU can expect a worker to engage in this activity.

Workplace Hazards

The Canadian Centre for Occupational Health and Safety (2023) uses this category to classify some hazards that do not easily fit within other categories but are workplace related including indoor air quality, scents or odours, weather (temperatures, lighting and storms) etc.

In concluding, the overall purpose of hazard assessment is to produce an exhaustive register of work-related hazards, no matter where that work occurs. Once this has been established, the next required step is to determine the risk associated with each hazard and this is achieved via risk assessment.

10.

Implementing: Risk Assessment

Having learned the importance of hazard identification, and some tactics to compile a thorough list of potential sources of harm in the workplace, it is now time to understand how to assess WHS risk.

Learning Objectives

This chapter explains:

- The objective of WHS risk assessment.
- The difference between likelihood and probability.
- Risk assessment techniques.
- The important role of workers in risk assessment and Safety I versus Safety II approaches.

Risk assessment identifies, for each hazard, the “likelihood and consequence of injury or harm occurring” (Standards Australia & Standards New Zealand, 2001, p. 5). What do risk assessment tools do? They aim to facilitate the

ranking of the likelihood, and consequences, of an interaction between the hazard and workers, plant and/or the environment.

Consequence

In risk analysis, it is useful to begin by connecting hazards with their potential harm. Wide-reaching tools, such as brainstorming and using scenarios (see Box 10.1), are useful to understanding the hazard's potential behaviour in different work contexts and conditions.

Box 10.1: Risk assessment strategies



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1499#oembed-1>

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator) & Treadwell, L. (producer).

(2019). Excerpt from Video 6: An introduction to work health and safety management. Preston, A., (audio engineer); Orvad, A., (artist) and Franks, R., (animator), Learning, Teaching and Curriculum, University of Wollongong, Australia. YouTube

Beginning broadly, and working down to task-specific risk assessments, is only achievable through extensive worker consultation. What the workplace looks like, and how the hazard behaves, can be different. In Risk Assessment Example 1, seeking to understand the consequence of sunlight exposure leads to consideration of sun sensitive workers, sunstroke and, following a conversation with a worker, discovers a range of unexpected potential hazards that may have been left undiscovered should **worker consultation** have not have occurred.

Risk Assessment Example 1: Exposure to sunlight (and the Glastonbury Festival!)

Due to **public health** efforts, awareness of common harms (consequences) of exposure to sunlight, such as UV exposure being linked with skin cancer, are relatively well known. However, some people are more sensitive to sunlight than the general population and “a medical assessment may be required to assess whether an offer of employment is in the mutual interest” (The University of Queensland, 2022, Section 3.0). If already employed, **reasonable adjustments** to roles may be required if

prolonged sun exposure is currently a requirement of the job.

Through brainstorming and the use of scenarios, workers may identify less commonly known risks specific to their work team that make a usually controlled hazard, hazardous for them—such as sunstrike (see Figure 10.1). Waka Kotahi (the New Zealand Transport Agency) identifies sunrise and sunset as “a very dangerous condition to drive in” as the sun is low in the sky and usual hazard controls, such as a vehicles sun visors, are ineffective (Waka Kotahi, n.d., para. 1). Between 2013 and 2017, sunstrike-related crashes led to 21 deaths and 780 injuries (Tischler, 2018).



Figure 10.1: Sunstrike reduces driver visibility

Source: “Morning glare through a dirty windshield!” by Bethesda Magazine, flickr.com, CC BY 2.0

British bakery delivery driver Steve Thomas begins his

shift at 1.15am and concludes his shift at 11.30am (Empson, 2021); this potentially exposes him to sunstrike every single day. Sunstrike will also be seasonally impacted, it will be worse in winter when the sun is lower in the sky expanding the sunstrike window for a longer period each day (Tischler, 2018). However, further discussion (**worker consultation**) with Steve reveals other task-specific risks and uncovers a particularly an unexpected one: the Glastonbury Festival! What could a music festival have to do with risk to a bakery delivery driver?



Figure 10.2: Glastonbury Festival attendees enjoying a performance.

Source: "Glastonbury Festival (2010)" by Neal Whitehouse Piper, flickr.com, CC BY-SA 2.0

Paul Empson, General Manager of Bakers Basco, rode along with Steve Thomas for the day and discovered:

For Steve, the early mornings are becoming more challenging as he gets older. Road rage among car drivers

has increased over the years and he notes that, with people more and more in a hurry these days, there is a lack of tolerance generally on the roads towards fellow drivers. Added to that, the carnage caused on the roads of Steve's route around Glastonbury each year has a knock-on effect with delivery times and additional hours due to heavy traffic. (Empson, 2021, para. 18)

Spending time with Steve has revealed 1) potential age-related fatigue (see Medical University of South Carolina, 2023), 2) a psychosocial hazard, road rage, and 3) that the Glastonbury Festival creates traffic congestion which likely would amplify Steve's fatigue, his exposure to road rage and contact with drivers heading for the festival who may be less familiar with the roads.

It is only by taking a broad approach that unique, job specific, risks of harm can come to be understood. Sometimes at this stage, like in this example, additional hazards will be identified, and these will need to be added to the hazard register.

Likelihood

Once all possible potential links between a hazard and a consequence are identified, it is time to focus in on assessing the likelihood of the consequence occurring. Broadly speaking there are three types of risk assessment: large scale assessment "for large scale complex hazard sites", required specific assessments "that are required under specific legislation or regulations" or general assessments as part of **due diligence** to comply with WHS legislation and **WHS regulator** expectations (Safety Culture, 2023, para. 8). Large scale assessment will

probably require risk assessment specialists. The accuracy and effectiveness of required specific assessments and general assessments will benefit from authentic worker engagement during the consultation process and this could even extend to include worker consultation on the choice of risk assessment tools to be adopted for the task.

No matter the specific tool, this aspect of risk assessment is focuses on the **'likelihood'** that the consequence of the hazard interacting with the workers, plant or environment will be harm. The likelihood of the harm occurring is ranked from low to high (see Table 10.1). The magnitude of the potential harm is then usually described and classified according to its severity from low to high (see Table 10.2).

Table 10.1: Likelihood hazard-related incident scale (1–5)

Likelihood	1	2	3	4	5
Likelihood of an incident relating to this hazard	Highly unlikely	Unlikely	Possible	Likely	Very likely

Source: Lynnaire Sheridan

Table 10.2: Injury severity scale (1–5)

Harm	1	2	3	4	5
Severity of likely harm	Minor	Moderate	Serious	Severe	Critical

Source: Lynnaire Sheridan, adopting Susan Baker's Injury Severity Scale retrieved from MD+Calc (2023)

At this point, some organisations will combine the consequences and likelihood scales together into a table. Some of the tables propose that consequence severity and likelihood be added together (summed) whereas others suggest that they are multiplied (as per Table 10.3).

Table 10.3: Hazard prioritisation (likelihood x severity)

Hazard	Likelihood	Severity	Risk Score
Hazard Example 1 High likelihood-high consequence	5	5	25
Hazard Example 2 Medium likelihood-medium consequence	3	3	9
Hazard Example 3 Low likelihood-high consequence	1	5	5

Source: Lynnaire Sheridan

Other organisations will prefer to generate a risk matrix (see Figure 10.3). In a risk matrix, the low probability–low severity are often represented in green to infer these risks do not merit hazard control. High probability–high severity risks are often red to infer they are unacceptable risk and that hazard control efforts must be taken. Finally,

there will be risks, often represented by yellow or orange, that are medium risks. Medium risks are assumed to be ones that can be managed using an **As Low As Reasonably Practicable (ALARP)** or **So Far As Is Reasonably Practicable (SFAIRP)** approach (Wolters Kluwer, n.d.).

		Severity		
		3 Critical	2 Moderate	1 Marginal
Probability	3 Probable	High - 9	High - 6	Medium - 3
	2 Occasional	High - 6	Medium - 4	Low - 2
	1 Improbable	Medium - 3	Low - 2	Low - 1

Figure 10.3: 3 x 3 risk matrix

Source: Lynnaire Sheridan, modified from Vector Solutions (2019)

The key challenge for Table 10.3 and Figure 10.3 is that they are fundamentally built on the flawed assumption that likelihood is objective and that matrices objectively calculate priorities for actioning. These two assumptions can result in risk management errors that have led to large-scale **critical incidents**.

Assumption error 1: Likelihood is objective, like probability

It is vital to understand that collective negotiation of the **likelihood** that a particular hazard will cause an identified corresponding harm is a subjective, not an objective, decision. While data may inform some aspects of the likelihood of occurrence, often it requires speculation of the timeframe and/or likely severity of the consequence; it is not based on mathematical or statistical **probability**.

Many different factors can impact on individual risk perception including a person's pre-disposition towards optimism or pessimism (optimists reduce the likelihood of the risk and pessimists the inverse), how numerate they are (more numerate people use data better and tend to be less risk biased), personal experience (lived experience of harm increases perceived likelihood of the risk), control over the risk (uncontrolled risks are perceived as more dangerous) and mood (angry people experience reduced risk perception and fearful individuals have amplified risk perceptions) (Ferrer & Klien, 2015). Likelihood is not a fixed value but it is instead based on the *perceived* likelihood as generated collaboratively by the stakeholders involved, based on what they know and what they perceive at that time.

In summary, likelihood is “the chance that something will happen” (Cambridge Dictionary, n.d., para. 1) and is not the same as mathematical probability (see Porter, n.d.). This distinction is important in safety management as the term likelihood should be used instead of probability because the actual probability of when a hazard will generate a particular harm is currently incalculable. However, risk tables and matrices complexify the misconception of likelihood as probability because often qualitative *perceived* likelihood is presented on rating scales using numbers (see Tables 10.1 and 10.2). It is then tempting to generate an overall ‘sum’, or simple multiplication (see Table 10.3) of likelihood and consequence but, as explained above, likelihood is based on risk perception rather than risk probability. There are no ‘real’ numbers assigned to risk matrices and therefore it is not possible to do calculations using it (Wolters Kluwer, n.d.).

Assumption error 2: Matrices (or tables) reflect the 'actual' priority

Risk tables or matrices are perceived as effectively ranking the risks of hazards from high to low, in many cases this is simply not true. Consider Table 10.3 *Hazard prioritisation (likelihood x severity)*, it is based on the mathematical logic of one organisation's online risk assessment tool (it will remain anonymous as it is erroneous). Hazard Example 1, the high likelihood-high consequence hazard, achieved a risk assessment score of 25. Hazard Example 2, the medium likelihood-medium consequence hazard, achieved a risk assessment score of 9. Hazard Example 3, the low likelihood-high consequence hazard, achieved a risk assessment score of 5. Figure 10.3, the risk matrix, ranks hazards similarly.

The flaw is that both Table 10.3 and Figure 10.3 place the lowest priority for action on low probability–high consequence events. Poorly designed tables and matrices inadvertently lead to low probability–high risk **critical incidents** being completely overlooked (Wolters Kluwer, n.d.). This was one of James Reason's insightful discoveries when investigating large-scale WHS incidents and why they were still occurring despite the existence of functional safety management systems (Reason, 1997), Hudson also mentions this in his video (see Chapter 6). Dekker proposes improper use of risk tools has focused organisations on resolving less complex hazards. Ironically when a organisation succeeds "in lowering a non-serious injury incident rate [it] definitely puts an organization at greater risk of accidents and fatalities" (Dekker, 2018, p. 8). Due to their flaws, efforts are being made to create and implement alternatives to risk matrices in the field of risk assessment (see Box 10.2).

Box 10.2: Developments in risk assessment

Adequately capturing low probably–high risk hazards for meaningful consideration during risk assessment is a challenge, one which is beyond the capabilities of risk matrices. Ortwin Renn presents an alternate model for risk assessment (German Advisory Council on Global change, 1998). His approach seeks to move beyond **likelihood** and **probability**, to adequately consider what acceptable risk *actually* is (**reasonably practicable**) from a societal perspective (Government Office for Science, 2011).

Through the German Advisory Council on Global Change, Renn proposes six risk classes (assigned names from Greek mythology) derived from nine overarching concerns derived from experts and the general public: “extent of damage, probability of occurrence, incertitude, ubiquity, persistency, reversibility, delay effect, violation of equity and potential of mobilization” (Government Office for Science, 2011, p. 42). Risk class descriptors encapsulate the characteristics of the risk challenges they represent:

1. Damocles. Risk sources that have a very high potential for damage but a very low probability of occurrence. e.g. technological risks such as nuclear energy and largescale chemical facilities
2. Cyclops. Events where the

probability of occurrence is largely uncertain, but the maximum damage can be estimated. e.g. natural events, such as floods and earthquakes.

3. Pythia. Highly uncertain risks, where the probability of occurrence, the extent of damage and the way in which the damage manifests itself is unknown due to high complexity. e.g. human interventions in ecosystems and the greenhouse effect
4. Pandora. Characterised by both uncertainty in probability of occurrence and the extent of damage, and high persistency...e.g. organic pollutants and endocrine disruptors.
5. Cassandra. Paradoxical in that probability of occurrence and extent of damage are known, but there is no imminent societal concern because damage will only occur in the future. There is a high degree of delay between the initial event and the impact of the damage. e.g. anthropogenic climate change.
6. Medusa. Low probability and low damage events, which due to specific characteristics nonetheless cause considerable concern for people. Often a large number of people are affected by these risks, but harmful results cannot be proven scientifically. e.g.

mobile phone usage and
electromagnetic fields. (Government
Office for Science, 2011, p. 42)

Firstly, these descriptors appear conceptually translatable to smaller-scale organisational scenarios despite being designed to address global environmental risk. Secondly, low probably–high risk situations become clearly visible for consideration. Renn explains that the descriptors are particularly useful to reduce the “gap between the layperson’s risk perception and expert risk analysis” (Renn & Klinke, 2004, p. S44).

If adopting this perspective, risk assessment is conceptualised as the probability of occurrence versus the extent of damage (see Figure 10.4). The goal of this model is to recognise which class a risk scenario falls into and, ideally, to move it from the outer intolerable area towards the normal areas so it can be managed on a day-to-day basis (the hazard is ‘controlled’). Their model is based on the premise that risks can shift classes as their threat is downgraded, for example Pythia can downgrade to Cyclops through the implementation of risk management strategies (German Advisory Council on Global change, 1998).

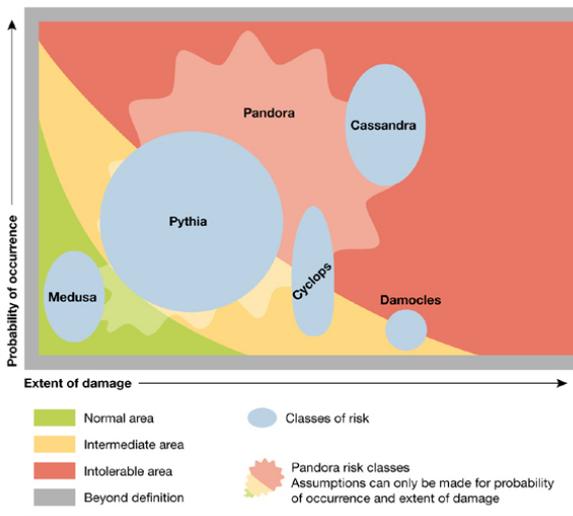


Figure 10.4: A typology of risk

Source: Renn (2004) adapted from original by German Advisory Council on Global Change

Alongside of their model, to actually enhance risk management, Renn and Klinke (2004) suggest management strategies appropriate for each class of risk (see Table 10.4). They propose that Damocles and Cyclops respond best to science-based management. Pythia and Pandora require application of precautionary principles. Cassandra and Medusa risks should be managed via discursive approaches. Notably, discursive approaches are a more transparent approach to risk management

compared to matrix tables and their numerical scales that infer objectivity, while actually being based on the *perceived* likelihood attributed by stakeholders when engaging in risk assessment in any given workplace at any given time.

Table 10.4: Renn and Klinke's proposed management strategies for each risk class

Management	Risk class	Extent of damage	Probability of occurrence	Strategies for action
Science-based	<p>Damocles</p> <p>Cyclops</p>	<p>High</p> <p>High</p>	<p>Low</p> <p>Uncertain</p>	<p>Reducing disaster potential</p> <p>Ascertaining probability</p> <p>Increasing resilience</p> <p>Preventing surprises</p> <p>Emergency management</p>
Precautionary	<p>Pythia</p> <p>Pandora</p>	<p>Uncertain</p> <p>Uncertain</p>	<p>Uncertain</p> <p>Uncertain</p>	<p>Implementing precautionary principle</p> <p>Developing substitutes</p> <p>Improving knowledge</p> <p>Reduction and containment</p> <p>Emergency management</p>

Discursive	Cassandra	High	High	Consciousness building
	Medusa	Low	Low	Confidence building Public participation Risk communication Contingency management

Source: Lynnaire Sheridan, modified from Renn & Klinke (2004)

While Renn’s approach may not entirely be relevant to WHS, or applicable at the scale of an organisation, its philosophical premise is useful when critiquing risk assessment tools to ensure that they are robust in the prioritisation of risk.

Further reading:

Renn, O., & Klinke, A. (2004). Systemic risks: a new challenge for risk management. *EMBO Reports*, 5(51), S41 – S46. Retrieved from <https://www.embopress.org/doi/epdf/10.1038/sj.embor.7400227>

Risk assessment in the field

Due to **change blindness**, it is important *before* a worker begins a task that they undertake a quick risk *re*-assessment. While a formal risk assessment for their workplace hazards should have already taken place, via the processes outlined above, things can and do change in the workplace. Changes relevant to a worker's safety need to be noticed, and acted upon, to ensure the risk that a hazard poses remains stable day to day (with the exception being when the safety management system identifies an opportunity for improved hazard control).

Hazard identification, and then risk assessment, may be required 'in the field' for workers who undertake their work in different environments. While they should be familiar with the hazards that their equipment poses, requiring risk re-assessment, it is important that they pause to consider what hazards exist in their less-familiar surroundings. Two risk assessment tools that are often used in the field are Take 5 and Checklists (see Box 10.3).

Box 10.3: Tools for worker risk assessment 'in the field'

This video explains two risk assessment tools, Take 5 and Checklists, that are particularly useful for workers who undertake work outside of regular workplaces i.e. 'in the field'.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1499#oembed-2>

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator) & Treadwell, L. (producer). (2019). Excerpt from Video 6: An introduction to work health and safety management. Preston, A., (audio engineer); Orvad, A., (artist) and Franks, R., (animator), Learning, Teaching and Curriculum, University of Wollongong, Australia. YouTube

It must be acknowledged that, in this context, risk assessment is heavily dependent on the worker authentically engaging. Dekker (2018), in *Safety Anarchy*, warns that these types of procedures become bureaucratic; in a worst-case scenario they might even be designed at head office and pushed out to work sites leading to worker skepticism (see Box 6.3). Risk assessment by workers of their work is heavily reliant on this procedure being embedded within a functional **safety culture**. Box 10.4 presents one company's clever solution when seeking to raise up their safety culture and communicate their new expectations to their employees. Effectively, it expects workers to engage in informal risk assessment and,

importantly, to take action to reduce the risk posed by the hazard.

Box 10.4: ‘Don’t walk on by’ worker risk assessment training

This is a safety **culture training** video designed to encourage staff to risk assess their environment and take action, where possible, to reduce potential worker interactions with hazards through ‘good **housekeeping**’.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1499#oembed-3>

Source: “Don’t Walk on By” Safety Music Video by Nick James Productions, YouTube

Risk signage

Risk signage is designed to raise the awareness of staff (and potentially visitors) to a hazard in their immediate environment and usually communicates a common consequence caused by that hazard with graphics used to overcome any language barriers (see Figure 10.5).



Figure 10.5: *Hauteur reduite* [Reduced Height]

Source: "*Hauteur Reduite* [Reduced Height]" by Leo Reynolds, flickr.com, CC BY-NC-SA 2.0

Many will be fixed signs whereas others are portable if the hazard is only present occasionally, such as Figure 10.6 for use only when the floor is wet.



Figure 10.6: A portable wet floor sign can be placed by cleaners to warn of the slip, trip and fall hazard posed by slippery wet floors

Source: "Stock photo image of a yellow 'caution wet floor' sign" by Rainbow International, flickr.com, CC BY 2.0

Finally, some other signs simply state the hazard as being present, in this case a toxic gas is used at this workplace (see Figure 10.7).

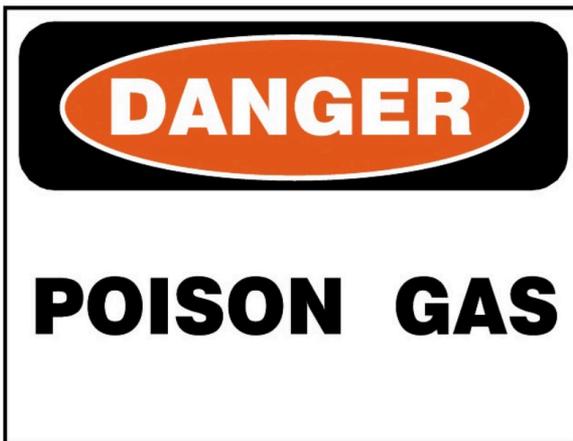


Figure 10.7: Danger sign advising that a poisonous gas is at the work site

Source: VectorPortal, CC BY 4.0

Tabal et al. (2023) found that safety signage is most accurately interpreted, and effectively used, when workers have undertaken general safety training as well as sign-specific training. Moreover, use of signs improves as workers age and/or acquire greater work experience. So while signs **inform** workers of the hazards, adherence to their message is enhanced when organisations also **educate** and **train** workers on the purpose of signage.

Safety I versus Safety II

In concluding this chapter, it is important to discuss **Safety I versus Safety II**. The transition from Safety I to Safety II is fundamentally a shift in mindset from focusing on what went wrong in an **incident (Swiss Cheese Model)** to what goes right day to day. It extends beyond considerations of **safety culture** (Reason, 1997; Hudson, 2007) towards a much more worker-centric approach to safety management, perhaps returning back towards Weick & Sutcliffe's (2001) discussions of the mindfulness of workers in **high reliability organisations**. Safety I's focus is on people as a source of error, whereas Safety II sees them as a "resource necessary for system flexibility and resilience" (Hollnagel et al., 2015, p. 4).

The shift from Safety I to Safety II is maybe nowhere more apparent than as reflected in the certification **standards**, as impacting on risk assessment. For AS/NZS 4801:2001 the focus was on taking organisations through the steps of the safety management system, adopting

scientific management's task orientation, whereas ISO 45001:2018 diagrammatically (see Figure 6.4) depicts leadership commitment and workers at the centre of safety management, reflecting a greater emphasis on human relations managerial approaches as critical to fostering the intrinsic worker motivation upon which safety management has always actually relied.

The emergence of Safety II recognises that everyone in the business, no matter their rank or status, must prioritise safety and take appropriate action in accordance with their role. In acknowledging the importance of front-line workers in their own safety, and that of others around them, we see James Reason's *flexible culture* (Chapter 6) coming to life through efforts to balance a system's administration with 'Do' and 'Act' (Plan-Do-Check-Act) to achieve continuous improvement. Whereas Safety I emphasises in the field risk assessment checklists, Safety II is more likely to encourage mindfulness, such as Take 5 (see Box 10.3).

Having completed risk assessment, and having contextualised its underpinnings during a time of transition from Safety I to Safety II, the next chapter will focus on how to control the risk associated with the hazard through hazard control.

11.

Implementing: Hazard Control

This final hazard and risk chapter focuses on hazard control, determining “appropriate ways to eliminate the hazard, or control the risk when the hazard cannot be eliminated” (Canadian Centre for Occupational Health and Safety, 2023, para. 6). Here the Hierarchy of Control conceptual model is presented to control hazards corresponding to the *engineering*, *procedural* and *administrative* safety defence layers in our Swiss Cheese Model (see Figure 8.1) before examining psychosocial hazards, and other human-related issues, and their management within the *people* safety defence layer.

Learning Objectives

This chapter introduces:

- The Hierarchy of Control as a useful conceptual model to control chemical, ergonomic, biological and physical hazards.
- Challenges and controls for Human Factors, incorporating performance influencing and

psychosocial factors.

- A reflection on the *meaning* of reasonably practicable, having identified hazards, their risks and potential controls.

Hierarchy of Control

The *most* important thing to understand when adopting the Hierarchy of Control is that it should *always* be undertaken in a sequential order from top to bottom (see Figure 11.1). First try to eliminate the hazard: Does the hazard even need to be present in your workplace? If the hazard is vital to undertaking work, could it be substituted with a less dangerous equivalent? If the hazard remains (or even a substitute is brought in), what guarding or other engineering solutions can isolate the workers from the hazard? What administrative controls, such as training, can ensure that the worker only engages with the hazard when needed and that they follow the safest possible **work procedures** when doing so? Finally, what personal protective equipment can be used as a final protective measure?

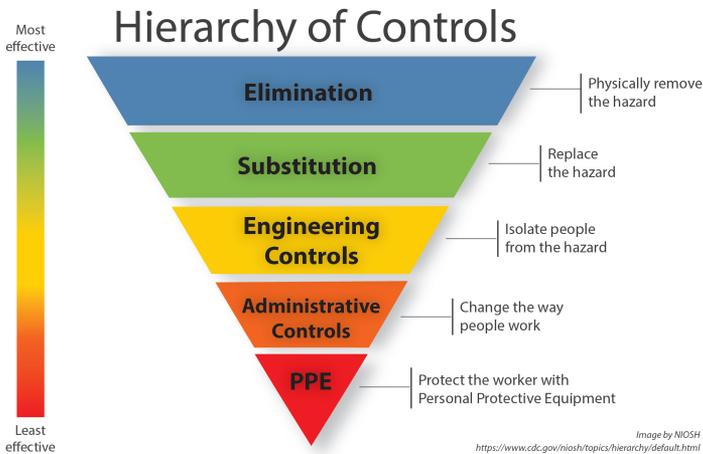


Figure 11.1: Hierarchy of Controls

Source: "Hierarchy of controls" by National Institute for Occupational Safety and Health, Public Domain

Using this hierarchy is important because WHS managers have the greatest control over the upper tiers of the Hierarchy of Control and the least over the bottom levels. For example, safety management staff can decide to substitute one hazard for another, but it is more difficult to ensure that an individual worker is using their safety glasses all the time. The emphasis put on planning in Chapter 7 is partly because it is tempting to get straight into trying to control hazards without doing things step by step, however, organisations risk spending lots of money on PPE for hazards that do not even need to be in their workplace.

Elimination

Inadvertently, sometimes due to **inattentional blindness**, hazards are present in our workplace that do not even need to be there. For example, during hazard identification, it may be found that there is an old unused piece of machinery sitting in the corner of the factory floor. While it may appear harmless, it is unnecessary, and its oily residues may present a fire hazard. Do you need to have that ticking timebomb in your workplace or could you have it properly disposed of?

Sometimes the hazard might be **ergonomic**. Via a workplace risk assessment by an **ergonomist**, the positioning of equipment might be shifted to eliminate the ergonomic risk. In some cases, these types of hazards will not be able to be resolved this way, and will require administrative controls, but if you can eliminate the hazard upstream in the control process, this is best approach.

Substitution

A chemical may be used to clean metal prior to powder-coating. The chemical currently used may be highly toxic and poses a substantial risk to workers. Could this chemical be substituted by another which is equally effective but less toxic? It is usually not **reasonably practicable** to continue to use a highly toxic chemical if a good substitute is available. Should the price of the substitute be substantially more, risking the financial viability of the task, it may be reasonably acceptable to remain with the current practice, however, some businesses may decide to eliminate the hazard and outsource that work

to a specialist business with specialist hazard controls in place.

Engineering controls

Does your machinery have appropriate guarding to protect your workers from harm? When importing new equipment, it is important that thorough risk assessments are undertaken to ensure that all potential ways that a worker could be injured by the machine and its operation are considered. Ideally then, effective engineering controls can be put in place to inhibit worker contact with hazards, such as moving parts (see Figure 11.2).



Figure 11.2: Moving parts of a machine are guarded by a yellow safety fence

Source: "Sheehan filter press safety guards right hand side" by CDE Global, Flickr.com, CC BY 2.0

When importing machinery, a similar risk assessment

should be undertaken and, in many jurisdictions, it is illegal to import machinery without safety guards being attached before supply (Safe Work Australia, 2014); as, unfortunately, some manufacturers sell safety guarding separately which discourages their purchase.

Does your equipment have a clearly marked and accessible emergency ‘stop’ mechanism (button)? In an emergency, it is important that machinery can safely, and quickly, be switched off to reduce further risk of harm (see Chapter 9, Working Alone Example 1). Can your machinery automatically stop? See *Past influencing the present* for details on a dead man’s switch, an automatic shutoff should an operator lose consciousness.

Past influencing the present

It is taken for granted that a power tool, such as a hand drill, only works while you hold the button down on its handle but this is an engineering hazard control known as a ‘dead man’s switch’ invented in the 1890s.



Figure 11.3: The 'trigger' on the hand drill is a small-scale dead man's switch

Source: "A man holds a cordless drill in his hand on a white background" by Marco Verch, Flickr.com, CC BY 2.0

Frank Sprague was an electrical engineer specialising in trams and railways. One of his inventions, in direct response to fatalities caused by railway disasters, was the dead man's switch (Sprague, 1932). This switch requires the driver to actively, and continually, be in contact with the device (see Figure 11.4) and when they are not, often due to a medical episode, it will bring the train to an automatic halt as the driver has ceased active control over the train (Newman, 2010).



Figure 11.4: A worker must have their foot pressing the 'dead man's switch' for the control panel to operate

Source: "Dead man's switch" by Washington State Department of Transportation, flickr.com, CC BY-NC-ND 2.0

Note: Engineering controls attempt to address some latent conditions in the **Swiss Cheese Model** (see Chapter 5) and are notionally considered the engineering safety defence layer in Figure 8.1.

Administrative controls

The purpose of administrative controls is to reduce worker exposure to hazards via appropriate work practices which

can include “work process training, job rotation, ensuring adequate rest breaks, limiting access to hazardous areas or machinery [or] adjusting [production] line speeds” (Centers for Disease Control and Prevention, 2023, para. 9). One such control is a Safe Operating Procedure and another is a Safe Work Method Statement (see Box 11.1).

A **Safe Operating Procedure** (or Standard Operating Procedure) are guidelines on the most efficient, safest, way to undertake the work. By standardising approaches to tasks, “workers don’t have to guess what to do next and can perform tasks efficiently and without danger to themselves or others. Failure to follow SOPs may cause significant safety breaches or loss in production and operational efficiency” (Safety Culture, n.d., para. 1). Again, worker involvement is important to ensure that uptake of Safe Operating Procedure occurs, rather than workers feeling patronised by instruction on simple activities or unrealistic procedures being expected of workers (see Dekker, 2018, and Box 6.3).

Box 11.1: *Regulated Safe Work Method Statement for High Risk Construction Work*

In addition to a situation requiring a business to undertake risk assessment and control, **WHS regulators** have specific requirements for high risk hazards and/or work. The *Safe Work Method Statement for High Risk Construction Work*, is an example of a support resource created by Safe Work Australia to help **PCBUs** comply with “18 high risk construction work activities defined in the WHS

Regulations” (Safe Work Australia, 2020, p. 1). Its purpose is:

To be used if identified as an ‘administrative control’ following a Risk Assessment and is a document that outlines the ‘high risk construction work’ activities to be carried out at a workplace, the hazards that may arise from these activities, and the measures to put in place to control the risks. (University of New England, n.d., para. 8)



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1505#oembed-1>

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator) and Treadwell, L. (producer). (2019). Excerpt from Video 6: An introduction to work health and safety management.

Preston, A., (audio engineer); Orvad, A., (artist) and Franks, R., (animator), Learning, Teaching and Curriculum, University of Wollongong, Australia. YouTube

Note: Administrative controls attempt to address some latent conditions in the **Swiss Cheese Model** (see Chapter

5) and are notionally considered the procedural and/or administrative safety defence layers in Figure 8.1.

Personal Protective Equipment (PPE)

When no other control measures are possible to implement, it is important to ensure that workers are wearing protective equipment that is suitable for their job's tasks.

Box 11.2: WHS Personal Protective Equipment



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1505#oembed-6>

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator) and Treadwell, L. (producer). (2019). Excerpt from Video 6: An introduction to work health and safety management.

Preston, A., (audio engineer); Orvad, A., (artist) and Franks, R., (animator), Learning, Teaching and Curriculum. University of Wollongong, Australia. YouTube

Managers have the least control over PPE implementation and compliance. It is useful, therefore, to come up with engaging ways to create a safety culture that makes wearing, and remembering to wear, PPE part of ‘how things are done around here’. In Box 11.3 Dominion, an American electrical services company, involve their workers in producing a video that, through a very catchy

rap song, helps staff remember in the field safety steps and PPE use.

Box 11.3: Safety Rap

In this video, staff have produced a rap song to remind themselves of PPE use and good safety practices in the field. It reinforces the organisation's safety culture by making safety a social norm.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1505#oembed-2>

Source: "Safety Rap" by Dennis McDade, Dominion VA Power, YouTube

It is now important to demonstrate use of the hierarchical qualities of this hazard control tool. Example 1 applies the Hierarchy of Control to a lathe machine and Example 2 applies the Hierarchy of Control to a ladder.

Hierarchy of Control Example 1: A lathe machine at a metal fabricating business



Figure 11.5: An industrial lathe machine

Source: “Workshop lathe machine” by Sunny Bansodeva, Wikimedia Commons, CC BY-SA 4.0

Lathes (see Figure 11.5) are tools designed to shape metal or wood (All Metals Fabricating, 2020). In this example, we will assume that the lathe is being used in a metal tool fabrication workshop. While there are many potential hazards, such as heavily lifting, contact with liquid coolant etc., as identified by WorkSafe (2017), this example will only focus on the machine when in operation.

Table 11.1: A Hierarchy of Control analysis of hazard control for a lathe in a metal tool fabrication workshop

Control	Decision
Elimination	<p>Not applicable:</p> <p>Lathe required for metal tool fabrication.</p>
Substitution	<p>Not applicable:</p> <p>There is no better equivalent on the market.</p>
Engineering Controls	<p>Applicable:</p> <p>Conduct review for automatic stop mechanism, retrofit if required.</p> <p>Conduct review of existing guarding, ensure it is fit for purpose or retrofit if required.</p> <p>Position lathe controls outside of the work zone to reduce potential contact of the lathe with worker limbs.</p>
Administrative controls	<p>Applicable:</p> <p>Ensure that a collaboratively designed safe work procedure has been written.</p> <p>Ensure that operators have had training and that the workplace culture supports adherence to the safe work procedure.</p>
Personal Protective Equipment	<p>Applicable:</p> <p>As objects can get stuck in lathes (loose clothing, jewellery etc.) provide well-fitting clothing and remove loose items.</p> <p>As objects can fall from the lathe, provide appropriate work footwear.</p> <p>As the lathe is loud, provide appropriate hearing protection.</p>

Source: Lynnaire Sheridan

Note: This table is for illustrative purposes only. It must **not** be used in place of actual hazard control for a lathe.

Hierarchy of Control Example 2: A ladder used by professional painters for exterior façade painting



Figure 11.6: A worker painting the exterior of a building

Source: "Painter at work above Claire's Hair Studio, Omagh" by Kenneth Allen, Geograph, CC BY-SA 2.0

Ladders (see Figure 11.6) are a piece of equipment, with steps or rungs, allowing people to access heights above the ground. In this example, we will assume that the ladder is

being used by professional painters who paint building facades for a commercial painting business.

Table 11. 2: A Hierarchy of Control analysis of hazard control for a ladder used by commercial painters

Control	Decision
Elimination	<p>Not applicable:</p> <p>To paint building exteriors, painters need to reach all parts of the building, and this includes working at heights.</p>
Substitution	<p>Applicable:</p> <p>Scaffolding or scissor lifts (see Figure 11.7) are likely safer options for painters working at height due to their greater stability compared to a ladder.</p> <p>It would be ideal if all buildings had their own scaffolding, but this is not the case. Currently the business cannot afford to own and install scaffolding for all the buildings they are concurrently required to paint. They also cannot afford the time to put up and take down a lesser amount of scaffolding.</p> <p><i>Decision: A scissor lift is hired, as a trial to see if it is suitable for the workers, as it potentially could quickly position—and re-position—the painter to the correct high as required.</i></p>
Engineering Controls	<p>Applicable:</p> <p>Conduct a risk assessment of the hired scissor lift machine, including testing to see that all safety mechanisms are functioning.</p>
Administrative controls	<p>Applicable:</p> <p>Ensure that either a qualified scissor lift operator is hired along with the machine or ensure that staff undergo correct training to be qualified to operate the scissor lift safely.</p>

Personal Protective Equipment	<p>Applicable:</p> <p>Ensure appropriate personal protective equipment as specified by the company hiring the scissor lifts and/or follow recommendations from the WHS regulator.</p> <p>For example, ensure that workers have apparatus that adheres them to the scissor lift basket.</p>
-------------------------------	--

Source: Lynnaire Sheridan

Note: This is not an exhaustive hazard assessment and must not be relied upon as an actual hazard control for adoption of a scissor lift for working at heights.



Figure 11.7: Two scissor lifts with safety baskets

Source: "Two slab scissor lifts used by the Tate Modern to install artworks" by Marie-Lan Nguyen, Wikimedia Commons, CC BY 2.5

In this example, the original hazard is able to be substituted, however, scissor lifts will have associated hazards and risks that will then also need to be considered.

By way of some final comments on the Hierarchy of Control, its depiction in Figure 11.1 is not the only conceptual model available. Safe Work Australia (2023), for example, ranks *substitution*, *isolation* and *engineering* controls as equally comparable in their hierarchy which may be a more useful approach in some business settings (See Figure 11.8).

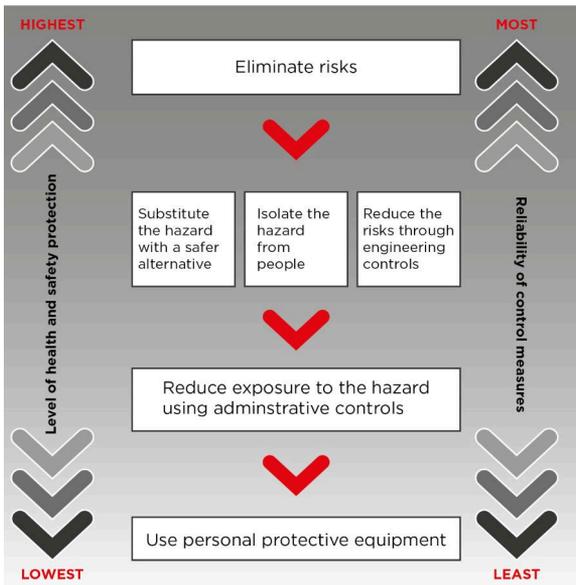


Figure 11.8: Alternate conceptual model for the Hierarchy of Control

Source: "The hierarchy of control measures" by Safe Work Australia (2023d),
CC BY 4.0

Finally, but notably, the Hierarchy of Control is not effective for controlling all types of hazards. Box 11.4 contains a short video outlining when using a hierarchical approach is useful but also when it is not. Given the examples outlined above, it is likely that you can see it appears effective for chemical, ergonomic, biological, physical, safety, and workplace hazards. Hazard controls for human factors, including psychosocial hazards, will now be discussed.

Box 11.4: WHS Hierarchy of Control

The following video provides a useful summary of the concepts discussed in this chapter associated with hazard control.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual->

*guide-whs-hr-managers-nz-
au/?p=1505#oembed-3*

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator) and Treadwell, L. (producer). (2019). Excerpt from Video 6: An introduction to work health and safety management.

Preston, A., (audio engineer); Orvad, A., (artist) and Franks, R., (animator), Learning, Teaching and Curriculum. University of Wollongong, Australia. YouTube

Controlling Human Factors

Taking a **blame-the-system** approach does not preclude us from attempting to control **human factors**. In the **Swiss Cheese Model**, the active failure in an **incident** is usually comprised by human factors (Reason, 1997). What is important is to focus on preventing the conditions that contribute to human error, not on any individual person, because “everyone can make errors no matter how well trained and motivated they are. However in the workplace, the consequences of such human failure can be severe” (Health and Safety Executive, n.d.-b, para. 1).

Human failure, however, is not one thing so different types of failures can be classified according to if they are deliberate or inadvertent (see Figure 11.9). The complexity of human factors is the reason why James Reason puts such a focus on the latent conditions in the Swiss Cheese Model because ‘controlling’ individual behaviour, even within a good **safety culture**, is the most difficult type of hazard control to achieve in a safety management system (Reason, 1997). In essence, both **Performance Influencing Factors** and psychosocial hazards need to be managed.

Controlling for Performance Influencing Factors

Conditions acting upon workers are considered to be Performance Influencing Factors, “the characteristics of the job, the individual, and the organisation that influence human performance. Optimising PIFs will reduce the likelihood of all types of human failure” (Health and Safety Executive, n.d.-c, para. 1). Figure 11.8 depicts a logic tree for human failures derived from Performance Influencing Factors. Essentially some human failures will be inadvertent whereas others will be deliberate. Health and Safety Executive (n.d.-b) explain that inadvertent errors may result in a slip (a usual action going wrong) or a lapse (a required action not being performed). Deliberate non-compliance violations require investigation to determine if non-compliance is routine (usual), situational (specific to the context on that day, such as time pressures) or exceptional (rule breaking to solve an unexpected problem).

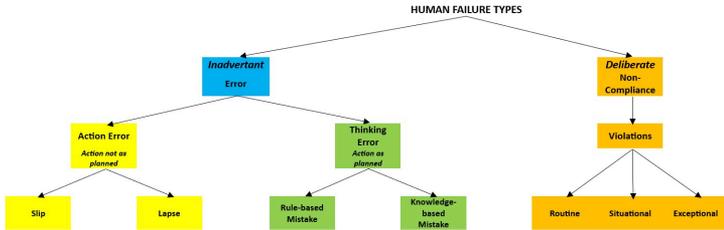


Figure 11.9: Human Failure Types

Source: Lynnaire Sheridan, modified from Health and Safety Executive (n.d.-b, para. 1).

Performance Influencing Factors, and their controls, are perhaps best understood via examples. The first example will explore worker fatigue (likely an *inadvertent error*) and the second discusses the influence of drugs or alcohol on work (likely *deliberate non-compliance*).

Performance Influencing Factor Example 1: Fatigue

Fatigue may be defined as “weariness or exhaustion from labor, exertion, or stress” (Merriam-Webster, n.d.-a, para. 1). It is identified as having an impact on “physical, mental, cognitive, emotional, and motivational functionality” (Billones et al., 2021, p. 8). It is a hazard because “the negative effects of fatigue range from losses or productivity at work due to medical disability, occupational hazards, deaths from medication errors, and suicidal ideation (Billones et al., 2021, p. 1).



Figure 11.10: Workplace fatigue increases the risk of human error

Source: "A Woman Resting Her Head on Her Desk" by RDNE Stock Project, pexels.com, Pexels free licence

To identify fatigue requires a risk assessment of staff and considering what is currently known about the causes of fatigue. For example, there is research that clearly links shift work with fatigue (Shen et al., 2006) and shift workers are likely to be an easily identifiable cohort in your worker population. In contrast, fatigue derived from outside of the workplace may be more difficult to identify (see Figure 11.11).



Figure 11.11: There may be many factors contributing to the fatigue experienced by a worker

Source: "Kids making noise and disturbing mom working at home" by Ketut Subiyanto, pexels.com, Pexels free licence

Currently, the most common ways to identify worker fatigue (in New Zealand) is via employee surveys and training managers to identify it in workers (Business NZ, 2021). Where there is a good *reporting culture*, supported by a *just culture* that will not blame the worker, these tools might be useful to identify work or home related fatigue. Increasingly however, organisations are seeking to address it as part of a broader wellbeing programme alongside of flexible work arrangements, **employee assistance programmes** (such as counselling) and even health food initiatives (Business NZ, 2021).

Fortunately, WorkSafe explain:

PCBUs don't have the sole responsibility to manage fatigue at work. Workers must take reasonable care of their own health and safety...Workers should: turn up in a state fit to work...inform your manager or supervisor if a task is beyond your capabilities...recognise the signs and symptoms of

fatigue...communicate with your manager and report fatigue-related incidents. (WorkSafe, 2017, para. 31)

Performance influencing factor assessment:

Fatigue is likely to be an inadvertent error, potentially leading to either action error, a slip or lapse, or a thinking error, a rules-based mistake or knowledge-based mistake (see Figure 11.9).

Performance Influencing Factor Example 2: Drugs and/or alcohol

Worker drug and alcohol consumption can impact on workplaces as it causes absenteeism (reduced work attendance) and presenteeism (reduced work performance when attending at work). Presenteeism costs businesses up to four times more than absenteeism because it generates impacts such as “reduced productivity and quality of work, job errors, injury, the negative effect on co-workers, inefficient use of resources and damaged property amongst others” (Sullivan et al., 2019, p. 543).



Figure 11.11: A drug test kit

Source: "Multi-drug Screen Test and Kit Boxes" by Curtis Adams, pexels.com, Pexels free licence

While drug and alcohol testing to determine if employees are **fit to work** might appear the best solution, as a medical procedure it requires careful (including legal consideration). Notably in the New Zealand context, “generally an employer may only ask employees and other workers to agree to alcohol or drugs tests if this is a condition of their appointment and in the employment agreement or workplace policies” (Ministry of Business, Employment and Innovation, n.d-d). The Ministry of Business, Innovation and Employment refer employers to the International Labour Organization’s Code of Practice on the management of alcohol and drug-related issues in the workplace (see ILO, 1996) for further guidance.

Performance influencing factor assessment:

Drugs or alcohol being present in a worker's system is likely to be deliberate non-compliance which is either a routine, situational or exceptional violation of workplace policy (see Figure 11.9).

Controlling psychosocial hazards

In contrast to human failures, caused by **Performance Influencing Factors** on an individual, psychosocial hazards tend to be generated by conditions in the workplace (recall examples such as lack of role clarity or poor organisational justice or bullying from Figure 9.7). WorkSafe suggest that “effective psychosocial risk management is dependent on the key agents having adequate knowledge, relevant and reliable evidence and effective and user friendly methods and tools, and the availability of competent experts, services and institutions, and research and development” (WorkSafe, 2019, p. 60). Clearly **PCBUs** must empower competent staff to enact psychological controls within their organisations.

A challenge posed by psychosocial hazards is that many of them can go unnoticed. Safe Work Australia (2022) explains that physical violence is obvious, others are less distinguishable in a generally poor workplace culture. Psychosocial injury flourishes when certain workplace demographics combine with low workplace diversity in

a poor workplace culture. This reinforces statements by Reason (1998), Hudson (2007) and Dekker (2018) that a strong safety culture be considered pivotal to WHS management. It also supports calls from the HR profession for workplace diversity across gender, age, ethnicity etc. (Ely & Thomas, 2020).

Effectively controlling psychosocial hazards requires organisations to address internal conditions (perhaps through changing recruitment practices to incorporate diversity into the workplace) at the same time as putting specific measures into place including ensuring safe access to their facilities (protecting staff from uninvited perpetrators), making all parts of the workplace visible (ensuring there are no areas where a worker could be trapped by another person), and controlling workplace temperatures (literally keeping things cool to keep people calm). Along side of these can be procedural interventions (extricating violent clients), through to administrative strategies, including training to build awareness of psychosocial hazards among staff (Safe Work Australia, 2022).

Note: Psychosocial hazard controls attempt to address some active failures in the **Swiss Cheese Model** (see Chapter 5) and are notionally considered the people safety defence layer in Figure 8.1.

Box 11.5: Video 5, An introduction to work health and safety management



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1505#oembed-4>

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator) and Treadwell, L. (producer). (2019). Video 5: An introduction to work health and safety management.

Preston, A., (audio engineer); Orvad, A., (artist) and Franks, R., (animator), Learning, Teaching and Curriculum, University of Wollongong, Australia. YouTube

Determining what is reasonably practicable

Once you have identified your hazards, undertaken risk assessment and devised hazard controls, it is time to determine what is **reasonably practicable** to implement. While an initial safety management budget may have been

established, what is reasonably practicable is not simply costing-out what can be afforded this financial year. Instead, to ensure **due diligence**, determining what is reasonably practicable will require collaborative discussions between safety staff, workers, representatives of workers (unions), sometimes WHS regulators and, very importantly, the senior leadership of the organisation.

Aligning stakeholder risk perceptions is important because, no matter the rigour of likelihood and consequences tools, the resource limitations of organisation will always demand a moral, values-based, judgement of what hazard controls are to be actioned, versus those activities that will be left until the next safety system cycle or even set aside indefinitely. Given the critical relationship between leadership commitment towards safety and safety resource allocation, it is important to identify that hazard control is constrained by financial resources. Less committed organisations will control fewer hazards and expose their workers to greater risk of harm. However, workers should be able to have a reasonable expectation to safely return home from work each day.

Box 11.6: What is reasonably practicable?

Through a process of aligning stakeholder risk perceptions, decisions can be made that prioritise hazard control according to the likelihood and severity of an incident within the organisation's logistical and budgetary constraints. The

organisation then progresses its safety management based on what is reasonably practicable at that point in time. This is the focus of the following video.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1505#oembed-5>

A transcript of this video is available here.

Source: Sheridan, L. (producer, narrator) and Treadwell, L. (producer). (2019). Excerpt from Video 6: An introduction to work health and safety management.

Preston, A., (audio engineer); Orvad, A., (artist) and Franks, R., (animator), Learning, Teaching and Curriculum. University of Wollongong, Australia. YouTube

Take this ten question quick quiz to review your understanding of hazard identification, risk assessment and hazard control concepts as introduced across Chapters 9, 10 and 11, and see how your learning is progressing.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1505#h5p-6>

In concluding this discussion of hazard controls, it is important to point out that implementing controls for all identified hazards will take time. Workers will continue to be exposed to an unacceptable risk levels until the organisation is able to implement hazard controls. This is why the next chapter is focused on how to achieve an effective emergency response, and how to escape a hazard, if necessary, to minimise harm.

12.

Implementing: Emergency response

Hazard identification, risk assessment and hazard control (Chapters 9–11) all focus on strengthening an organisation’s safety defence layers in response to **latent conditions** contributing to WHS **incidents**, as outlined in Chapter 5’s discussions of the **Swiss Cheese Model**. Importantly, James Reason emphasises that it is not possible to control all possible hazards all of the time, so it is vital to “to provide the means of escape and rescue should hazard containment fail” (Reason, 1997, p.7). This is known as an **emergence response** and is the focus of this chapter.

Learning Objectives

This chapter introduces:

- The principles behind emergency response planning and procedures.
- Natural and public disaster management in the WHS context.
- Real life examples of how WHS management principles have improved actual

emergency responses.

- The role of effective crisis leadership in WHS.
- The importance of simulation training to consolidate emergency response planning.

An emergency response may be defined as:

An immediate, systematic response to an unexpected or dangerous occurrence. The goal of an emergency response procedure is to mitigate the impact of the event on people, property, and the environment. Emergencies warranting a response range from hazardous material spills resulting from a transportation accident to a natural disaster. (Mishra, 2018, para. 1)



Figure 12.1: Signage indicates the direction of the closest emergency exit

Source: pxhere.com, CCO

A fully functioning WHS management system is constantly striving to ‘block the holes’ in James Reason’s **Swiss Cheese Model** and reduce the risk of a serious incident occurring. When all else fails, however, an emergency response is our last layer of protection. Importantly, emergency response protocols extend beyond WHS boundaries to include first responses to **natural disaster** or **public disaster** situations. The goal of any emergency response is to reduce injury and loss of life as the immediate situation unfolds.

The challenge of natural disasters, public disasters or even a critical WHS incident is that they are low probability-high consequence, events (Pearson & Clair, 1998). The following video explains why being prepared is important but also why it is a challenge to keep our focus on these unlikely, but potentially catastrophic, events.

Box 12.1: Video disaster and preparedness

This video is useful when trying to understand preparing for disasters (**incidents**). While it refers to individuals, the same logic applies to businesses when planning for natural disasters or WHS incidents.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=727#oembed-1>

*Source: "Episode 1, Meet 'Disaster' and 'Preparedness'",
PrepareMetroKC, YouTube*

Emergency response plans

So where should we begin? The role of an emergency response plan is to identify the best response when a particular situation eventuates. For example, an emergency response for a fire requires a building evacuation. This is quite different a lockdown designed to protect staff from a potentially violent workplace trespasser. The goal of the emergency response is to reduce the risk of harm to those immediately threatened by the hazard.

Developing an emergency response plan is challenging because it depends on the number of known potential hazards and the number of people and/or first responders who need to be coordinated. However, the alternative is having no planned response for known potential hazards which clearly increases the risk of harm to workers and

site visitors (sub-contractors, customers etc.) as well as increasing a business' legal liability.

In the following *Contemporary WHS Challenge*, Steve Anderson, former Chief Executive Officer of Foodstuffs (South Island), discusses the critical role that their emergency response plan played in responding to the Christchurch 2011 earthquakes.

Contemporary WHS challenges – earthquakes

While **Acts of God** technically sit outside of WHS **legislation, natural disasters** can and do have many impacts on our workplaces and do have WHS implications. Particularly with global climate change increasing the risk of weather-based natural disasters (United States Geological Survey, n.d.; see Figure 12.2), it is important to consider how to take the best of our WHS practices and apply these when our businesses are engaged in disaster management.



Figure 12.2: Cyclone Gabrielle, February 2023, caused devastation to the North Island of New Zealand

Source: "Gabrielle cleanup Havelock North 2023" by Vanessa Parker, © NZ Defence Force, Wikimedia Commons, CC BY 4.0

The Christchurch earthquake of February 2011 was a natural disaster that immediately caused loss of life, with some employees dying at work when buildings were damaged, but also immediately generated many hazards for the survivors, ranging from unsafe live power cables, through to hygiene issues arising from the disrupted water supplies and sewerage systems.

Box 12.1: The Christchurch earthquake

The following video provides a quick overview of the scale and impact of this Christchurch earthquake.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=727#oembed-2>

Source: "A look back at the Christchurch earthquake, a dark day in New Zealand history", 1News, YouTube

Steve Anderson was Chief Executive Officer of Foodstuffs (South Island) at the time of this natural disaster. In the following videos he provides insights into the importance of caring for workers during crises (Box 12.3), managing fatigue during recovery (Box 12.4) and the importance of being prepared (Box 12.5).

Box 12.3: Steve Anderson, the importance of caring for workers during a crisis

In this video, Steve Anderson explains how little acts of

care towards workers can boost morale and keep staff focused on the common goal.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=727#oembed-3>

*Source: Leckie, T. and Sheridan, L. (producers) (2023).
Business for Good: Steve Anderson.*

Molloy, J. (video and audio), Pearce, J. (coordinator), Hortle, L. (assistant), Media Production Unit, Otago Business School. University of Otago, New Zealand. Youtube

Box 12.4: Steve Anderson, the importance of managing worker fatigue during a crisis

In this video, Steve Anderson explains how fatigue can

impact on all staff during a crisis and the importance of being mindful of the impacts of fatigue.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=727#oembed-4>

Source: Leckie, T. and Sheridan, L. (producers) (2023). Business for Good: Steve Anderson.

Molloy, J. (video and audio), Pearce, J. (coordinator), Hortle, L. (assistant), Media Production Unit, Otago Business School. University of Otago, New Zealand. YouTube

Box 12.5: Steve Anderson, the importance of preparing an emergency response ahead of the emergency

In this video, Steve Anderson explains how an emergency simulation that went wrong 18 months prior to

the Christchurch earthquake, fundamentally improved FoodStuff's response to the real emergency.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=727#oembed-5>

Source: Leckie, T. and Sheridan, L. (producers) (2023). Business for Good: Steve Anderson.

Molloy, J. (video and audio), Pearce, J. (coordinator), Hortle, L. (assistant), Media Production Unit, Otago Business School. University of Otago, New Zealand. YouTube

You can see from these videos, particularly the last one, that having a positive WHS culture of preparedness can help a business to navigate and survive such a difficult time. WorkSafe in New Zealand has also continued to clarify which aspects of preparing for an earthquake should be included or excluded from WHS management (see Further Reading), but being prepared and caring about people was Steve Anderson's guiding principles.

Further reading:

WorkSafe (2022) *Dealing with earthquake-related health and safety risks: information for PCBU's and building owners*. Available at: <https://www.worksafe.govt.nz/laws-and-regulations/operational-policy-framework/operational-policies/dealing-with-earthquake-related/> (accessed 26/09/2023).

Reflect:

Imagine you are HR manager for a business that experiences a severe weather event. *What are your WHS obligations versus your social-moral responsibilities at such a critical time?*

Steps to actually create your plan will not be covered here as it is appropriate to examine your legislative requirements, refer to industry standards and involve your staff in creating the plan, however, there are many resources available for businesses starting, or continually improving on, their emergency response plans (see Box 12.6).

Box 12.6: Resources on emergency plans and natural disasters

For resources on emergency plans visit:

In Australia:

<https://www.safeworkaustralia.gov.au/safety-topic/managing-health-and-safety/emergency-plans-and-procedures>

In New Zealand:

<https://www.worksafe.govt.nz/topic-and-industry/hazardous-substances/managing/emergency-plans/>

For further resources on natural disasters visit:

In Australia:

<https://knowledge.aidr.org.au/resources/emergency-planning-handbook/>

In New Zealand:

<https://getready.govt.nz/en/>

Ideally organisations would have designed and well-practised **emergency responses** that will reduce any further potential harm during **critical incidents**. It is useful, however, to gain insights from the broader field of **crisis management** to inform our understanding of the specific role of leadership during, and in the aftermath, of a larger scale critical incident.

Leadership during emergency responses (Crisis Management)

A **crisis** maybe defined as “an unstable or crucial time or state of affairs in which a decisive change is impending...especially one with possibility of a highly undesirable outcome” (Merriam-Webster, n.d.b, para. 3). Ideally, an emergency response would reduce confusion and focus staff on action during an incident, but even then the immediate consequences and recovery phase may prove complex for leaders. Crises are important because they are low-probability but high-consequence situations that are time sensitive, and implicitly are high uncertainty (Pearson & Clair, 1998). These are precisely the scenarios that are challenging for decision-making, as they invoke leaders to adopt their **heuristics**—mental shortcuts to decision-making that can be implicitly biased (Paulus et al., 2022)—which may not lead to the best outcomes.

Eric McNulty is an expert on crisis management who suggests successful crisis leadership comprises:

1. A capable team

The leader will surround themselves with a capable team who are empowered to make valuable contributions through decentralised decision-making.

This is important because, under the high task load conditions established by crises, leaders are vulnerable to heuristics (Paulus et al., 2022) and shared decision-making has been determined to be most effective approach (Kunzle et al., 2010).

2. Asking questions

The leader will ask questions to get other people's perspectives and engage them in collaborative problem solving.

This keeps the leader informed while, again, ensuring that they are not impacted by **heuristics** and other potential decision-making biases (Thompson et al., 1998).

Box 12.7: Steve Anderson, the importance of asking questions during a crisis

In this video Steve Anderson outlines the importance of **worker consultation** and asking questions during crisis events.



One or more interactive elements has been excluded from this version of the text. You can view them online here:
<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=727#oembed-6>

Source: Leckie, T. and Sheridan, L. (producers) (2023). Business for Good: Steve Anderson.

Molloy, J. (video and audio), Pearce, J. (coordinator), Hortle, L. (assistant), Media Production Unit, Otago Business School. University of Otago, New Zealand. YouTube

3. Having a focus on order, rather than control

The leader will recognise that they cannot fully control the situation so they focus on order by making sure everyone knows what is expected of them, and what they can expect from others.

When things are ‘out of control’ during a crisis it often activates the amygdala region of our brain. The amygdala

can trigger responses including fight, flight, fright, etc. (Schauer & Elbert, 2010); this does not help leaders, or their followers, achieve the vital common goals required for the organisation and its people to survive. While some leaders might think they need to control everything to establish stability in crises, this is not achievable (McNulty & Marcus, 2020). Instead, they must make “ a conscious effort to deactivate [the] amygdala and activate [the] frontal lobes, the part of [the] brain responsible for rational, logical, thinking” (Holland, 2023, para. 22). Creating order—clarity on what to do—might be what is required to help everyone step out of amygdala activation and back towards being able to use their executive brain functions, such as decision-making.

Box 12.8: Prime Minister Jacinda Ardern’s statement to the nation (New Zealand) on Covid-19, March 21, 2020

In the following video, Jacinda Ardern introduces the COVID-19 national response levels and the behaviours expected of the New Zealand public. This is an example of creating order rather than attempting to control this crisis situation.



One or more interactive elements has

 *been excluded from this version of the text. You can view them online here:*
<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=727#oembed-7>

Source: "Prime Minister Jacinda Ardern statement to the nation on Covid-19, March 21", RNZ, YouTube

For this successful crisis leadership ‘recipe’ to work, the leader must maintain the trust of their followers (staff and other relevant stakeholders who should be collaborating to move towards a common goal). To do this, they must be rallying people towards an authentic common goal, they must have confidence, but it must be paired with humility, they must communicate the truth and it must be communicated clearly (McNulty et al., 2019)

Box 12.9: Prime Minister Jacinda Ardern’s pre-lockdown casual communication with the people of New Zealand

In this video, Jacinda Ardern “communicates the

truth” about COVID-19 case patterns ahead of a lockdown (i.e. cases will increase before any reduction in infections will occur). Dressed informally (arguably a sign of “humility”), she conveys “confidence” in what New Zealand can achieve during the COVID-19 crisis if everyone collaborates to achieve COVID-19 elimination (the “common goal”).



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=727#oembed-8>

Source: “Jacinda Ardern hosts coronavirus Q&A from home after putting child to bed”, Guardian News, YouTube

In contrast, it is common that leaders who hold a narrow view, end up managing rather than leading, by becoming overly involved in all decision-making, and becoming task oriented at the very time people need empathy and humanity. So McNulty & Marcus suggest, “determine which decisions only you can make and delegate the rest. Establish clear guiding values and principles while foregoing the temptation to do everything yourself” (2020, p. 4).

Box 12.10: Eric McNulty, leading through a crisis



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=727#oembed-9>

Source: "Eric McNulty on Leading through Crisis", Eric McNulty, YouTube

Simulated emergency responses

Almost of equal harm to not having an emergency response plan, is having a plan without training workers on the actual emergency procedures and rehearsing these emergency responses under safe, practice, conditions. Even when we offer drills, some staff will not take this simulation training seriously, so this type of training works best when it is embedded in a functional **safety culture**. Some staff might be blasé about emergency responses because they believe their instincts will kick-in and protect them when faced with a critical situation, but this is simply not the case. The following video demonstrates that

without practice, people can be slow to react during an emergency response and this increases their risk of harm.

Box 12.11: Human behaviour during a fire alarm

The following video demonstrates why emergency response training is required. Unexpectedly, human instinct is not a reliable safety mechanism in WHS management.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=727#oembed-10>

Source: "Human behaviour during a fire alarm | iHASCO", IHasco, YouTube

The following workplace recognises that they might have some staff with poor attitudes towards emergency response drills. In their emergency response training video they use humour to highlight poor worker attitudes and behaviours towards safety emergency response protocols, while reinforcing the desired emergency response procedures.

Box 12.12: A fire evacuation training video

This video demonstrates what workers are meant to do during a building fire evacuation and uses humour to point out common, but unacceptable, behaviours.



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=727#oembed-11>

Source: "Building Evacuation due to Fire", Faculty Development at Austin Community College, YouTube

In conclusion, the process you might undertake in your business to create an emergency response plan will vary, however, collaboration with staff to identify the hazards and create workable emergency responses is crucial. Rolling out initial awareness training and following it up with simulated emergency response events will enable your business to, firstly, ensure the emergency response procedures documented on paper are actionable in practice and, secondly, make these response procedures memorable

for staff should they ever be required in an actual emergency. Finally, the leadership you demonstrate during any emergency event will fundamentally shape its outcome.

13.

Closing the Loop: Measuring, Evaluating, Reviewing and Improving

The final phase in a safety management system is to ‘close the loop’ by evaluating safety data to determine the cycle’s safety outcomes, before deciding what is **reasonably practicable** to implement in the next safety management system cycle. This corresponds to the ‘Check’ and ‘Act’ phases of **Plan-Do-Check-Act** (see figure 6.4).

Learning Objectives

This chapter explains:

- The expected components of a data-driven safety performance review.
- The purpose of a safety performance review.

Measurement of safety should be an ongoing process that is embedded into day-to-day implementation of WHS. Ideally, if the system was planned well, workers are continually collecting data as safety activities are undertaken (**input indicators**), or as issues arise (**output**

indicators), such as reporting a **near miss**. Input and output **KPIs** should then be centralised into a reporting system that can provide up-to-date insights for safety management staff via **dashboards**. However, evaluation of this data is crucial as data on its own does not generate insights or invoke action.

A principal responsibility of WHS systems specialist staff is to ensure safety performance reviews with senior leadership are scheduled and incorporated into regular business reporting cycles. The purpose of this is to ensure that safety remains a priority for the business, but also to foster the leadership's commitment to safety and, finally, to secure the resources required to sustain and enhance safety initiatives that, in turn, should lead to improved safety outcomes at the conclusion of the next full cycle of the safety management system.

What comprises a safety review? A data-driven presentation of safety **input indicators** and **output indicators** for that reporting period, perhaps complemented by anecdotes that demonstrate that the data reflects impacts on people, culminating in an honest appraisal of the organisation's performance on hazard control. Safety management staff would then present their proposed safety initiatives for the next reporting cycle, including the resources required to enhance control of current safety challenges, while quickly addressing new issues that have emerged across the last cycle of the system. The safety review would comprise both 'health' and 'safety' data.

The WHS 'health' data would include **input indicators**, outlining both existing and emerging **occupational health** preventative measures, and **output indicators**, updating senior leaders on the occurrence of occupational illness and injury as identified in their worker population. It is a

time to brief senior leaders on any emerging occupational disease trends, as identified by public health officials and communicated to the organisation by the **WHS regulator**.

WHS 'safety' data would include **input indicators**, such as attendance rates at safety training courses or the number of completed emergency evacuation drills, and **output indicators**, including lost time injuries, and injuries without lost time and near misses (see Chapter 5). Considering this in the context of Reason's **Swiss Cheese Model** (see Figure 5.1), the review considers both **active failures** and **latent conditions**. If the safety system is functioning well, and no **critical incidents** occurred, the safety team will explain how inputs into the safety system combined with the safety culture to minimise and prevent losses. This would be an ideal outcome.

One of the greatest challenges of a successful safety management system is securing the resources to sustain and continually improve safety management. It is easy for senior leaders, despite their **moral judgement** or **business risk** commitment to safety, to become complacent when safety management is effective in preventing loss within the organisation. As Wieck & Sutcliffe (2001) advise, organisations that are most effective at safety management, such as **high reliability organisations**, figure out ways to stay 'mindful' and preoccupied with safety failure. If this can be achieved, your organisation will stay in the *proactive* or *generative* rungs of Hudson's Safety Culture Ladder (see Figure 6.2). If not, your organisation may find itself slipping towards a *calculative* or *reactive* **safety culture** and, longer term, less effective WHS management.

Notably, organisations that undergo safety system **certification** evaluate the rigour of their internal safety management system through external, independent, auditing. Some organisations do this to foster their **social**

licence to operate, as it independently demonstrates the organisation's capacity to manage safety. Other businesses may undertake certification as a governance practice, as part of **due diligence**, in order to ensure safety staff are accountable for delivery of their process enhancements. Rarely would the auditing cycle of a **standards accreditation** body be as frequent as an organisation's internal safety management review cycle. This means that the auditing cycle is overlaid upon the organisation's safety review cycle and, when these occur, their insights are pivotal and inform system-level improvements.

At the end of your safety review, with your leadership commitment re-affirmed and your budget allocated for the next cycle in your organisation of WHS management, according to the **PDCA** approach, it is time to "take action based on what you learned" (American Society for Quality, n.d., para. 3). You would examine, based on insights from the review, the adequacy of safety policy and procedures and proceed to enact any required changes. You would then enter the planning phase of the next safety management system cycle, before implementing required changes. Whatever the review timeframe is, continuous improvement can only be achieved by going through the safety management cycle and seeking out opportunities to enhance safety management over and over again (see Figure 6.1), in recognition that internal and external factors are constantly acting on your organisation (see Figure 6.4), potentially creating weaknesses that will develop into holes in your **Swiss Cheese** (Figure 5.1). Continuous improvement is infinite, however, its discussion in this context of WHS management for HR management must now conclude.

This section of the book, *Practice: Establishing,*

implementing and closing the loop in a safety management system, was designed as a conceptual overview of how organisations can approach the implementation of WHS safety management systems using a **standards**-based approach, while recognising that the specific tools and techniques that each business will adopt will be based on factors including the scale of the business, the nature of the work (ie. level of risk), and the **legislative** requirements of the **jurisdiction** within which the business operates. These chapters were designed to assist you, as an HR practitioner, to identify your moral stance on safety and, most importantly, to determine the level of competency you need, particularly if further professional development is required, to competently fulfil your safety management role within your organisation.

Conclusion

WHS management emerged during the **Industrial Revolution** (Chapters 2 and 3) but has evolved from its domain within **labour** rights, to be positioned as a **business risk** requiring a **systems**-based approach to manage it (Chapter 7). Management of **occupational health and incidents** was conceptualised using the **Swiss Cheese Model** of incident causation. This theory proposes that when **active failures** (human error) combine with **latent conditions** (safety defence layer weaknesses that may lay dormant in organisations until an active failure occurs setting off a chain of events) it culminates in an **incident** (Chapter 5). Large-scale, **critical incidents**, have a substantial impact on people and businesses; it is these low probability–high risk events that present a substantial **compliance, operational and reputational risk** to organisations (Chapter 7).

While **latent conditions** can be addressed through **safety management systems**, the only way to *really* achieve effective safety management is via a strong organisational **safety culture** (Chapter 6). Safety culture motivates the ‘Do’ and ‘Act’ in the Plan-Do-Check-Act (**PDCA**) continuous improvement cycle (Chapter 10). From Reason’s perspective, it is the **learning culture** component of a safety culture that is most important. Learning from an incident, or most ideally from a **near miss**, should identify what to improve but only the culture can foster the authentic safety improvement required to reduce risk of an incident (Chapter 6). In examining safety management implementation, all staff have a role to play

(Chapters 8–10), but leader commitment to safety is critical to resourcing safety management and setting the tone of an organisation's safety culture (Chapter 7). When safety is not a **moral imperative, business risk** can be used to advocate for safety management, however, history cautions us that labour supply and demand will always play a role in the overall prioritisation of safety management as a business imperative (Chapters 2 and 3).

Fundamentally, as research on **high reliability organisations** informs us, when organisations take a moral stance and intrinsically value the health and safety of their workers, they stay preoccupied with safety because they have a strong safety culture that makes safety everyone's business (Chapter 6). This is reflected in the transition from **Safety I to Safety II**, from AS/NZS 4801:2001 to ISO45001:2018, which now puts people at the centre of safety management. Keeping people at the centre of WHS should motivate all we. There should be no death statistics in WHS, we must remember deaths and injuries are the devastating consequences of poor business practices on people.

Glossary

Accident

An accident which is defined as “something bad that happens that is not expected or intended and that often damages something or injures someone” (Cambridge Dictionary, 2023, para. 1) or “something that happens by chance or without expectation; an event that is without apparent or deliberate” (Oxford English Dictionary, n.d., para. 6).

Accident Compensation Corporation (ACC)

New Zealand has universal coverage approach to injury “If someone in New Zealand has an accident and we cover their injury, we use this money to help pay for and support their recovery. This includes treatment, health, rehabilitation and support services, loss of income or financial help and injury prevention in the community” (Accident Compensation Corporation, 2018, para. 2). This coverage applies to anyone who incurs an injury, including visitors, within New Zealand. This compensation is administered via the Accident Compensation Corporation (ACC).

Accreditation

Accreditation is formal authorisation by an standards organisation permitting the accredited entity (person

or business) to certify other businesses against their standards (United Kingdom Accreditation Service, n.d.).

Active failures

"Human beings contribute to the breakdown of such [complex technological] systems in two ways. Most obviously, it is by errors and violations committed at the 'shape end' of the system...Such unsafe acts are likely to have a direct impact on the safety of the system and, because of the immediacy of their adverse effects, these acts are termed active failures" (Reason, 1997, p. 10).

Acts of God

Acts of God: "The operation of uncontrollable natural forces, an instance or result of such forces, frequently in the context of insurance" (Oxford Dictionary, 2023, para. 3).

American Dream

Is an aspiration for citizens and those who have immigrated to the United States that they can achieve the "American Dream of a better, richer, and happier life for all our citizens of every rank" (Adams, 1931, Preface, para. 2).

As Low As Reasonably Practicable Approach (ALARP)

"ALARP is short for 'as low as reasonably practicable'. SFAIRP is short for 'so far as is

reasonably practicable'. The two terms mean essentially the same thing and at their core is the concept of "reasonably practicable"; this involves weighing a risk against the trouble, time and money needed to control it" (Health and Safety Executive, n.d.-a, para. 2).

AS/NZS 4801:2001

AS/NZS 4801:2001 Occupational health and safety management systems - Specification with guidance for use was agreed to safety management standards published in 2001 (see Standards Australia and Standards New Zealand, 2001). These standards have now been superseded by AS/NZS ISO 45001:2018 Occupational health and safety management systems - Requirements with guidance for use (see Standards Australia, 2018).

AS/NZS ISO 45001:2018

AS/NZS ISO 45001:2018 Occupational health and safety management systems - Requirements with guidance for use are the currently agreed to International Organization for standards safety management system standards (see Standards Australia, 2018).

Auditing

"Auditing is defined as the on-site verification activity, such as inspection or examination, of a process" (ASQ, 2023, para. 1).

Biological Hazards

"Biological hazards are organic substances that present a threat to the health of people and other living organisms. Biological hazards include: viruses...toxins from biological sources, spores, fungi, pathogenic, micro-organisms, bio-active substances" (ComCare, 2023, para. 1).

Blame the system

"Theories about the causes of industrial accidents can be classified into two broad types: those which emphasize the personal characteristics of the workers themselves and those which locate the causes in the wider social, organisational or technological environment. The former approach is conveniently termed blaming-the-victim and the latter, blaming the-system" (Hopkins & Palser, 1987, p. 26).

Blame the victim

"Theories about the causes of industrial accidents can be classified into two broad types: those which emphasize the personal characteristics of the workers themselves and those which locate the causes in the wider social, organisational or technological environment. The former approach is conveniently termed blaming-the-victim and the latter, blaming the-system" (Hopkins & Palser, 1987, p. 26).

Boston Artesans

Collectives of craftsman in Boston who affiliated to lobby for work rights. They produced circulars

(widely distributed letters stating their case) in "the name of the Carpenters, Masons and Stone Cutters" (Irving & Schwaab, 1952, p. 342 - 343).

Boston Associates

Boston Associates is a term coined by Vera Shlakman to refer to "a small group of investors from Boston were critical to the larger industrial development of New England. This group, connected by social and blood ties, consolidated wealth and dominated the American textile industry during the first half of the nineteenth century" (Charles River Museum of Industry & Innovation, n.d., para. 1).

"Men like Patrick Tracy Jackson, Francis Cabot Lowell and Nathan Appleton were linked together not only because they had made it to the top of Boston's elite, but because they wanted to make sure that industrial growth did not run amok—that it was restrained by traditional values of community, hard work, social obligation, and decency." (Charles River Museum of Industry & Innovation, n.d., para. 1).

Bottom-up approach

"A way of planning or organizing something that considers the smaller parts or details, or the lower or less powerful levels of a group of organization, first" (Cambridge Dictionary, n.d, para. 1).

Business case

A business case is "an explanation or set of reasons describing how a business decision will improve a business, product, etc., and how it will affect costs

and profits and attract investments" (Cambridge Dictionary, n.d, para. 1).

Business risk

Business risk may be defined as "the exposure a company or organization has to factors that could lower its profits or lead it to fail" (Kenton, 2022, para. 1).

Capitalism

"The practices or principles of capitalists; the dominance of capitalists in financial and business enterprises; an economic system based on wage labour in which the means of production is controlled by private or corporate interests for the purpose of profit, with prices determined largely by competition in a free market" (Oxford English Dictionary, n.d., para 1).

Certification

Certification is the auditing of a business, by an independent accredited entity, to demonstrate (certify) its compliance with standards set by a standards organisation (United Kingdom Accreditation Service, n.d.).

Change blindness

"Failing to notice significant changes to visual scenes...understanding the inability or failure to detect change is critical to improving worker safety (Solomon et al., 2021, p. 1).

Chemical Hazards

"A hazardous chemical can be a solid, liquid or gas. It can be a pure substance, consisting of one ingredient, or a mixture of substances. It can harm the health of a person who is exposed to it" (Comcare, 2023, para. 1).

Chronic disease

"Chronic diseases are defined broadly as conditions that last 1 year or more and require ongoing medical attention or limit activities of daily living or both" (CDC, 2022, para. 1).

Cognitive decline

"A gradual loss of memory, orientation, executive function, and the ability to carry out the activities of daily living (Lake, 2021, p. 66).

Collective Bargaining

"Collective Bargaining, the ongoing process of negotiation between representatives of workers and employers to establish the conditions of employment" Encyclopedia Britannica, 18th September 2023.

Communism

"A theory that advocates the abolition of private ownership, all property being vested in the community, and the organization of labour for the common benefit of all members; a system of social

organization in which this theory is put into practice" (Oxford English Dictionary, n.d., para.1).

Compliance

"Conformity in fulfilling official requirements" (Merriam-Webster, n.d., para. 1).

Compliance risk

"Compliance risk primarily arises in industries and sectors that are highly regulated" (Kenton, 2022, para. 9).

Crisis

"An unstable or crucial time or state of affairs in which a decisive change is impending" (Merriam-Webster, n.d., para. 1).

Crisis management

"The process by which a government, business, or other organization deals with a crisis or emergency" (Oxford English Dictionary, 2023, para. 1).

Critical incident

A critical incident is "a sudden, unexpected and overwhelming event, that is out of the range of expected experiences" (UNHCR, 2019, para. 1).

Dashboard

"A dashboard is a way of displaying various types of visual data in one place. Usually, a dashboard is

intended to convey different, but related information in an easy-to-digest form. And oftentimes, this includes things like key performance indicators (KPI)s or other important business metrics that stakeholders need to see and understand at a glance" (Tableau Software, n.d., para. 5).

Developed economy

“A developed economy is typically characteristic of a developed country with a relatively high level of economic growth and security. Standard criteria for evaluating a country’s level of development are income per capita or per capita gross domestic product, the level of industrialization, the general standard of living, and the amount of technological infrastructure” (Majaski, 2022,para. 1).

Developing economy

“Terms such as ‘emerging countries’, ‘least developed countries’, and ‘developing countries’ are commonly used to refer to countries that do not enjoy the same level of economic security and industrialization, and growth as developed countries” (Majaski, 2022, para. 9).

Disability

"Disability is part of being human. Almost everyone will temporarily or permanently experience disability at some point in their life...Disability results from the interaction between individuals with a health condition, such as cerebral palsy, Down syndrome and depression, with personal and environmental factors

including negative attitudes, inaccessible transportation and public buildings, and limited social support" (World Health Organization, n.d., para. 1).

Note: This definition is based on the Social Model of Disability. For more information on this see: Ikutegbe P, Randle M, Sheridan L, et al. (2023) Successful employment outcomes for people with disabilities: A proposed conceptual model. 75(3): 202 - 224.

Disaster (public, non-work specific)

"A sudden calamitous event bringing great damage, loss, or destruction" (Merriam-Webster, n.d., para. 1). As such, these events are is not specific to work or a workplace.

Disciplinary Processes

"Particularly where employment relationships are well-defined and enforceable, discipline and grievance processes are the mechanisms for policing the relationship and enforcing its terms. Discipline is the employer's response to a perceived breach of the terms of the relationship by the employee. Grievance, in strict definition, is the employee's mechanism for addressing an alleged breach of the terms of the relationship by an employer" (McAndrew, 2016, p. 92).

Discrimination

"Discrimination is the unfair or prejudicial treatment of people and groups based on characteristics such as race, gender, age, or sexual orientation. The human

brain naturally puts things in categories to make sense of the world. Very young children quickly learn the difference between boys and girls, for instance. But the values we place on different categories are learned—from our parents, our peers, and the observations we make about how the world works. Often, discrimination stems from fear and misunderstanding. Discrimination is a public health issue. Research has found that the experience of discrimination—when perceived as such—can lead to a cascade of stress-related emotional, physical, and behavioral changes" (American Psychological Association, 2022, para. 1)

Division of Labour

"Is the extent to which jobs in an organization are subdivided into separate tasks" (Heery & Noon, n.d., para. 1).

Due diligence

"The care that a reasonable person exercises to avoid harm to other persons or their property" (Merriam-Webster, n.d., para. 1).

Educate

"To help or cause (a person, the mind, etc.) to develop the intellectual and moral faculties in general; to impart wisdom to; to enlighten" (Oxford English Dictionary, 20223, part 5).

Emergency response

"An emergency response is an immediate, systematic response to an unexpected or dangerous occurrence. The goal of an emergency response procedure is to mitigate the impact of the event on people, property, and the environment. Emergencies warranting a response range from hazardous material spills resulting from a transportation accident to a natural disaster" (Mishra, 2018, para. 1).

Employee Assistance Programme

"An employee assistance program (EAP) is a work-based intervention program designed to assist employees in resolving personal problems that may be adversely affecting the employee's performance...Programs are delivered at no cost to employees by stand-alone [independent] EAP vendors or providers" (SHRM, 2023, para. 1).

Employment Relationship

An employment relationship is "the connection between employees and organizations through which individuals sell their labour to an employer. In practice, employment relationships can be short-term or long-term, can be governed by informal understandings or an explicit contract, and can involve workers and organizations of all types. From a legal perspective, the laws in each country define what is considered an employment relationship covered by employment and labour law as well as other public policies such as unemployment insurance or social security" (Budd, 2016, p. 123).

The nature of employment relationships are "defined by their terms, which spell out the rights, entitlements and obligations of employers and employees" (McAndrew, 2016, p. 92).

Environmental risk management

"Environmental risk management is the process of systematically identifying credible environmental hazards, analyzing the likelihood of occurrence and severity of the potential consequences, and managing the resulting level of risk" (Speight, 2015, p. 322).

Ergonomic Hazards

"Ergonomic hazards are physical factors in the environment that may cause musculoskeletal injuries" (ComCare, 2023, para. 1).

Ergonomics

"The design of furniture or equipment and the way this affects people's ability to work effectively" (Cambridge Dictionary, n.d., para. 1).

Ergonomist

"Someone who studies the design of furniture or equipment and the way this affects people's ability to work effectively" (Cambridge Dictionary, 2023, para. 1).

Fit to work

"Fit to work or fitness to work is a medical assessment

done when an employer wishes to be sure an employee can safely do a specific job or task" (Canadian Centre for Occupational Health and Safety, n.d., para. 1).

Forced Labour

"Forced labour differs from slavery in that it involves not the ownership of one person by another but rather merely the forced exploitation of that person's labour" (Encyclopedia Britannica, 2023, para. 1).

Fordism

"Fordism is a term widely used to describe (1) the system of mass production that was pioneered in the early 20th century by the Ford Motor Company" (Jessop, 2020, para. 1).

Gig economy

"A gig economy is a labor market that relies heavily on temporary and part-time positions filled by independent contractors and freelancers rather than full-time permanent employees" (Investopedia, 2022, para. 2)

Hazard

A hazard may be defined as "anything with the potential to harm life, health or property" (Dunn, 2012, p. 53).

Hazard control

Hazard control is determining "...appropriate ways to eliminate the hazard, or control the risk when the hazard cannot be eliminated" (Canadian Centre for Occupational Health and Safety, n.d., para. 6).

Hazard identification

"Hazard identification is part of the process used to evaluate if any particular situation, item, thing, etc. may have the potential to cause harm" (CCOSH, 2023, para. 4).

Health

The World Health Organization defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 1946, p. 1).

Heuristics

"A heuristic is a mental shortcut commonly used to simplify problems and avoid cognitive overload. Heuristics are part of how the human brain evolved and is wired, allowing individuals to quickly reach reasonable conclusions or solutions to complex problems. These solutions may not be optimal ones but are often sufficient given limited timeframes and calculative capacity" (Chen, 2023, para. 1).

High Reliability Organizations

High reliability organisations are distinguished from

other organisations as they have a: "...preoccupation with failure, reluctance to simplify interpretations, sensitivity to operations, commitment to resilience and deference to expertise" (Weick & Sutcliffe, 2001, p. 30).

Housekeeping

"The care and management of property and the provision of equipment and services (as for an industrial organization)" (Merriam-Webster, n.d, para. 2).

Human Capital

"Human capital, intangible, collective resources possessed by individuals and groups within a given population These resources include all the knowledge, talents, skills, abilities, experience, intelligence, training, judgment, and wisdom possessed individually and collectively, the cumulative total of which represents a form of wealth available to nations and organizations to accomplish their goals" (Huff, n.d., para. 1).

Human Factors

"Human factors refer to environmental, organisational and job factors, and human and individual characteristics, which influence behaviour at work in a way which can affect health and safety" (Health and Safety Executive, n.d.-b, para. 1).

Human Relations School

The Human Relations School of thought was founded by Elton Mayo at Harvard Business School in the early 20th century (O'Connor, 1999). The Human Relations School of thought is a "human relations approach, aimed at improving morale and reducing resistance to formal authority" (Miles, 1965, para. 1).

Human Resource Management

"The management of people in working organizations. It is also frequently called personnel management" Encyclopedia Britannica, 2023, para.1).

Inattentional blindness

"Inattentional blindness is a popular human error associated with selective attention or inattention. It can be depicted as an individual's failing to notice or recognize a visual object or event due to a lack of active attention in a given situation" (Park et al., 2022, p. 1),

Incident

In the WHS context, "An incident is an unplanned event or chain of events that results in losses such as fatalities or injuries, damage to assets, equipment, the environment, business performance or company reputation" (Wolters Kluwer, n.d., para. 1).

Industrial Engineers

"Industrial engineers devise efficient systems that

integrate workers, machines, materials, information, and energy to make a product or provide a service" (U.S. Bureau of Labor Statistics, 2023, para. 1).

Industrial Revolution

"Industrial Revolution, in modern history, the process of change from an agrarian and handicraft economy to one dominated by industry and machine manufacturing. These technological changes introduced novel ways of working and living and fundamentally transformed society. The process began in Britain in the 18th century and from there spread to other parts of the world...the United States and western Europe, began undergoing the 'second' industrial revolution by the late 19th century" (Encyclopaedia Britannica, 2023, para. 1).

Industrialisation

"The development of industries in a country or region on a wide scale; the process of industrializing or fact of being industrialized" (Oxford English Dictionary, n.d., p.1).

Inform

"To impart knowledge of some particular fact, occurrence, situation, etc." (Oxford English Dictionary, 2023, part 1.2).

Inorganic dust

"Particles in the air may cause lung problems...Inorganic refers to any substances that do

not contain carbon" (John Hopkins Medicine, n.d., para. 6).

International Labour Organization

The International Labour Organization was created by the Treaty of Versailles in 1919 but is now a specialist organisation of the United Nations devoted to “advancing opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity” (International Labour Organization, n.d., p. 1).

International Organization for Standardization (ISO)

The ISO (International Organization for Standardization) is "is an independent, non-governmental international organization with a membership of 169 national standards bodies. Through its members it brings together experts to share knowledge and develop voluntary, consensus-based, market relevant International Standards that support innovation and provide solutions to global challenges” (International Organization for Standardization, n.d., para. 1).

Jurisdiction

“The power, right, or authority to interpret and apply the law...the limits or territory within which authority may be exercised” (Merriam-Webster, n.d., para. 1).

Key Performance Indicators (KPIs)

“Key performance indicators (KPIs) are used to

measure and monitor whether an organization is on the right track...KPIs play an important role in modern organizations improving performance is key to achieving organizational success” (Madsen and Stenheim, 2022, para. 1).

Knowledge economy

"The knowledge economy is a system of consumption and production that is based on intellectual capital. In particular, it refers to the ability to capitalize on scientific discoveries and applied research" (Hayes, 2021, para. 1).

Labour

Labour "means any valuable service rendered by a human agent in the production of wealth, other than accumulating and providing capital or assuming the risks that are a normal part of business undertakings" (Encyclopedia Britannica, 2022, para. 1).

Labour Union

“Trade union, also called labour union [particularly in the United States], association of workers in a particular trade, industry or company created for the purposes of securing improvements in pay, benefits, working conditions or social and political status through collective bargaining” (Encyclopedia Britannica, n.d., para. 1). Notably, Trade unions emerged in the United Kingdom during the Industrial Revolution to protect craftspeople's rights (they emerged from original crafts guilds), whereas in the United States they drew all workers (skilled and

unskilled) together to negotiate labour rights (hence these are known as Labour Unions).

Lag (outcome) indicator

"Outcome indicators refer more specifically to the objectives of an intervention, that is its 'results', its outcome...These indicators, therefore, allow us to know whether the desired outcome has been generated. It may take time before final outcomes can be measured" (World Health Organization, 2014, para. 7).

Latent conditions

"Fallibility is an inescapable part of the human condition, it is now recognized that people working in complex systems make errors or violate procedures for reasons that generally go beyond the scope of individual psychology. These reasons are latent conditions....poor design, gaps in supervision, undetected manufacturing defects or maintenance failures, unworkable procedures, clumsy automation, shortfalls in training, less than adequate tools and equipment - may be present for many years before they combine with local circumstances and active failures to penetrate the system's many layers of defences" (Reason, 1997, p. 10).

Lead (input) indicator

"These indicators refer to the resources needed for the implementation of an activity or intervention. Policies, human resources, materials, financial resources are examples of input indicators. Example:

inputs to conduct a training course may include facilitators, training materials, funds" (World Health Organization, 2014, para. 1)

Legislation

"A law or set of laws suggested by a government and made official by a parliament" (Cambridge Dictionary, n.d., para. 1).

Likelihood

Likelihood is "the chance that something will happen" (Cambridge Dictionary, 2023, para. 1) compared with probability which is "mathematics concerned with the laws governing random events, including the collection, analysis and interpretation, and display of numerical data" (Porter, n.d., para. 1). This distinction is important in safety management as the term likelihood is used instead of probability because the actual probability of when a hazard will generate a particular harm is currently incalculable. In WHS management then, the term likelihood describes a rating that is collaboratively generated by the stakeholders involved based on what they know and what they perceive at that time - it is their perceived likelihood for the risk.

Management

"Organization, supervision, or direction; the application of skill or care in the manipulation, use, treatment, or control (of a thing or person), or in the conduct of something" Oxford English Dictionary, n.d., para. 1).

Medical retirement

"Medical retirement...is different from normal retirement because after normal retirement the employee doesn't often work again, after medical retirement the employee often looks for a different job that is not limited by the illness or injury" (Ministry for Business, Innovation and Employment, n.d., para. 16).

The advantage for an employee of having a medical retirement is "the reason for leaving will be reflected in their record of service and in any references that the employer gives them (rather than dismissal for incapacity). A medical retirement package may include a financial payment which can provide some financial security while the employee gets better and considers future options. Sometimes a medical retirement package includes career support, EAP counselling or medical assistance" (Ministry for Business, Innovation and Employment, n.d., para. 18).

Metric System

The Metric System is:

"The International System of Units (SI), commonly known as the metric system, is the international standard for measurement. The International Treaty of the Meter was signed in Paris on May 20, 1875 by seventeen countries, including the United States. The seven SI base units, which are comprised of

Length - meter (m)

Time - second (s)

Amount of substance - mole (mole)

Electric current - ampere (A)

Temperature - kelvin (K)

Luminous intensity - candela (cd)

Mass - kilogram (kg)" (National Institute of Standards and Technology, 2023, p. 2).

Middle Ages

“Middle Ages, the period in European history from the collapse of the Roman civilisation in the 5th century to the period of Renaissance (variously interpreted as beginning in the 13th, 14th or 15th century, depending on the region of Europe and other factors)” (Encyclopaedia Britannica 2023, para 1).

Modern Slavery

"Modern slavery is a relationship based on exploitation. It is defined by a range of practices that include: trafficking in persons; slavery; servitude; forced marriage; forced labour; forced marriage, debt bondage; deceptive recruiting for labour or services; and the worst forms of child labour and is visible in many global supply chains. Each of these terms is defined in treaties and documents of the United Nations and the International Labour Organization" (Australian Human Rights Institute, 2019, para. 3)

Moral Judgement

Moral judgement is the “evaluation of actions with respect to moral norms and values established in society” (Thoma et. al. 1991 cited in Li et al., 2017, p. 122).

Natural Disaster

"A sudden and terrible event in nature (such as a hurricane, tornado, or flood) that usually results in serious damage and many deaths" (Merriam-Webster, n.d., para. 1).

Near miss

Near misses are "unplanned incidents that occurred at the workplace that, although not resulting in any injury or disease, had the potential to do so" (Archer et al., 2015, p. 86). When contextualised in the Swiss Cheese Model of incident causation, they can be understood as "an event that could have potentially resulted in...losses, but the chain of events stopped in time to prevent this" (Wolters Kluwer, n.d., para. 1).

Negligence

"Negligence, in law, the failure to meet a standard of behaviour established to protect society against unreasonable risk" (Encyclopaedia Britannica, 2023, para. 1).

Occupation

Technically occupations are "the activities and tasks of everyday life. These include things people do to look after themselves, to enjoy themselves, and to contribute to the social and economic fabric of their communities" (Occupational Therapy Board of New Zealand, n.d., para. 1).

Note: Occupation does not just refer to employment.

Occupational disease

Occupational disease is “any illness associated with a particular occupation or industry. Such diseases result from a variety of biological, chemical, physical, and psychological factor that are present in the work environment or are otherwise encountered in the course of employment” (Kazantzis, 2022, para. 1).

Occupational Epidemiology

"Occupational epidemiology has the same main goal as the broad field of epidemiology: to identify the causes of disease in a population in order to intervene to remove them. Occupational epidemiology is an exposure-oriented discipline; it is thus the systematic study of illnesses and injuries related to the workplace environment" (Merletti et al., 2014, p. 1577 citing Checkoway et al. 2004).

Occupational health

Occupational health had its modest beginnings in first aid and disease controls for high risk heavy industry workplaces, such as mines, but gained greater recognition in the 1970s when the World Health Organization acknowledged its contribution to the identification of workplace-derived factors causing occupational illness and suggested its remit should be broadened to encompass public health. So, today, many occupational health specialists have more of a public health, and less of an immediate workplace, focus (Schilling, 1989).

Occupational Health and Safety (OHS)

Health and safety at work is known as occupational health and safety, workplace health and safety and work health and safety. Occupational health and safety would appear to be a traditional term which is currently less in favour, perhaps, because the term occupation is broader than paid work (consider occupational therapy). The term workplace health and safety then likely emerged to define the focus as being on work, as opposed to other types of occupation. Today, given the rise of flexible work arrangements and the ‘gig economy’, worker safety has been clarified in legislation as being the responsibility of persons conducting a business or undertaking (PCBUs) no matter where their workers undertake that work. It is for this reason that this book adopts the term work, health and safety.

Occupational Therapy

"Occupational therapy is the art and science of helping people take part in everyday living through their occupations" (Occupational Therapy Board of New Zealand, n.d., para. 1)

Note: Occupation in this context is not limited to the occupations of work and employment.

Operational risk

Operational risk “arises from within the corporation, especially when the day-to-day operations of a company fail to perform” (Kenton, 2022, para. 10).

Paternalism

“The policy or practice of restricting the freedoms and responsibilities of subordinates or dependants in what is considered or claimed to be their best interests” (Oxford Dictionary, 2023, para. 1).

Paternalistic

“Of, relating to, or of the nature of paternalism; practising paternalism” (Oxford English Dictionary, n.d., para. 1).

PCBU

A PCBU, a person conducting a business or undertaking, “may be an individual person or an organisation. This does not include workers or officers of PCBUs, volunteer associations, or home occupiers that employ or engage a tradesperson to carry out residential work” (WorkSafe, 2019, p. 4).

Performance Influencing Factors

"Performance Influencing Factors (PIFs) are the characteristics of the job, the individual and the organisation that influence human performance. Optimising PIFs will reduce the likelihood of all types of human failure (Health and Safety Executive, n.d.-c, para. 1).

Performance management

Decramer et al. (2021, p. 91) succinctly describe that: "Performance management is described as the process

of measuring, communicating and managing employee performance in the workplace so that performance is aligned with the strategy of the organisation (Bauer et al., 2020). The HR system of performance management comprises a specific approach to consistently manage individual performance goals (DeNisi & Smith, 2014) and consists of multiple related HR practices: planning, monitoring, evaluation, and reward of employees' performance (Aguinis, 2013; Audenaert et al., 2019)".

Physical hazards

"Physical hazards are factors or conditions within the environment that can harm your health" (Comcare 2023, para. 1).

Plan-Do-Check-Act (PDCA)

"The Plan-do-check-act cycle is a four-step model for carrying out change. Just as a circle has no end, the PDCA cycle should be repeated again and again for continuous improvement" (ASQ, 2023, para. 1) where the different steps are: "Plan: Recognize an opportunity and plan a change, Do: Test the change. Carry out a small-scale study; Check: Review the test, analyze the results, and identify what you've learned; Act: Take action based on what you learned in the study step" (ASQ, 2023, para. 3).

Planning

"The establishment of goals, policies, and procedures for a social or economic unit" (Merriam-Webster, n.d., para. 1).

Policies

Policies "are rules and guidelines that define and limit action, and indicate the relevant procedures to follow" (Heery & Noon, n.d., para. 1).

Probability

Probability is "mathematics concerned with the laws governing random events, including the collection, analysis and interpretation, and display of numerical data" (Porter, n.d., para. 1).

Procedures

Procedures are "step-by-step sequences of actions that should be taken to attain particular objectives" (Heery & Noon, n.d., para. 1).

Productivity

"At the corporate level, productivity is a measure of the efficiency of a company's production process, it is calculated by measuring the number of units produced relative to employee labor hours or by measuring a company's net sales relative to employee labor hours" (Kenton, 2023, para. 3).

Prosecution

"The act of officially accusing someone of committing and illegal act by brining a case against that person in a court of law" (Cambridge Dictionary, n.d, para. 1).

Protestant ethic

"The value attached to hard work, thrift, and efficiency in one's worldly calling, which, especially in the Calvinist view, were deemed signs of an individuals' election, or eternal salvation" (Britannica, 2020, para. 1).

Psychosocial hazards

"Psychosocial hazards are aspects of work which have the potential to cause psychological or physical harm" (ComCare, n.d., para. 1).

Public health

"Public health is the science and art of preventing disease, prolonging life, and promoting physical health and efficiency through organized community efforts for the sanitation of the environment, the control of community infections, the education of the individual principles of personal hygiene, the organization of medical and nursing service for the early diagnosis and preventative treatment of disease, and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health" (Windslow, 1920, p. 30)

Punitive

"Intended as a punishment" (Cambridge Dictionary, n.d, para. 1).

Quality risk management

“Quality risk management is a systematic, risk-based approach to quality management. The process is composed of the assessment, control, communication, and review of quality risks. It is especially critical in the pharmaceutical industry, where product quality can greatly affect consumer health and safety” (Safety Culture, 2023, para. 1).

Reasonable adjustment

“Reasonable adjustments are changes an employer makes to remove or reduce a disadvantage related to someone's disability. For example: making changes to the workplace, changing someone's working arrangements, finding a different way to do something, providing equipment, services or support. Reasonable adjustments are specific to an individual person. They can cover any area of work“ (Advisory, Conciliation and Arbitration Service, 2022, para. 1).

Note: Disability can be permanent or temporary.

In the Australian legal context:

"The concept of reasonable adjustments reflects the understanding that a worker with an injury, ill health or disability can often perform tasks if adjustments are made to accommodate the effects of their injury, ill health or disability. The aim of any reasonable adjustment is to minimise the impact of the injury, health problem or disability to enable the worker to fully take part in work-related programs and effectively undertake the inherent requirements of their job.

Workers face many obstacles to participating in a

life in work. Reasonable adjustments that support someone's ability to work can be effective in:

- > preventing deterioration of health and allowing employees with health problems to stay at work
- > enabling employees to stay at work or return to work after injury
- > assisting people with a disability to enter and stay in the workplace" (ComCare, 2013, para. 1).

Reasonably Practicable

Australia's Model Work Health and Safety Bill defines reasonably practicable as:

"In this Act, reasonably practicable, in relation to a duty to ensure health and safety, means that which is, or was at a particular time, reasonably able to be done in relation to ensuring health and safety, taking into account and weighing up all relevant matters including:

(a) the likelihood of the hazard or the risk concerned occurring; and

(b) the degree of harm that might result from the hazard or the risk; and

(c) what the person concerned knows, or ought reasonably to know, about:

(i) the hazard or the risk; and

(ii) ways of eliminating or minimising the risk; and

(d) the availability and suitability of ways to eliminate or minimise the risk; and

(e) after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost

is grossly disproportionate to the risk" (WorkSafe Australia, 2023, Section 18).

Regulation

"Regulations are rules made by a government or other authority in order to control the way something is done or the way people behave" (Collins Dictionary, n.d., para. 1).

Relativistic

A relativistic stance is "based on the belief that truth and right and wrong can only be judged in relation to other things and that nothing can be true or right in all situations" (Cambridge Dictionary, 2023, para. 1)..

Reputational risk

Reputational Risk "Any time a company's reputation is ruined, either by an event that was the result of a previous business risk or by a different occurrence, it runs the risk of losing customers and its brand loyalty suffering" (Kenton, 2022, para. 11).

Return to work plan

"A return to work program is a workplace's written plan that focuses on finding meaningful and suitable work for workers coming back to the workplace from injury or illness. The program should include prevention, accommodation, and support for recovery. Through collaboration, the goal of the program is to have the worker return to their pre-injury or pre-illness job, where appropriate, and in a timely

manner. The return to work program outlines the roles and responsibilities of all parties involved. It is a guideline for developing individualized plans for both physical and mental injuries. Return to work programs can also be used to facilitate accommodations for non-work-related injuries" (Canadian Centre for Occupational Health and Safety, n.d., para. 1).

Risk (WHS)

"Likelihood and consequence of injury or harm occurring" (Standards Australia & Standards New Zealand, 2001, p. 5).

Risk Assessment

"The purpose of risk assessment is to identify and manage hazards to reduce the likelihood of incidents occurring" (ACC, 2012, p. 52).

Safe Operating Procedures

"Standard Operating Procedure (SOP) sometimes called a Safe Operating Procedure, outlines a set of detailed instructions to help workers perform complex tasks properly and safely. Having standard operating procedures in place means workers don't have to guess what to do next and can perform tasks efficiently and without danger to themselves or others. Failure to follow SOPs may cause significant safety breaches or loss in production and operational efficiency" (Safety Culture, n.d., para. 1).

Safe Work Method Statement

WHS regulators sometimes have specific requirements for high risk hazards and/or work. Safe Work Method Statements are documents "that outlines the 'high risk ...activities to be carried out at a workplace, the hazards that may arise from these activities, and the measures to put in place to control the risks " (University of New England, n.d., para. 8).

Safety

Safety is a "state in which the risk of harm (to persons) or damage is limited to an acceptable level" and risk is the "likelihood and consequence of injury or harm occurring" (Standards Australia & Standards New Zealand, 2001, p. 5).

Safety Audit

"A safety audit is a process that is considered the gold standard for evaluating the effectiveness of occupational health and safety programs. Their primary purpose is to identify health and safety hazards, assess the effectiveness of the measures in place to control those hazards, and ensure compliance with the Occupational Health and Safety Administration's (OSHA) standards. Safety audits are conducted by independent audit consultants in order to ensure an unbiased review of policies, procedures, and safety management systems" (Safeopedia, 2021, para. 1).

Safety culture

“A culture that supports an organization’s OH&S management system is largely determined by top management and is the product of individual and group values, attitudes, managerial practices, perceptions, competencies and patters of activities that determine commitment to, and the style and proficiency of, its OH&S management system” (Standards Australia and Standards New Zealand, 2018), p. 27).

Safety culture ladder (Patrick Hudson)

Patrick Hudson's health, safety and environment ladder conceptualises "a pathway from less to more advanced [safety] cultures" (Hudson, 2007, p. 703). It sees organisational safety behaviours as ranging from pathological, very weak safety cultures, through to generative cultures that embody a strong safety culture.

Safety Culture theory (James Reason)

James Reason conceptualises a safety culture as comprising “four critical subcomponents of a safety culture: a reporting culture, a just culture, a flexible culture and a learning culture” (Reason, 1997, p. 196). By focusing on the development of these individual subcomponents, he believes that a safety culture will emerge as “ways of doing, thinking and managing that have enhanced safety health as their natural byproduct” (Reason, 1997, p. 192).

Safety I and Safety II

Safety management is increasingly being classified into two eras (or paradigms); Safety I and Safety II.

Safety I, the dominant safety management paradigm from the 1960s into the 2000s, can be explained as a safety management approach that "presumes that things go wrong because of identifiable failures or malfunctions of specific components: technology, procedures, the human workers and the organisations in which they are embedded. Humans—acting alone or collectively—are therefore viewed predominantly as a liability or hazard, principally because they are the most variable of these components" (Hollnegal et al., 2015, p. 3). The Swiss Cheese Model of incident causation is an artifact of Safety I conceptualisations of safety management.

Safety II has emerged across the 2000s with Hollnegal advocating for a shift "from ensuring that 'as few things as possible go wrong' to ensuring that 'as many things as possible go right'" (Hollnegal et al., 2015, p. 3). Their 2015 white paper "From Safety-I to Safety-II" essentially coined the two terms and explained Safety II as assuming "that everyday performance variability provides the adaptations that are needed to respond to varying conditions, and hence is the reason why things go right. Humans are consequently seen as a resource necessary for system flexibility and resilience" (Hollnegal et al., 2015, p. 3).

In summary, Hollnegal et. al. consider Safety I's focus to be on people as a source of error (active failures), whereas Safety II sees people as a "resource

necessary for system flexibility and resilience” (Hollnegal et al., 2015, p. 4).

Safety management system

A safety management system is “ a systematic approach to managing safety. It is designed to continuously improve safety performance through the identification of hazards, the collection and analysis of safety data and safety information, and the continuous assessment of safety risks” (Civil Aviation Authority of New Zealand, 2023, p. 12).

Scientific Management

Scientific Management may be defined as: “An approach to management, based on the theories of F.W. Taylor, dealing with the motivation to work. It sees it as a manager’s duty to find out the best way to do a given job, by a process of work measurement, then give each worker individual instructions which have to be strictly followed. The individual is thus seen as the extension of his or her machine, and his or her rewards are also to be allocated mechanically, with more pay expected to produce more output regardless of any other factors” (Statt, 1999, p. 150).

Scientific Method

"Mathematical and experimental technique employed in the sciences. More specifically, it is the technique used in the construction and testing of a scientific hypothesis" (Encyclopaedia Britannica, 2023, para. 1, Scientific Method).

Scientific Revolution

The Scientific Revolution was a "drastic change in scientific thought that took place during the 16th and 17th centuries. A new view of nature emerged during the Scientific Revolution, replacing the Greek view that had dominated science for almost 2,000 years...bringing about the following transformations: the re-education of common sense in favour of abstract reasoning; the substitution of a quantitative for a qualitative view of nature; the view of nature as a machine rather than as an organism; the development of an experimental, scientific method that sought definite answers to certain limited questions couched in the framework of specific theories; and the acceptance of new criteria for explanation, stressing the "how" rather than the "why" that had characterized the Aristotelian search for final causes" (Spencer et al., 2019, para. 1).

Slave

A slave is a " person who has the (legal) status of being the property of another, has no personal freedom or rights, and is used as forced labour or as an unpaid servant; an enslaved person" (Oxford English Dictionary, 2022, para. 1).

Slave labour

Slave labour is "labour performed involuntarily and under duress, usually by relatively large groups of people" (Encyclopaedia Britannica, 2022, para. 1).

Slavery

Slavery is “a form of dependent labour performed by a nonfamily member. The slave was deprived of personal liberty and the right to move about geographically” (Encyclopaedia Britannica, 2022, para. 1).

So far as is reasonably practicable (SFAIRP)

"ALARP is short for 'as low as reasonably practicable'. SFAIRP is short for 'so far as is reasonably practicable'. The two terms mean essentially the same thing and at their core is the concept of "reasonably practicable"; this involves weighing a risk against the trouble, time and money needed to control it" (Health and Safety Executive, n.d.-a, para. 2).

Social Class

Social class is “a group of people within a society who possess the same socioeconomic status” (Encyclopaedia Britannica, 2023, para. 1).

Social license to operate

"The social license to operate (SLO), or simply social license, refers to the ongoing acceptance of a company or industry's standard business practices and operating procedures by its employees, stakeholders, and the general public. The concept of social license is closely related to the concept of sustainability and the triple bottom line" (Kenton, 2023, para. 1).

Socialism

"A theory or system of social organization based on state or collective ownership and regulation of the means of production, distribution, and exchange for the common benefit of all members of society; advocacy or practice of such a system, especially as a political movement" (Oxford English Dictionary, n.d.).

Standard Operating Procedures

"Standard Operating Procedure (SOP) sometimes called a Safe Operating Procedure, outlines a set of detailed instructions to help workers perform complex tasks properly and safety. Having standard operating procedures in place means workers don't have to guess what to do next and can perform tasks efficiently and without danger to themselves or others. Failure to follow SOPs may cause significant safety breaches or loss in production and operational efficiency" (Safety Culture, n.d., para. 1).

Standards

Standards are agreed to principles and approaches established by panels of experts (International Organization for Standardization, n.d.).

Strategic risk

"Strategic risk is when a business does not operate according to its business model or plan" (Kenton, 2022, para. 8).

Swiss Cheese model of safety incident causation

"James Reason proposed the image of "Swiss cheese" to explain the occurrence of system failures...According to this metaphor, in a complex system, hazards are prevented from causing human losses by a series of barriers. Each barrier has unintended weaknesses, or holes – hence the similarity with Swiss cheese. These weaknesses are inconstant – i.e., the holes open and close at random. When by chance all holes are aligned, the hazard reaches the patient and causes harm" (Perneger, 2005, p. 71).

System

"A group or set of related or associated things perceived or thought of as a unity or complex whole" (Oxford Dictionary, 2023, para. 1).

Top-down approach

"Used to refer to a situation in which decisions are made by a few people in authority, rather than by the people who are affected by the decisions" (Cambridge Dictionary, n.d, para. 1).

Trade Union

"Trade union, also called labour union [particularly in the United States], association of workers in a particular trade, industry or company created for the purposes of securing improvements in pay, benefits, working conditions or social and political status through collective bargaining" (Encyclopedia

Britannica, n.d., para. 1). Notably, Trade unions emerged in the United Kingdom during the Industrial Revolution to protect craftsperson's rights (they emerged from original crafts guilds), whereas in the United States they drew all workers (skilled and unskilled) together to negotiate labour rights (hence these are known as Labour Unions).

Train

"To subject to discipline and instruction for development of character, behaviour, or skill" (Oxford English Dictionary, 2023, part 11.10).

Treaty of Versailles

The Treaty of Versailles is a "peace document signed at the end of World War I by the Allied and associated powers and by Germany in the Hall of Mirrors in the Palace of Versailles, France, on June 28, 1919" (Encyclopaedia Britannica, 2023, para. 1).

Triple bottom line

"The triple bottom line is a business concept that states firms should commit to measuring their social and environmental impact—in addition to their financial performance—rather than solely focusing on generating profit, or the standard 'bottom line'" (Miller, 2020, para. 5).

United Nations

"The United Nations is an international organization founded in 1945. Currently made up of 193 Member

States, the UN and its work are guided by the purposes and principles contained in its founding Charter. The UN has evolved over the years to keep pace with a rapidly changing world. But one thing has stayed the same: it remains the one place on Earth where all the world's nations can gather together, discuss common problems, and find shared solutions that benefit all of humanity (United Nations, 2023, para. 1).

United Nations Sustainable Development Goals (UNSDGs)

"The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests" (United Nations, 2023, para. 1).

Voluntary compliance

"The act of obeying a particular rule or law, or of acting according to an agreement without being forced to" (Collins Dictionary, n.d., para. 1).

Wellbeing

According to the World Health Organization: "Well-being is a positive state experienced by individuals and societies. Similar to health, it is a resource for daily life and is determined by social, economic and environmental conditions. Well-being encompasses quality of life and the ability of people and societies to contribute to the world with a sense of meaning and purpose" (World Health Organization, n.d, para. 1).

Western

William McNeill explains that the "west" and "western" have different interpretations across history and dependent on the particular context: " 'the West' in the sense of Western civilization. The first and most obvious point to make is that the meaning of the West is a function of who is using the word. Those who feel themselves to be part of the West-who think of the West as "we"-will surely have flattering things to say about their civilization. Those who think of the West as the "other" are likely to define it in less flattering terms. The basic meaning of the word is "where the sun sets"-one of the cardinal directions" (1997, p. 513).

However, at this time in history, western "encompassed the Atlantic littoral of Europe (the British Isles, Scandinavia, the Low Countries, France, and Iberia) plus America. In time, it came to encompass Australia, New Zealand, and all other European overseas settlements, The West, therefore, could be imagined as a civilization independent of locale" (McNeill 1997, p. 513 - 514).

Whistleblower

"On the simplest level, a whistleblower is someone who reports waste, fraud, abuse, corruption, or dangers to public health and safety to someone who is in the position to rectify the wrongdoing. A whistleblower typically works inside of the organization where the wrongdoing is taking place; however, being an agency or company "insider" is not essential to serving as a whistleblower. What matters is that the individual discloses information about wrongdoing that otherwise would not be known" (National Whistleblowers Center, 2023, para. 3).

WHS event

Three types of potential WHS events that occur at different scales and levels of severity:

“Lost time injuries/diseases: Those occurrences that resulted in a fatality, permanent disability or time lost from work of one day/shift or more.

Injuries without lost time: Those occurrences that were not lost time injuries and for which first aid and/or medical treatment was administered.

Near-misses: Unplanned incidents that occurred at the workplace that, although not resulting in any injury or disease, had the potential to do so” (Archer et al., 2015, p. 86)

WHS regulator

In principle, and in accordance with the Australian Model Work Health and Safety Bill, a regulator is a legally established government body whose functions are:

“ (a) to advise and make recommendations to the Minister and report on the operation and effectiveness of this Act;

(b) to monitor and enforce compliance with this Act;

(c) to provide advice and information on work health and safety to duty holders under this Act and to the community;

(d) to collect, analyse and publish statistics relating to work health and safety;

(e) to foster a co-operative, consultative relationship between duty holders and the persons to whom they owe duties and their representatives in relation to work health and safety matters;

(f) to promote and support education and training on matters relating to work health and safety;

(g) to engage in, promote and co-ordinate the sharing of information to achieve the object of this Act, including the sharing of information with a corresponding regulator;

(h) to conduct and defend proceedings under this Act before a court or tribunal;

(i) any other function conferred on the regulator by this Act”

(Safe Work Australia, 2023, section 152).

Work

Work is "the activities and labour necessary to the survival of society" (Encyclopaedia Britannica, 2018, para. 1).

Work health and safety (WHS)

World Health Organization defines work

(occupational) health and safety as "all aspects of health and safety in the workplace and has a strong focus on primary prevention of hazards" (World Health Organization, n.d., para. 1).

Note: Health and safety at work is known as occupational health and safety, workplace health and safety and work health and safety. Occupational health and safety would appear to be a traditional term which is currently less in favour, perhaps, because the term occupation is broader than paid work (consider occupational therapy). The term workplace health and safety then likely emerged to define the focus as being on work, as opposed to other types of occupation. Today, given the rise of flexible work arrangements and the 'gig economy', worker safety has been clarified in legislation as being the responsibility of persons conducting a business or undertaking (PCBUs) no matter where their workers undertake that work. It is for this reason that this book adopts the term work health and safety.

Worker

A worker is a person undertaking work for a PCBU (Safe Work Australia, 2023).

Note: There are some nuanced legal differences between Australia and New Zealand legislation definitions of workers.

Worker consultation

"Good consultation enables workers to respond and contribute to issues that directly affect them, and provide valuable information and insights. It's a two-way process where information and views are shared

between PCBUs and workers. PCBUs can become more aware of hazards and issues experienced by workers, and involve them in finding solutions or addressing problems. Workers often notice issues and practices, or foresee consequences, that might otherwise be overlooked. PCBUs must genuinely consult with workers and their representatives, including HSRs, before any changes or decisions are made that may affect their health and safety. Consultation should take place during both the initial planning and implementation phases so that everyone's experience and expertise can be taken into account" (Safe Work SA, 2023, para. 8).

Workers' Compensation

“Workers’ compensation, commonly referred to as “workers’ comp,” is a government-mandated program that provides benefits to workers who become injured or ill on the job or as a result of the job. It is effectively a disability insurance program for workers, providing cash benefits, healthcare benefits, or both to workers who suffer injury or illness as a direct result of their jobs” (Kagan, 2023, para. 1).

Workers' compensation (Australia)

"Workers’ compensation is a type of insurance that can offer you an important safety net if you become injured or ill because of work...Under Australian law, employers must have insurance to cover their workers in case they get sick or injured because of work" (Safe Work Australia, 2023, para. 1).

Workplace

“The office, factory, etc., where people work”
(Encyclopaedia Britannica, n.d, para. 1).

Workplace Health and Safety

Health and safety at work is known as occupational health and safety, workplace health and safety and work health and safety. Occupational health and safety would appear to be a traditional term which is currently less in favour, perhaps, because the term occupation is broader than paid work (consider occupational therapy). The term workplace health and safety then likely emerged to define the focus as being on work, as opposed to other types of occupation. Today, given the rise of flexible work arrangements and the ‘gig economy’, worker safety has been clarified in legislation as being the responsibility of persons conducting a business or undertaking (PCBUs) no matter where their workers undertake that work. It is for this reason that this book adopts the term work health and safety.

Glossary References

Accident Compensation Corporation. (2018, December 12). *What your levies pay for*. Retrieved September 25, 2023, from <https://www.acc.co.nz/about-us/our-levies/what-your-levies-pay/>

Adams, J. T. (1931). *The Epic of America*. Little, Brown & Company. <https://www.routledge.com/The-Epic-of-America/Adams/p/book/9781412847438>

Advisory, Conciliation and Arbitration Service. (2022, November 1). *Reasonable adjustments at work*. <https://www.acas.org.uk/reasonable-adjustments#:~:text=Reasonable%20adjustments%20are%20changes%20an,changing%20someone's%20working%20arrangements>

American Psychological Association. (2022, October 31). *Discrimination: What it is and how to cope*. American Psychological Association. <https://www.apa.org/topics/racism-bias-discrimination/types-stress>

Archer, R., Borthwick, K., Travers, M., & Ruschena, L. (2015). *WHS: A management guide*. Cengage Learning.

Australian Human Rights Institute. (2019, August 12). *What is modern slavery?* University of New South Wales. <https://www.humanrights.unsw.edu.au/research/modern-slavery>

Budd, J. (2016). *Employment relationship*. In A. Wilkinson & S. Johnstone (Eds.), *Encyclopedia of Human Resource Management* (pp. 123). Edward Elgar Publishing. <https://www.elgaronline.com/display/book/9781783475469/C96.xml>

Cambridge Dictionary. (n.d.). *Accident*. Cambridge

Dictionary. Retrieved October 4, 2023, from <https://dictionary.cambridge.org/dictionary/english/accident>

Cambridge Dictionary. (n.d.). Bottom-up approach. Cambridge Dictionary. Retrieved October 16, 2023, from <https://dictionary.cambridge.org/dictionary/english/top-down>

Cambridge Dictionary. (n.d.). Business Case. Cambridge Dictionary. Retrieved October 14, 2023, from <https://dictionary.cambridge.org/dictionary/english/business-case>

Cambridge Dictionary. (n.d.). Legislation. Cambridge Dictionary. Retrieved October 7, 2023, from <https://dictionary.cambridge.org/dictionary/english/legislation>

Cambridge Dictionary. (n.d.). Relativistic. Cambridge Dictionary. Retrieved October 14, 2023, from https://dictionary.cambridge.org/dictionary/english/relativistic#google_vignette

Cambridge Dictionary. (n.d.). Top-down. Cambridge Dictionary. Retrieved October 16, 2023, from <https://dictionary.cambridge.org/dictionary/english/top-down>

Canadian Centre for Occupational Health and Safety. (n.d.) Return to Work. Canadian Centre for Occupational Health and Safety. Retrieved July, 29, 2022, from https://www.ccohs.ca/oshanswers/psychosocial/rtw/rtw_program.html

Charles River Museum of Industry & Innovation. (n.d.). The Boston Associates. Charles River Museum of Industry & Innovation. Retrieved September 11, 2023, from <https://www.charlesrivermuseum.org/the-boston-associates>

Checkoway, H., Pearce, N., & Crawford-Brown, D.

(1989). *Research methods in occupational epidemiology*. Oxford University Press. https://link.springer.com/referenceworkentry/10.1007/978-0-387-09834-0_24#ref-CR25

Civil Aviation Authority of New Zealand. (2023). *Advisory Circular: AC100-1 Safety Management*. Civil Aviation Authority of New Zealand. <https://www.aviation.govt.nz/assets/rules/advisory-circulars/AC100-1.pdf>

Collins Dictionary. (n.d.). Regulation. In *Collins dictionary*. Retrieved October 20, 2023, from <https://www.collinsdictionary.com/dictionary/english/regulation>

Collins Dictionary. (n.d.). Voluntary Compliance. In *Collins dictionary*. Retrieved October 20, 2023, from <https://www.collinsdictionary.com/dictionary/english/regulation>

ComCare. (2013, July 10). Reasonable adjustments. Australian Government. Retrieved October 7, 2023, from <https://www.comcare.gov.au/about/forms-pubs/docs/pubs/claims/reasonable-adjustments-information-sheet.pdf>

ComCare. (2021, December 1). *Chemical hazards*. Australian Government. Retrieved October 18 2023, from <https://www.comcare.gov.au/safe-healthy-work/prevent-harm/chemical-hazards>

ComCare. (2021, December 1). Chemical hazards. Australian Government. Retrieved October 18 2023, from <https://www.comcare.gov.au/safe-healthy-work/prevent-harm/chemical-hazards>

ComCare. (2022, February 3). *Benefits of returning to work*. Australian Government. Retrieved October 18, 2023, from <https://www.comcare.gov.au/claims/getting-you-back-to-work/benefits-of-returning-to->

October 7, 2023, from <https://www.britannica.com/money/topic/Industrial-Revolution>

Encyclopaedia Britannica. (2023, September 17). Human Resources Management. Encyclopaedia Britannica. Retrieved October 5, 2023, from <https://www.britannica.com/topic/human-resources-management>

Encyclopaedia Britannica. (2023, September 18). Collective Bargaining. Encyclopaedia Britannica. Retrieved September 20, 2023, from <https://www.britannica.com/money/topic/collective-bargaining>

Encyclopaedia Britannica. (2023, September 4). Middle Ages. Encyclopaedia Britannica. Retrieved September 25, 2023, from <https://www.britannica.com/event/Middle-Ages>

Encyclopaedia Britannica. (n.d.). Trade Union. Encyclopaedia Britannica Retrieved September 5, 2023, from <https://www.britannica.com/money/trade-union>

Encyclopaedia Britannica. (n.d.). Workplace. Encyclopaedia Britannica,. Retrieved September 10, 2023, from <https://www.britannica.com/dictionary/workplace>

Hayes, A. (2021, January 22). What Is the Knowledge Economy? Definition, Criteria, and Example. Investopedia. Retrieved October 7, 2023, from <https://www.investopedia.com/terms/k/knowledge-economy.asp>

Health and Safety Executive. (n.d.-a). *Construction physical ill health risks: Vibration*. Retrieved October 18, 2023, from [https://www.hse.gov.uk/construction/healthrisks/physical-ill-health-risks/vibration.htm#:~:text=What%20you%20should%20know,Arm%20Vibration%20Syndrome%20\(HAVS\)](https://www.hse.gov.uk/construction/healthrisks/physical-ill-health-risks/vibration.htm#:~:text=What%20you%20should%20know,Arm%20Vibration%20Syndrome%20(HAVS)).

Health and Safety Executive. (n.d.-b). *Human factors:*

Managing human failures. Retrieved October 23, 2023, from <https://www.hse.gov.uk/humanfactors/topics/humanfail.htm>

Health and Safety Executive. (n.d.-c). *Performance influencing factors*. Retrieved October 23, 2023, from <https://www.hse.gov.uk/humanfactors/assets/docs/pifs.pdf>

Heery, E., & Noon, M. (n.d.). Division of Labour. Oxford University Press. Retrieved June 21, 2022, <https://www.oxfordreference.com/view/10.1093/acref/9780191827822.001.0001/acref-9780191827822-e-323>

Heery, E., & Noon, M. (n.d.). Policies. Oxford University Press. Retrieved October 23, 2023, <https://www.oxfordreference.com/display/10.1093/acref/9780199298761.001.0001/acref-9780199298761-e-947?rskey=QNM7rV&result=1221>

Heery, E., & Noon, M. (n.d.). Procedures. Oxford University Press. Retrieved October 23, 2023, <https://www.oxfordreference.com/display/10.1093/acref/9780199298761.001.0001/acref-9780199298761-e-983?rskey=IV3uUq&result=1268>

Hopkins, A., & Palser, J. (1987). Industrial Relations Journal, 18(1), 26 – 39.

Hudson, P. (2007). Implementing a safety culture in a major multi-national. Safety Science, 45(6), 697 – 722. <https://www.sciencedirect.com/science/article/pii/S0925753507000227>

Huff, R. (n.d.). Human Capital. Encyclopaedia Britannica Retrieved August 5, 2023, from <https://www.britannica.com/money/human-capital>

Ikutegbe, P., Randle, M., Sheridan, L., Gordon, R., & Dolnicar, S. (2023). Successful employment outcomes for people with disabilities: A proposed conceptual model.,

75(3), 202 – 224. <https://doi.org/https://doi.org/10.1037/cpb0000222>

International Labour Organization. (n.d.-a). *History of the ILO*. Retrieved October 20, 2023, from <https://www.ilo.org/inform/online-information-resources/research-guides/history/lang-en/index.htm>

International Labour Organization. (n.d.-b). *The ILO in New Zealand*. Retrieved October 20, 2023, from https://www.ilo.org/asia/WCMS_399591/lang-en/index.htm

International Organization for Standardization. (n.d). About us. International Organization for Standardization. Retrieved October 7, 2023, from <https://www.iso.org/about-us.html>

International Organization for Standardization. (n.d). ISO standards are internationally agreed by experts. International Organization for Standardization. Retrieved October 27, 2023, from <https://www.iso.org/standards.html>

Investopedia. (2022, September 1). Gig Economy: Definition, Factors Behind It, Critique & Gig Work. Investopedia. Retrieved September 9, 2023, from <https://www.investopedia.com/terms/g/gig-economy.asp>

Irving, M., & Schwaab, E. (1952). *The Faith of Our Fathers, an Anthology Expressing the Aspirations of the American Common Man 1790-1860*. Alfred A. Knopf. <https://www.albany.edu/history/history316/TenHourDay.html>

Jessop, B. (2020, June 15). Fordism. Encyclopaedia Britannica Retrieved August 11, 2023, from <https://www.britannica.com/money/topic/Fordism>

John Hopkins Medicine. (n.d.). Occupational Lung Diseases. John Hopkins Medicine. Retrieved September 18, 2023, from <https://www.hopkinsmedicine.org/health/conditions-and-diseases/occupational-lung-diseases>

Kazantzis, G. (2022, December 29). Occupational Disease. *Encyclopaedia Britannica*. Retrieved September 3, 2023, from <https://www.britannica.com/science/occupational-disease>

Kenton, W. (2022, March 25). What is Business Risk? Investopedia. Retrieved September 12, 2023, from <https://www.investopedia.com/terms/b/businessrisk.asp#:~:text=Business%20risk%20usually%20occurs%20in,operational%20risk%2C%20and%20reputational%20risk.>

Kenton, W. (2023a, August 26). Social License of Operate. Investopedia. Retrieved September 12, 2023, from <https://www.investopedia.com/terms/s/social-license-slo.asp>

Kenton, W. (2023b, May 25). What is Productivity and How to Measure it Explained. Investopedia. Retrieved August 11, 2023, from <https://www.investopedia.com/terms/p/productivity.asp>

Lake, R. (2021). A 2,000-year History of Bipolar. In *Bipolar* (pp. 65 – 83). Academic Press. <https://doi.org/https://doi.org/10.1016/B978-0-12-819256-6.00003-1>.

Madsen, D., & Stenheim, T. (2022, July 25). *Key Performance Indicators (KPIs)*. Elgar Online. Retrieved September 8, 2023, from <https://www.elgaronline.com/display/book/9781800377486/b-9781800377486.key.performance.indicators.xml?rskey=GXX804&result=1>

Majaski, C. (2022, March 14). What Is a Developed Economy? Definition, How It Works, HDI Index. Investopedia. Retrieved September 7, 2023, from <https://www.investopedia.com/terms/d/developed-economy.asp>

McAndrew, I. (2016). Discipline and grievance. In A. Wilkinson & S. Johnstone (Eds.), *Encyclopedia of Human*

Resource Management (pp. 92 – 95). Edward Elgar Publishing. <https://www.elgaronline.com/display/book/9781783475469/C73.xml>

McNeill, W. (1997). What we mean by the west. *Orbis*, 41(4), 513 – 524. [https://doi.org/doi.org/10.1016/S0030-4387\(97\)90002-8](https://doi.org/doi.org/10.1016/S0030-4387(97)90002-8).

Merriam-Webster. (n.d.). Compliance. Merriam-Webster. Retrieved September 7, 2023, from <https://www.merriam-webster.com/dictionary/jurisdiction>

Merriam-Webster. (n.d.). Crisis. Merriam-Webster. Retrieved September 7, 2023, from <https://www.merriam-webster.com/dictionary/jurisdiction>

Merriam-Webster. (n.d.). Disaster. Merriam-Webster. Retrieved September 7, 2023, from <https://www.merriam-webster.com/dictionary/jurisdiction>

Merriam-Webster. (n.d.). Due Diligence. Merriam-Webster. Retrieved September 7, 2023, from <https://www.merriam-webster.com/dictionary/jurisdiction>

Merriam-Webster. (n.d.). Housekeeping. Merriam-Webster. Retrieved September 7, 2023, from <https://www.merriam-webster.com/dictionary/jurisdiction>

Merriam-Webster. (n.d.). Jurisdiction. Merriam-Webster. Retrieved September 7, 2023, from <https://www.merriam-webster.com/dictionary/jurisdiction>

Merriam-Webster. (n.d.). Natural Disaster. Merriam-Webster. Retrieved September 7, 2023, from <https://www.merriam-webster.com/dictionary/jurisdiction>

Merriam-Webster. (n.d.). Planning. Merriam-Webster. Retrieved September 7, 2023, from <https://www.merriam-webster.com/dictionary/jurisdiction>

Miles, R. (1965, October, 1). Human Relations or Human Resources? *Harvard Business Review*. Retrieved October 7, 2023, from <https://hbr.org/1965/07/human-relations-or-human-resources>

Miller, K. (2020, December 8). The Triple Bottom Line: What it is & why it's important. Harvard Business School. Retrieved October 12, 2023, from <https://online.hbs.edu/blog/post/what-is-the-triple-bottom-line>

Ministry of Business, Innovation and Employment. (n.d.). *Medical incapacity*.. Retrieved September 26, 2023, from <https://www.employment.govt.nz/resolving-problems/types-of-problems/medical-incapacity/>

Mishra, T. (2018, November 8). What Does Emergency Response Mean? Safeopedia. Retrieved October 12, 2023, from <https://www.safeopedia.com/definition/195/emergency-response>

National Institute of Standards and Technology. (2023, November 7). SI Units. National Institute of Standards and Technology. Retrieved November 25, 2023, from <https://www.nist.gov/pml/owm/metric-si/si-units>

Occupational Therapy Board of New Zealand. (n.d.). What is occupational therapy? Occupational Therapy Board of New Zealand. Retrieved October 6, 2023, from <https://www.otboard.org.nz/site/about/OT?nav=sidebar>

O'Connor, E. (1999). The Politics of Management Thought: A Case Study of the Harvard Business School and the Human Relations School. *The Academy of Management Review*, 24(1), 117 – 131. <https://www.jstor.org/stable/259040>

Oxford English Dictionary. (2022, September 12). Labour. Oxford English Dictionary,. Retrieved September 20, 2023, from <https://www.britannica.com/money/topic/labor-in-economics>

Oxford English Dictionary. (2023, September 10). Act of God. Oxford English Dictionary. Retrieved October 4, 2023, from https://www.oed.com/dictionary/act_n?tab=meaning_and_use#136836834

Oxford English Dictionary. (2023, September 10).

System. Oxford English Dictionary. Retrieved October 9, 2023, from <https://www.oed.com/search/dictionary/?scope=Entries&q=system>

Oxford English Dictionary. (2023, September 8). Accident. Oxford English Dictionary. Retrieved October 4, 2023, from https://www.oed.com/dictionary/accident_n?tab=meaning_and_use#39895077

Oxford English Dictionary. (n.d.). Industrialization. Oxford English Dictionary. Retrieved September 5, 2023, from https://www.oed.com/dictionary/industrialization_n?tab=meaning_and_use#539588

Oxford English Dictionary. (n.d.). Capitalism. Oxford English Dictionary. Retrieved September 25, 2023, from https://www.oed.com/dictionary/capitalism_n?tab=meaning_and_use#10138274

Oxford English Dictionary. (n.d.). Communism. Oxford English Dictionary. Retrieved September 25, 2023, from https://www.oed.com/dictionary/communism_n?tab=meaning_and_use

Oxford English Dictionary. (n.d.). Management. Oxford English Dictionary. Retrieved September 5, 2023, from https://www.oed.com/dictionary/management_n?tab=meaning_and_use#38366929

Oxford English Dictionary. (n.d.). Paternalistic. Oxford English Dictionary. Retrieved September 20, 2023, from https://www.oed.com/dictionary/paternalistic_adj?tab=meaning_and_use#31752693

Oxford English Dictionary. (n.d.). Socialism. Oxford English Dictionary. Retrieved September 25, 2023, from https://www.oed.com/dictionary/socialism_n?tab=meaning_and_use#21928371

Perneger, T. (2005). The Swiss cheese model of safety incidents: are there holes in the metaphor? *BMC Health*

Services Research, 5. [https://doi.org/doi: 10.1186/1472-6963-5-71](https://doi.org/doi:10.1186/1472-6963-5-71)

Porter, T. (n.d.). Probability and statistics. In *Encyclopaedia Britannica*. Retrieved October 22, 2023, from <https://www.britannica.com/science/probability/Risks-expectations-and-fair-contracts>

Reason, J. (1997). Engineering a Safety Culture. In *Managing the Risks of Organizational Accidents* (pp. 191 – 222). Taylor & Francis Group. <https://ebookcentral.proquest.com/lib/uow/detail.action?docID=4387688>

Safe Work Australia. (2023, August 1). Model Work Health and Safety Bill. Safe Work Australia. Retrieved September 5, 2023, from <https://www.safeworkaustralia.gov.au/doc/model-work-health-and-safety-act>

Safeopedia. (2021, December 17). Safety Audit. Safeopedia. Retrieved October 16, 2023, from <https://www.safeopedia.com/definition/486/safety-audit>

Safety Culture. (n.d.). *Standard Operating Procedures (SOP)*. Safety Culture. Retrieved October 23, 2023, from <https://safetydocs.safetyculture.com/product-guides/standard-operating-procedures-sop/>

Speight, J. (2015). *Subsea and Deepwater Oil and Gas Science and Technology*. Elsevier. <https://www.sciencedirect.com/science/article/pii/B9781856175586000106>

Spencer, B., Brush, S., & Osler, M. (2019, November 26). Scientific Revolution. *Encyclopaedia Britannica*. Retrieved October 7, 2023, from <https://www.britannica.com/science/Scientific-Revolution>

Standards Australia, & Standards New Zealand. (2001). AS/NZS 4801 Occupational health and safety management systems – Specification with guidance for use. Standards

Australia Standards New Zealand.
<https://au.i2.saiglobal.com/management/viewer/?doc=/management/onlineviewer/download/cbb894db07c53680aeb842791861e957.pdf&did=264020&pid=1014483&resid=185097&bookmark=0>

Standards Australia. (2018). AS/NZS ISO 45001. Standards Australia. <https://au.i2.saiglobal.com/management/display/index/0/1279371>

Tableau Software. (n.d.). What is a dashboard? A complete overview. Tableau Software. Retrieved September 16, 2023 from <https://www.tableau.com/learn/articles/dashboards/what-is#:~:text=A%20dashboard%20is%20a%20way,easy%2Dto%2Ddigest%20form>.

UNHCR. (2019). Dealing with critical incidents and trauma (staff). The UN Refugee Agency. Retrieved October 3, 2023, from <https://emergency.unhcr.org/staff-emergencies/health-and-wellbeing/dealing-critical-incidents-and-trauma-staff>

United Kingdom Accreditation Service. (n.d.). Accreditation vs Certification: What's the difference? United Kingdom Accreditation Service. Retrieved September 27, 2023, from <https://www.ukas.com/accreditation/about/accreditation-vs-certification/>

University of New England. (n.d.). *Risk management tools*. Retrieved October 23, 2023, from <https://www.une.edu.au/safety/whs-forms/risk-management-forms>

Weick, K., & Sutcliffe, K. (2001). Managing the unexpected: What business can learn from high reliability organizations. In *Managing the Unexpected: Assuring high performance in an age of complexity* (pp. 1 – 23). Jossey-Bass. <https://www.amazon.com/Managing-Unexpected-Resilient-Performance-Uncertainty/dp/>

Part I References

HISTORY

Adams, J. T. (1931). *The epic of America*. Little, Brown & Company. <https://www.routledge.com/The-Epic-of-America/Adams/p/book/9781412847438>

American Federation of Labor. (2023). *Lowell Mill women create the first union of working women*. American Federation of Labor. Retrieved September 5, 2023, from <https://aflcio.org/about/history/labor-history-events/lowell-mill-women-form-union#:~:text=In%20the%201840s%2C%20they%20shifted,t%20stop%20the%20mill%20girls.>)

Anderson, J. (2017). Elegant engravings of the Pacific: Illustrations of James Cook's expeditions in British eighteenth-century magazines. *British Art Studies*, 7. <https://doi.org/doi.org/10.17658/issn.2058-5462/issue-07/janderson>

Appleton, S. (2022). *Caesar Augustus*. National Geographic. Retrieved June 15, 2023, from <https://education.nationalgeographic.org/resource/caesar-augustus/>

Appleton, S., & Willis, M. (2022). *Why conquer?* Retrieved June 15, 2023, from <https://education.nationalgeographic.org/resource/why-conquer/>

Baysal, E. (2013). Will the real specialist please stand up? Characterising early craft specialisation, a comparative

approach for Neolithic Anatolia. *Documenta praehistorica*, 40, 233-246. <https://doi.org/10.4312/dp.40.19>

Beaglehole, J. C. (1962). *The Endeavour journal of Joseph Banks 1768-1771*. New Zealand Electronic Text Centre. <https://nzetc.victoria.ac.nz/tm/scholarly/tei-Bea01Bank-t1-front-d13.html>

Beaglehole, J. C. (1974). *The life of Captain James Cook*. Adam and Charles Black. <https://nzetc.victoria.ac.nz/tm/scholarly/tei-Bea04Cook.html>

Boddewyn, J. (1961). Frederick Winslow Taylor Revisited. *The Journal of the Academy of Management*, 4(2), 100-107. <https://doi.org/10.2307/254498>

Brown, M. (2023, May 17). Harrowing lives of children sent to work in English mills revealed in first study of kind. *The Guardian*. <https://www.theguardian.com/society/2023/may/17/harrowing-lives-of-children-sent-to-work-in-english-mills-revealed-in-first-study-of-kind>

Brown Mitchell, J. (2023). European exploration. In *Encyclopaedia Britannica*. Retrieved September 25, 2023, from <https://www.britannica.com/topic/European-exploration/The-Age-of-Discovery>; <https://www.britannica.com/topic/European-exploration>

Captain Cook Society. (2023). *Muster for HMB Endeavour during the first Pacific voyage, 1768-1771*. Captain Cook Society. Retrieved 02/09/2023 from <http://www.captaincooksociety.com/Portals/ccs/Files/Documents/Musters/3endeavourmuster1.pdf>

Carey, B. (2016). From Guinea to Guernsey and Cornwall to the Caribbean: Recovering the history of slavery in the western English Channel. In K. Donington, R. Hanley, & J. Moody (Eds.), *Britain's history and memory of transatlantic slavery: Local nuances of a 'national sin'* (pp. 21-38). Liverpool University Press.

<https://doi.org/https://doi.org/10.5949/liverpool/9781781382776.003.0002>

Carlyle, T. (1843). *Past and present*. Chapman and Hall. <https://doi.org/https://doi.org/10.1017/CBO9780511696749>

Cartwright, M. (2023). *Trade Unions in the British Industrial Revolution*. World History Encyclopedia. Retrieved August 30, 2023, from <https://www.worldhistory.org/article/2212/trade-unions-in-the-british-industrial-revolution/>

Clinton, C. (2008). *Life in Civil War America*. National Park Service History. http://npshistory.com/publications/civil_war_series/4/index.htm

Committee on Education and the Workforce. (2023). *A brief history of the Committee on Education and the Workforce*. Committee on Education and the Workforce. Retrieved September 5, 2023, from <https://edworkforce.house.gov/committee/committeehistory.htm>

Commons, J. (1918). *History of labour in the United States* (Vol. 2). Macmillan. <https://archive.org/details/historyoflabouri02commuoft/page/14/mode/2up>

Conlin, M. (2015). *One nation divided by slavery : Remembering the American Revolution while marching toward the civil war*. Kent State University Press.

Cornish, W. (2010). III Law and Organised Labour 1867-1914. In *The Oxford history of the laws of England* (pp. 667-720). Oxford Academic. <https://doi.org/doi.org/10.1093/acprof:oso/9780199239757.003.0022>

Cwiek, S. (2014, January 27). *The middle class took off 100 years ago ... thanks to Henry Ford?* <https://www.npr.org/2014/01/27/267145552/the-middle-class-took-off-100-years-ago-thanks-to-henry-ford>

Davies-Barrett, A., Antoine, D., & Roberts, C. (2019).

Inflammatory periosteal reaction on ribs associated with lower respiratory tract disease: A method for recording prevalence from sites with differing preservation. *American Journal of Physical Anthropology*, 168(3), 530-542. <https://doi.org/10.1002/ajpa.23769>

Deb Roy, R. (2018). Decolonise science – time to end another imperial era. *The Conversation*. <https://theconversation.com/decolonise-science-time-to-end-another-imperial-era-89189>

Dennis, M. (2017). Big science. In *Encyclopaedia Britannica*. Retrieved June 15, 2022, from <https://www.britannica.com/science/Big-Science-science>

Donington, K., Hanley, R., & Moody, J. (2016). Introduction. In K. Donington, R. Hanley, & J. Moody (Eds.), *Britain's history and memory of transatlantic slavery: Local nuances of a 'national sin'* (pp. 1-18). Liverpool University Press. <https://doi.org/https://doi.org/10.5949/liverpool/9781781382776.003.0001>

Elliott, M., & Hughes, J. (2019, August 19). A brief history of slavery that you didn't learn at school. *The New York Times Magazine*. <https://www.nytimes.com/interactive/2019/08/19/magazine/history-slavery-smithsonian.html#:~:text=Soon%20after%20this%20deal%2C%20the,cotton%2C%20sugar%20and%20rice%20fields>.

Encyclopaedia Britannica. (2017). Combination Acts. In *Encyclopaedia Britannica*. Retrieved August 29, 2023, from <https://www.britannica.com/money/topic/Combination-Acts>

Encyclopaedia Britannica. (2020). Protestant ethic. In *Encyclopaedia Britannica*. Retrieved June 15, 2023, from <https://www.britannica.com/money/topic>

Encyclopaedia Britannica. (2023a). Middle Ages. In

Encyclopaedia Britannica. Retrieved September 25, 2023, from <https://www.britannica.com/event/Middle-Ages>

Encyclopaedia Britannica. (2023b). The early Stuarts and the Commonwealth. In *Encyclopaedia Britannica*. Retrieved September 25, 2023 from <https://www.britannica.com/place/United-Kingdom/The-early-Stuarts-and-the-Commonwealth>

Encyclopaedia Britannica. (2023c). Anthony Ashley Cooper, 7th earl of Shaftesbury. In *Encyclopaedia Britannica* Retrieved August 29, 2023, from <https://www.britannica.com/biography/Anthony-Ashley-Cooper-7th-earl-of-Shaftesbury>

Fabian Society. (n.d.). *Our history*. Retrieved August 29, 2023, from <https://fabians.org.uk/about-us/our-history/>

Facing History & Ourselves. (2017, November 15). *The Science of race*. <https://www.facinghistory.org/resource-library/science-race>

Foner, P. (1947). *History of the labor movement in the United States: From colonial times to the founding of the American Federation of Labor*. International Publishers.

Ford Motor Company. (2020). *The moving assembly line and the five-dollar workday*. Retrieved September 11, 2023, from <https://corporate.ford.com/articles/history/moving-assembly-line.html#:~:text=Henry%20Ford%20famously%20remarked%20that,built%20step%2Dby%2Dstep>.

Freeman, J. (2020, June 17). *The history of labor in the U.S.* <https://2017-2021.state.gov/briefings-foreign-press-centers/the-history-of-labor-in-the-u-s/#:~:text=In%201935%2C%20Congress%20passes%20the,go%20on%20strike%20without%20reprisal>.

Gilder Lehrman Institute of American History. (2013). *Lowell Mill Girls and the factory system, 1840*. <https://www.gilderlehrman.org/history-resources/>

spotlight-primary-source/lowell-mill-girls-and-factory-system-1840

Golding, E. (1989). *Working lives: A guide to the records of the New York state factory investigating commission in the New York State Archives and Records Administration* https://www.archives.nysed.gov/sites/archives/files/res_topics_bus_guide.pdf

Gowland, R., Caffell, A., Quade, L., Levene, A., Millard, A., Holst, M., Tapp, P., Delaney, S., Brown, C., Nowell, G., McPherson, C., Shaw, H., Stewart, N., Robinson, S., Montgomery, J., & Alexander, M. (2023). The expendables: Bioarchaeological evidence for pauper apprentices in 19th century England and the health consequences of child labour. *Plos One*, 18(5). <https://doi.org/10.1371/journal.pone.0284970>

Griffin, E. (2014). *Child labour*. British Library. Retrieved August 31, 2023, from <https://www.bl.uk/romantics-and-victorians/articles/child-labour>

Guyton, G. (1999). A brief history of workers' compensation. *The Iowa Orthopaedic Journal*, 19, 106-110. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1888620/>

Harper, K. (2011). Among slave systems: a profile of late Roman slavery. In *Slavery in the late Roman world* (pp. 33–66). Cambridge University Press. <https://doi.org/doi:10.1017/CBO9780511973451.002>

Health and Morals of Apprentices Act [Factory Act] 1802 <https://babel.hathitrust.org/cgi/pt?id=nyp.33433035285216&seq=9>

Heery, E., & Noon, M. (2017). *Division of labour*. Oxford University Press. <https://www.oxfordreference.com/view/10.1093/acref/9780191827822.001.0001/acref-9780191827822-e-323>

Historical Association. (n.d.). *Social structure*.

Retrieved September 25, 2023, from <https://www.history.org.uk/student/module/4536/overview-of-elizabeth-i/4543/social-structure#:~:text=Elizabethan%20England%20had%20four%20main,and%20their%20children%20could%20get>.

Hounshell, D. (1988). The same old principles in the new manufacturing. *Harvard Business Review*, 66(6), 54–61. <https://hbr.org/1988/11/the-same-old-principles-in-the-new-manufacturing>

Hunt, P. (2010). *Slavery*. Oxford University Press. <https://doi.org/10.1093/acref/9780195170726.013.1170>

Innes, J. (2002). Origins of the factory acts: The Health and Morals of Apprentices Act 1802. In N. Landau (Ed.), *Law, Crime and English Society 1660-1830*. Cambridge University Press. <https://doi.org/doi:10.1017/CBO9780511495885.012>

Irving, M., & Schwaab, E. (1952). *The faith of our fathers, an anthology expressing the aspirations of the American common man 1790-1860*. Alfred A. Knopf. <https://www.albany.edu/history/history316/TenHourDay.html>

Jacob, M. C. (2014). *The first knowledge economy : human capital and the European economy, 1750-1850*. Cambridge University Press.

Jefferson, T. (1776). *Copy of Declaration of Independence*. Retrieved June 15, 2023, from <https://www.archives.gov/founding-docs/declaration-transcript>

Kelly, M. (1950). Early federal regulation of hours of labor in the United States. *Industrial & Labor Relations Review*, 3(3), 362-374. <https://www.jstor.org/stable/2518533>

Kenton, W. (2023, March 28). *Karl Marx: His books, theories and impacts*. Investopedia.

<https://www.investopedia.com/terms/k/karl-marx.asp#:~:text=His%20key%20theories%20were%20a,ushering%20in%20a%20classless%20society>

Komlos, J. (1990). Nutrition, population growth and the Industrial Revolution in England. *Social Science History*, 14(1), 69-91. <https://www.jstor.org/stable/1171364>

Kondolf, G. M., & Podolak, K. (2014). Space and time scales in human-landscape systems. *Environmental Management*, 53(1), 76-87. <https://doi.org/https://doi.org/10.1007/s00267-013-0078-9>

Lawrence, C. (2015). *18th- and 19th-century European expeditions*. University of Maryland Libraries. <http://livingstoneonline.org/uuid/node/c97b074f-908e-4022-8ce9-e23418a99796>

Liberto, D. (2021, January 16). *Marxian economics: Definition, theories vs. classical economics*. Investopedia. <https://www.investopedia.com/terms/m/marxian-economics.asp>

Lincoln, A. (1863, December 8). *Third Annual Message*. The American Presidency Project. Retrieved September 11, 2023, from <https://www.presidency.ucsb.edu/documents/third-annual-message-9>

Lombardi, J. (1942). *Labor's voice in the cabinet: A History of the Department of Labor from its origin to 1921*. Columbia University Press.

MacLaury, J. (1988). *Chapter 1: Start-up of the Department and World War I 1913-1921*. U.S. Department of Labor. Retrieved September 11, 2023, from <https://www.dol.gov/general/aboutdol/history/hs75menu>

Marx, K. (1867). *Das Capital* (Vol. 1). Verlag von Otto Meissner.

McKelvey, J. (1952). *AFL attitudes towards production, 1900 – 1932* (Vol. 2). Cornell University.

McKinney, G. (2013). *Henry W. Blair's campaign to*

reform America: From the Civil War to the U.S. Senate. University Press of Kentucky.

Meiklejohn, A. (1958). Industrial health: Meeting the challenge. *Journal of Industrial Medicine*, 16(1), 1-10. <https://doi.org/doi:10.1136/oem.16.1.1>

Migration Policy Institute. (2013). Major US Immigration Laws, 1790-Present. In M. P. Institute (Ed.), (pp. 8). Washington D.C.: Migration Policy Institute.

Min, J., Kim, Y., Lee, S., Jang, T.-W., Kim, I., & Song, J. (2019). The Fourth Industrial Revolution and its impact on occupational health and safety, worker's compensation and labor conditions. *Safety and Health at Work*, 10(4), 400-408. <https://www.sciencedirect.com/science/article/pii/S2093791119304056>

Ministry for Culture and Heritage. (2023, July 17). *European voyaging and discovery*. Retrieved June 15, 2023, from <https://nzhistory.govt.nz/culture/encounters/european-exploration>

Mohamud, A., & Whitburn, R. (2018). *Britain's involvement with the New World slavery and the transatlantic slave trade*. British Library. Retrieved June 15, 2023, from <https://www.bl.uk/restoration-18th-century-literature/articles/britains-involvement-with-new-world-slavery-and-the-transatlantic-slave-trade>

Mohler, S. L. (1940). Slave education in the Roman Empire. *Transactions and Proceedings of the American Philological Association*, 71, 262-280. <https://doi.org/10.2307/283128>

Montes, L. (2008). Newton's real influence on Adam Smith and its context. *Cambridge journal of economics*, 32(4), 555-576. <https://doi.org/10.1093/cje/bem056>

Nelson, D. (1992). Scientific management in retrospect. In D. Nelson (Ed.), *A Mental revolution : scientific*

management since Taylor. Ohio State University Press.
<https://kb.osu.edu/handle/1811/6191>

Newton, D. E. (2021). Industrial revolution. In K. H. Nemeš & J. L. Longe (Eds.), *The Gale Encyclopedia of Science* (6th ed., Vol. 4, pp. 2366-2368). Gale.
<https://link.gale.com/apps/doc/CX8124401335/ITOF?u=otago&sid=bookmark-ITOF&xid=30b83c46>

Nicholson, P. (2004). *Labor's story in the United States*. Temple University Press. https://www.google.co.nz/books/edition/Labor_s_Story_in_the_United_States/XwxmQgAACAAJ?hl=en&gbpv=1

Nyland, C. (1998). Taylorism and the mutual-gains strategy. *Industrial Relations*, 37(4), 519-542.
<https://doi.org/10.1111/0019-8676.00102>

Oxford English Dictionary. (n.d.). Empiricism. In *Oxford English Dictionary*. Retrieved June 15, 2022, from <https://www.oed.com/view/Entry/61344?redirectedFrom=empiricism>

Perlès, C. (2001). *The early neolithic in Greece*. Cambridge University Press. <https://doi.org/doi.org/10.1017/CBO9780511612855>

Ransom, R. (1989). *Conflict and compromise: The political economy of slavery, emancipation, and the American Civil War*. Cambridge University Press. <https://www.essentialcivilwarcurriculum.com/the-economics-of-the-civil-war.html>

Rothchild, E. (2018). A (New) economic history of the American Revolution? *The New England Quarterly*, 91(1), 110-128. <https://www.jstor.org/stable/26405907>

Schuster, J. (1996). Scientific revolution. In G. Cantor, R. Olby, J. Christie, & J. Hodge (Eds.), *Companion to the history of modern science* (pp. 217-242). Routledge.

Shaw, A. (2016, August 23). *Factory model vs 21st century model of education*. LinkedIn.

<https://www.linkedin.com/pulse/factory-model-vs-21st-century-education-anne-shaw/>

Sheridan, L. (2009). *“I know it’s dangerous” Why Mexicans risk their lives to cross the border*. University of Arizona Press.

Smith, L. T. (2021). *Decolonizing methodologies: Research and indigenous peoples*. Bloomsbury Academic & Professional. <http://ebookcentral.proquest.com/lib/otago/detail.action?docID=6605401>

Sorabella, J. (2003, October). *The Grand Tour*. The Metropolitan Museum. <https://www.metmuseum.org/toah/hd/grtr/>

[hd_grtr.htm#:~:text=Thus%20was%20born%20the%20idea,for%20the%20next%20300%20years](https://www.metmuseum.org/toah/hd/grtr/hd_grtr.htm#:~:text=Thus%20was%20born%20the%20idea,for%20the%20next%20300%20years).

Spengler, J. J. (1977). Adam Smith on human capital. *The American Economic Review*, 67(1), 32-36. <http://www.jstor.org/stable/1815877>

Spoden, J. (2019). *Conflict Over natural resources*. World History Project. <https://www.oerproject.com/-/media/WHP/PDF/Unit9/>

[WHP-1750-9-5-10-Read—Conflict-Over-Natural-Resources—860L.ashx](https://www.oerproject.com/-/media/WHP/PDF/Unit9/WHP-1750-9-5-10-Read—Conflict-Over-Natural-Resources—860L.ashx)

Statt, D. (1999). *The concise dictionary of business management*. Taylor & Francis Group. <http://ebookcentral.proquest.com/lib/uow/detail.action?docID=166459>

Sutherland, T. (2012, April 12). *Lewis Hine: The child labour photos that led to change*. BBC News. Retrieved September 5, 2023, from <https://www.bbc.com/news/av/magazine-17673213>

Sylvester, C. (1994). Leisure, science, and religion in 17th-century England. *Leisure Sciences*, 16(1), 1-16. <https://doi.org/10.1080/01490409409513213>

Taylor, F. (1911). *The principles of scientific*

management. Harper and Brothers. <https://archive.org/details/principlesofscie00taylrich/mode/2up?view=theater&q=underworking>

Te Papa. (1998). *Biography of Joseph Banks*. Te Papa Collections Online. Retrieved June 17, 2022, from <https://collections.tepapa.govt.nz/topic/574>

The Labour Party. (n.d.). *Labour's legacy*. Retrieved August 29, 2023, from <https://labour.org.uk/about/labours-legacy/>

Thompson, B. (1913). The relation of scientific management to the wage problem. *Journal of Political Economy*, 21(7), 630-642. <https://www.jstor.org/stable/1820171>

Tomlins, C. (1993). *Law, labor, and ideology in the early American republic*. Cambridge University Press. <https://doi.org/doi.org/10.1017/CBO9780511583643>

Towne, H. R. (1886). The Engineer as an economist. *Best Papers Proceedings – Academy of Management*, 8(2), 3. <https://doi.org/10.5465/AMBPP.1986.4976735>

Trade Union Act 1871 <https://www.irishstatutebook.ie/eli/1871/act/31/enacted/en/html>

Trasciatti, M. A. (2022, March 24). *The odyssey of the Triangle Shirtwaist Factory fire memorial*. The Labor and Working Class History Association. <https://www.lawcha.org/2022/03/24/odyssey-triangle-fire-memorial/>

U.S. Bureau of Labor Statistics. (2023). *History of the U.S. Bureau of Labor Statistics*. Retrieved September 11, 2023, from <https://www.bls.gov/bls/history/home.htm>

U.S. Citizenship and Immigration Service. (2020, July 30). *Early American immigration policies*. Retrieved September 11, 2023, from <https://www.uscis.gov/about-us/our-history/overview-of-ins-history/early-american-immigration-policies>

UK Parliament. (n.d.). *Early Factory Legislation*. Retrieved August 29, 2023, from <https://www.parliament.uk/about/living-heritage/transformingsociety/livinglearning/19thcentury/overview/earlyfactorylegislation/#>

Violatti, C. (2018, April 2). Neolithic Period. In *World history encyclopedia*. Retrieved June 16, 2022, from <https://www.worldhistory.org/Neolithic/>

Voice of Industry Project. (n.d.). *The ten hour movement*. Retrieved September 11, 2023, from <https://www.industrialrevolution.org/10-hours-movement>

Walling, W. E. (1905). British and American trade unionism. *The Annals of the American Academy of Political and Social Science*, 26, 109-127. <https://www.jstor.org/stable/1010586?seq=5>

Wasson, D. (2016, October 24). Roman Egypt. In *World history encyclopedia*. https://www.worldhistory.org/Roman_Egypt/

Webb, S., & Webb, B. (1898). *The history of trade unionism*. Amalgamated Society of Engineers.

Weightman, G. (2007). *The Industrial revolutionaries: The making of the modern world, 1776-1914*. Grove Press.

Wickham, J. (2014). *The enslavement of war captives by the Romans to 146 BC* University of Liverpool. https://livrepository.liverpool.ac.uk/17893/1/WickhamJ_May2014_17893.pdf

Wittke, C. (1949). Immigration policy prior to World War I. *Annals of the American Academy of Political and Social Science*, 262(March), 5-14. https://www.jstor.org/stable/pdf/1026968.pdf?refreqid=excelsior%3A30d1e621840ddcad286373bbf57d4324&ab_segments=&origin=&initiator=&acceptTC=1

Witzel, M. (2011). *A History of management thought*.

Routledge. <http://ebookcentral.proquest.com/lib/otago/detail.action?docID=957119>

Wolf, B. (2019, August 12). *Why does the division of labor matter?* Adam Smith Works. <https://www.adamsmithworks.org/speakings/why-does-the-division-of-labor-matter>

World Vision. (2021). *Risky goods: New Zealand imports*. <https://www.worldvision.org.nz/getmedia/6904e490-14b7-4fbf-b11e-308ddf99c44a/WVNZ-research-risky-goods-nz-imports/>

Zhao, W. (2019). Industrial Revolution and the change of landscape in modern England. *Journal of Landscape Research*, 11(4), 105-107. <https://doi.org/https://doi.org/10.16785/j.issn1943-989x.2019.4.022>

Part II References

THEORY

Advisory, Conciliation and Arbitration Service. (2022, November 1). *Reasonable adjustments at work*. <https://www.acas.org.uk/reasonable-adjustments#:~:text=Reasonable%20adjustments%20are%20changes%20an,changing%20someone's%20working%20arrangements>

Agim, T., & Sheridan, L. (2013). James Reason's safety culture in aged care: Frontline staff perspectives on reporting, just, learning and flexible culture in a large Australian residential aged care provider. *Journal of Health, Safety & Environment*, 29(2), 103-112.

Ahrens, W., Krickeberg, K., & Pigeot, I. (2014). An introduction to epidemiology. In W. Ahrens & I. Pigeot (Eds.), *Handbook of Epidemiology* (pp. 3- 41). Springer. https://link.springer.com/referenceworkentry/10.1007/978-0-387-09834-0_24

Alzheimers New Zealand. (2017). *Dementia economic impact report 2016*. <https://cdn.alzheimers.org.nz/wp-content/uploads/2021/05/Economic-Impacts-of-Dementia-2017.pdf>

Andrew, C., Phillipson, L., & Sheridan, L. (2018). What is the impact of dementia on occupational competence, occupational participation and occupational identity for people who experience onset of symptoms while in paid employment? A scoping review. *Australian Occupational*

Therapy, 66(2), 130-144. <https://doi.org/doi/10.1111/1440-1630.12535>

Andrew, C., Traynor, V., & Iverson, D. (2015). An integrative review: understanding driving retirement decisions for individuals living with a dementia. *Journal of Advanced Nursing*, 71(12), 2728-2740. <https://onlinelibrary.wiley.com/doi/10.1111/jan.12727>

Archer, R., Borthwick, K., Travers, M., & Ruschena, L. (2015). *WHS: A management guide*. Cengage Learning.

Australian Government. (2023). *Intergenerational report 2023: Australia's future to 2063*. <https://treasury.gov.au/sites/default/files/2023-08/p2023-435150.pdf>

Australian Institute of Health and Welfare. (2023, June 28). *Older Australians*. Commonwealth of Australia. <https://www.aihw.gov.au/reports/older-people/older-australians/contents/employment-and-work>

Best Practice Certification. (2023, March 15). *Why does your business need ISO certification?* <https://bestpractice.biz/why-does-your-business-need-iso-certification/>

Cambridge Dictionary. (2023a). Accident. In *Cambridge dictionary*. Retrieved October 4, 2023, from <https://dictionary.cambridge.org/dictionary/english/accident>

Cambridge Dictionary. (2023b). Ergonomist. In *Cambridge dictionary*. Retrieved October 6, 2023, from <https://dictionary.cambridge.org/dictionary/english/ergonomist>

Canadian Centre for Occupational Health and Safety. (2022, July 29). *Return to Work*. https://www.ccohs.ca/oshanswers/psychosocial/rtw/rtw_program.html

Centers for Disease Control and Prevention. (2022,

August 31). *CDC 24/7: Saving lives, protecting people*.
<https://www.cdc.gov/about/>

Centers for Disease Control and Prevention. (2021, August 4). *Total Worker Health® partnerships*.
<https://www.cdc.gov/niosh/twh/partner.html>

Civil Aviation Authority of New Zealand. (2023, June 15). *Advisory circular: AC100-1 safety management..*
<https://www.aviation.govt.nz/assets/rules/advisory-circulars/AC100-1.pdf>

ComCare. (2013, August 10). *Reasonable adjustments*. Australian Government. <https://www.comcare.gov.au/about/forms-pubs/docs/pubs/claims/reasonable-adjustments-information-sheet.pdf>

Deci, E., & Ryan, R. (2015). Self-determination theory. In *International encyclopedia of the social & behavioral sciences* (2nd ed., pp. 486-491).
<https://www.sciencedirect.com/science/article/abs/pii/B9780080970868260364>

Dekker, S. (2018). *The safety anarchist*. Routledge.

Dementia Australia. (2022). *About dementia*. Retrieved June 26, 2023, from <https://www.dementia.org.au/about-dementia/what-is-dementia>

Dunn, C. (2012). *Planning work health & safety: An introduction to best practice*. CCH Australia.

European Agency for Safety and Health and Work. (n.d.). *European standards*. Retrieved September 27, 2023, from <https://osha.europa.eu/en/european-standards>

Evans, D., Murray, C., Berndt, A., & Robertson, J. (2021). Supporting people with dementia in employment. In D. Evans, L.-F. Low, & K. Laver (Eds.), *Dementia rehabilitation: Evidence-based interventions and clinical recommendations* (pp. 149-170). Academic Press.
<https://www.sciencedirect.com/book/9780128186855/dementia-rehabilitation>

Hollnagel, E., Wears, R., & Braithwaite, J. (2015). *From Safety-I to Safety-II: A white paper*. <https://www.england.nhs.uk/signuptosafety/wp-content/uploads/sites/16/2015/10/safety-1-safety-2-whte-papr.pdf>

Hopkins, A., & Palser, J. (1987). The causes of coal mine accidents. *Industrial Relations Journal*, 18(1), 26-39.

Hudson, P. (2007). Implementing a safety culture in a major multi-national. *Safety Science*, 45(6), 697 – 722. <https://www.sciencedirect.com/science/article/pii/S0925753507000227>

International Organization for Standardization. (1997). *Friendship among equals: Recollections from ISO's first fifty years*. https://www.iso.org/files/live/sites/isoorg/files/about%20ISO/docs/en/Friendship_among_equals.pdf

International Organization for Standardization. (2021, October 14). *A shared vision for a better world on World Standards Day*. <https://www.iso.org/news/ref2734.html>

International Organization for Standardization. (2023). *ISO standards are internationally agreed by experts*. <https://www.iso.org/standards.html>

Jenks, S. (2017, March 4). *Importance of ISO certification for supply chains, sustainability and society at large*. Kodiak Hub Community. <https://kodiakhub.medium.com/importance-of-iso-certification-for-supply-chains-sustainability-and-society-at-large-16d6bdb12261#:~:text=Suppliers%20who%20take%20the%20initiative,trustworthy%20in%20buyer%20supplier%20relationships.>

Kazantzis, G. (2022). Occupational disease. In *Encyclopaedia britannica*. Retrieved October 3, 2023, from <https://www.britannica.com/science/occupational-disease>

Lemen, R., Dement, J., & Wagoner, J. (1980). Epidemiology of asbestos-related diseases. *Environmental*

Health Perspectives, 34, 1-11.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1568524/pdf/envhper00470-0008.pdf>

Mason, D. (2007, July 17). *Reasonable adjustment*. Australian Human Rights Commission.
<https://humanrights.gov.au/about/news/speeches/reasonable-adjustment>

Ministry of Business, Innovation and Employment. (n.d.). *Medical incapacity*. Retrieved September 26, 2023 from <https://www.employment.govt.nz/resolving-problems/types-of-problems/medical-incapacity/>

Meiklejohn, A. (1958). Industrial health: Meeting the challenge. *Journal of Industrial Medicine*, 16(1), 1-10.
<https://doi.org/doi:10.1136/oem.16.1.1>

Merletti, F., Mirabelli, D., & Richiardi, L. (2014). Occupational epidemiology. In W. Ahrens & I. Pigeot (Eds.), *Handbook of epidemiology* (pp. 1577-1609). Springer. https://link.springer.com/referenceworkentry/10.1007/978-0-387-09834-0_24

National Safety Council. (2013, May). *Near miss reporting systems*. <https://nsccdn.azureedge.net/nsc.org/media/site-media/docs/workplace/near-miss-reporting-systems.pdf>

National Institute of Standards and Technology. (2023, November 7). *SI Units*. <https://www.nist.gov/pml/owm/metric-si/si-units>

Health and Safety at Work Act, (2015). <https://www.legislation.govt.nz/act/public/2015/0070/latest/DLM5976660.html>

Oxford English Dictionary. (n.d.). *Accident*. Oxford english dictionary. Retrieved October 4, 2023, from https://www.oed.com/dictionary/accident_n?tab=meaning_and_use#39895077

Oxford English Dictionary. (n.d.). *Act of God*. Oxford

english dictionary. Retrieved October 4, 2023, from https://www.oed.com/dictionary/act_n?tab=meaning_and_use#136836834

Reason, J. (1997a). Hazards, defences and losses. In *Managing the risks of organizational accidents* (pp. 1-20). Taylor & Francis Group. <https://ebookcentral.proquest.com/lib/uow/detail.action?docID=4387688>

Reason, J. (1997b). Engineering a safety culture. In *Managing the risks of organizational accidents* (pp. 191-222). Taylor & Francis Group. <https://ebookcentral.proquest.com/lib/uow/detail.action?docID=4387688>

Reason, J. (1998). Achieving a safe culture: Theory and practice. *Work & Stress*, 12(3), 293-306. <https://www.tandfonline.com/doi/abs/10.1080/02678379808256868>

Reason, J. (2000). Human error: Models and management. *British Medical Journal*, 320(7237), 768-770. https://www.jstor.org/stable/pdf/25187420.pdf?refreqid=fastly-default%3A6a5df5c60f14b4b42abf695c10df3b56&ab_segments=&origin=&initiator=&acceptTC=1

Royal Commission into Aged Care Quality and Safety. (2021). *Final Report: Care, Dignity and Respect* (Vol. 1). Commonwealth of Australia. <https://webarchive.nla.gov.au/awa/20230426073849/> <https://agedcare.royalcommission.gov.au/>

Safe Work Australia. (2023, August 1). *Model Work Health and Safety Act*. <https://www.safeworkaustralia.gov.au/doc/model-work-health-and-safety-act>

Schilling, R. (1989). Chapter 1 – Developments in occupational health. In H. Waldron (Ed.), *Occupational*

health practice (3rd ed., pp. 1-21). Butterworth-Heinemann. <https://doi.org/https://doi.org/10.1016/B978-0-407-33702-2.50006-3>

Sheridan, L., & Agim, T. (2014). Aged care safety dilemma: Caring for self versus caring for residents. *Australian Journal on Aging*, 33(4), 283-285. <https://onlinelibrary.wiley.com/doi/10.1111/ajag.12128>

Standards Australia. (2018). *AS/NZS ISO 45001*. <https://au.i2.saiglobal.com/management/display/index/0/1279371>

Standards Australia, & Standards New Zealand. (2001). *AS/NZS 4801 Occupational health and safety management systems – Specification with guidance for use*. <https://au.i2.saiglobal.com/management/viewer/?doc=/management/onlineviewer/download/cbb894db07c53680aeb842791861e957.pdf&did=264020&pid=1014483&resid=185097&bookmark=0>

Standards Australia, & Standards New Zealand. (2018). *Occupational health and safety management systems – Requirements with guidance for use*. <https://www.standards.govt.nz/shop/asnzs-iso-450012018/>

StatsNZ. (2022, July 27). *One million people aged 65+ by 2028*. Retrieved September 26, 2023, from <https://www.stats.govt.nz/news/one-million-people-aged-65-by-2028/#:~:text=The%20proportion%20of%20the%20population,one%2Dquarter%20of%20the%20population>.

UK Parliament. (n.d.). *Early factory legislation*. Retrieved August 29, 2023, from <https://www.parliament.uk/about/living-heritage/transformingsociety/livinglearning/19thcentury/overview/earlyfactorylegislation/#>

United Kingdom Accreditation Service.(n.d.). *Accreditation vs certification: What's the difference?.*

Retrieved September 29, 2023, from <https://www.ukas.com/accreditation/about/accreditation-vs-certification/>

UNHCR UN Refugee Agency. (2019). *Dealing with critical incidents and trauma (staff)*. Retrieved October 3, 2023, from <https://emergency.unhcr.org/staff-emergencies/health-and-wellbeing/dealing-critical-incidents-and-trauma-staff>

Weick, K., & Sutcliffe, K. (2001). Managing the unexpected: What business can learn from high reliability organizations. In *Managing the Unexpected: Assuring high performance in an age of complexity* (pp. 1-23). Jossey-Bass. <https://www.amazon.com/Managing-Unexpected-Resilient-Performance-Uncertainty/dp/0787996491#:~:text=Managing%20the%20Unexpected%20is%20a,position%20to%20tackle%20future%20challenges>.

Wolters Kluwer. (n.d.). *Incident Analysis Models*. Retrieved October 3, 2023, from <https://www.wolterskluwer.com/en/solutions/enablon/bowtie/expert-insights/barrier-based-risk-management-knowledge-base/incident-analysis-methods>

Work Health and Safety Act, (2011). <https://www.legislation.gov.au/Details/C2018C00293>

Worksafe. (2019, July 18). *Introduction to the Health and Safety at Work Act 2015 – special guide*. <https://www.worksafe.govt.nz/managing-health-and-safety/getting-started/introduction-hswa-special-guide/>

Worksafe. (2022, November 16). *What to know about exposure monitoring and health monitoring*. <https://www.worksafe.govt.nz/topic-and-industry/monitoring/what-to-know-for-small-businesses/>

Worksafe Victoria. (n.d.). *Aged Care: Safety basics*.

Worksafe Victoria. Retrieved September 26, 2023, from <https://www.worksafe.vic.gov.au/aged-care-safety-basics>

World Health Organization. (1946, June 19). *Constitution of the World Health Organization*. Retrieved October 5, 2023, from <https://www.who.int/about/governance/constitution#:~:text=Health%20is%20a%20state%20of,belief,%20economic%20or%20social%20condition>.

World Health Organization. (n.d.). *Occupational health*. Retrieved October 5, 2023, from <https://www.who.int/westernpacific/health-topics/occupational-health>

World Health Organization. (n.d.). *Dementia*. Retrieved September 26, 2023, from <https://www.who.int/news-room/fact-sheets/detail/dementia>

Part III References

PRACTICE

Accident Compensation Corporation. (2018, December 12). *What your levies pay for..* Retrieved September 25, 2023, from <https://www.acc.co.nz/about-us/our-levies/what-your-levies-pay/>

AIMS Industrial. (n.d.). *Overview of Work Health and Safety (WHS) Laws in Australia.* Retrieved October 20, 2023, from <https://www.aimsindustrial.com.au/blog/australia-whs-laws>

Air New Zealand. (2023). *2023 Sustainability Report.* <https://p-airnz.com/cms/assets/PDFs/2023-Air-New-Zealand-Sustainability-Report-Final.pdf>

All Metals Fabricating. (2020, July 26). *What Is a Lathe and How Does It Work.* <https://www.ametals.com/post/what-is-a-lathe-and-how-does-it-work#:~:text=A%20lathe%20is%20a%20machining,behind%20a%20nicely%20shaped%20workpiece.>

Ammendolia, C., Cassidy, D., Steenstra, I., Soklaridis, S., Boyle, E., Eng, S., Howard, H., Bhupinder, B., & Côté, P. (2009). Designing a workplace return-to-work program for occupational low back pain: an intervention mapping approach. *BMC Musculoskeletal Disorders*, 10. <https://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/1471-2474-10-65>

Archer, R., Borthwick, K., Travers, M., & Ruschena, L. (2015). *WHS: A management guide.* Cengage Learning.

Arlinghaus, K., & Johnson, C. (2018). Advocating for

behavior change with education. *American Journal of Lifestyle Medicine*, 12(2), 113-116. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6124997/pdf/10.1177_1559827617745479.pdf

American Society for Quality. (n.d.). *What is the Plan-Do-Check-Act (PDCA) cycle?* Retrieved October 15, 2023, from <https://asq.org/quality-resources/pdca-cycle#:~:text=The%20Plan%2Ddo%2Dcheck%2Dact%20Procedure,learned%20in%20the%20study%20step>.

Billones, R., Liwang, J., Butler, K., Graves, L., & Saligan, L. (2021). Dissecting the fatigue experience: A scoping review of fatigue definitions, dimensions, and measures in non-oncologic medical conditions. *Brain, Behavior & Immunity – Health*, 15, 10. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8474156/>

Business NZ. (2021). *Workplace Wellness Report 2021*. <https://businessnz.org.nz/wp-content/uploads/2022/07/Southern-Cross-Health-Insurance-BusinessNZ-Workplace-Wellness-Report-2021.pdf>

Cambridge Dictionary. (n.d.). Legislation. In *Cambridge dictionary*. Retrieved October 7, 2023, from <https://dictionary.cambridge.org/dictionary/english/legislation>

Cambridge Dictionary. (n.d.). Likelihood. In *Cambridge dictionary*. Retrieved October 22, 2023, from <https://dictionary.cambridge.org/dictionary/english/likelihood>

Capodaglio, E. (2010). Ergonomics and occupational therapy. *Giornale italiano di medicina del lavoro ed ergonomia*, 32(4), 184-186. <https://pubmed.ncbi.nlm.nih.gov/21438256/>

Canadian Centre for Occupational Health and Safety. (2023, June 12). *Hazards*. https://www.ccohs.ca/topics/hazards/#ctgt_1-5

Centers for Disease Control and Prevention. (2022, July 21). *About chronic disease*. <https://www.cdc.gov/chronicdisease/about/index.htm#:~:text=Print,disability%20in%20the%20United%20States>.

Centers for Disease Control and Prevention (2022, June 10). *Biological hazards*. <https://www.cdc.gov/niosh/learning/safetyculturehc/module-2/2.html#:~:text=Biological%20hazards%20are%20disease%20producing,acute%20or%20chronic%20health%20conditions>.

Centers for Disease Control and Prevention. (2022, April 28a). *Physical hazards*. <https://www.cdc.gov/niosh/learning/safetyculturehc/module-2/7.html>

Centers for Disease Control and Prevention. (2022, April 28b). *Hierarchy of controls*. <https://www.cdc.gov/niosh/topics/hierarchy/default.html>

Collins Dictionary. (n.d.). Regulation. In *Collins dictionary*. Retrieved October 20, 2023, from <https://www.collinsdictionary.com/dictionary/english/regulation>

ComCare. (2022, February 3). *Benefits of returning to work*. Australian Government. <https://www.comcare.gov.au/claims/getting-you-back-to-work/benefits-of-returning-to-work#:~:text=Returning%20to%20or%20recovering%20at,the%20workplace%20and%20feel%20supported>

ComCare. (2021, December 1). *Chemical hazards*. Australian Government. Retrieved 18/10/2023 from <https://www.comcare.gov.au/safe-healthy-work/prevent-harm/chemical-hazards>

ComCare. (2022, June 10). *Physical hazards*. Australian Government. <https://www.comcare.gov.au/safe-healthy-work/prevent-harm/physical-hazards>

ComCare. (2023, May 9). *Biological hazards*. Australian Government. <https://www.comcare.gov.au/safe-healthy-work/prevent-harm/biological-hazards>

ComCare. (n.d.). *Psychosocial hazards*. Australian Government. Retrieved October 18, 2023, from <https://www.comcare.gov.au/safe-healthy-work/prevent-harm/psychosocial-hazards>

Dekker, S. (2018). *The safety anarchist*. Routledge.

Department of Employment and Workplace Relations. (2023, October 27). *Work health and safety*. Australian Government. [https://www.dewr.gov.au/work-health-and-safety#:~:text=Work%20health%20and%20safety%20\(WHS,\(the%20model%20WHS%20laws\).](https://www.dewr.gov.au/work-health-and-safety#:~:text=Work%20health%20and%20safety%20(WHS,(the%20model%20WHS%20laws).)

Dubbink, W., & Van Liedekerke, L. (2020). Rethinking the purity of moral motives in business: Kant against moral purism. *Journal of Business Ethics*, 167, 379-393. <https://doi.org/https://link.springer.com/article/10.1007/s10551-019-04167-y>

Dunn, C. (2012). *Planning work health & safety: An introduction to best practice*. CCH Australia.

Ely, R., & Thomas, D. (2020). Getting serious about diversity: Enough already with the business case. *Harvard Business Review*, 98(6), 114-122. <https://hbr.org/2020/11/getting-serious-about-diversity-enough-already-with-the-business-case>

Empson, P. (2021). Why we should celebrate the drivers who keep bakery moving. *British Baker*. <https://bakeryinfo.co.uk/issues/why-we-should-celebrate-the-drivers-who-keep-bakery-moving/662180.article>

Evans, D., Murray, C., Berndt, A., & Robertson, J. (2021). Supporting people with dementia in employment. In D. Evans, L.-F. Low, & K. Laver (Eds.), *Dementia rehabilitation: Evidence-based interventions and clinical recommendations* (pp. 149-170). Academic Press.

<https://www.sciencedirect.com/book/9780128186855/dementia-rehabilitation>

External Reporting Board. (2023, August 29). *Sustainability Reporting*. <https://www.xrb.govt.nz/sustainability-reporting/#:~:text=Sustainability%20reporting%20provide s%20an%20overview,framework%20for%20Aotearoa%20New%20Zealand>

Fabian Society. (n.d.). *Our History*. Fabian Society. Retrieved August 29, 2023, from <https://fabians.org.uk/about-us/our-history/>

Federal Aviation Administration. (n.d.). *Human factors primer for aviation mechanics*. Retrieved October 10, 2023, from https://www.faa.gov/gslac/ALC/course_content.aspx?pf=1&preview=true&cID=258

Ferrer, R., & Klien, W. (2015). Risk perceptions and health behavior. *Current Opinion in Psychology*, 1(5), 85-89. <https://www.sciencedirect.com/science/article/pii/S2352250X15001177?via%3Dihub>

Government Office for Science. (2011). *Blackett review of high impact low probability risks*. <https://assets.publishing.service.gov.uk/media/5a7c901540f0b62aff6c28c0/12-519-blackett-review-high-impact-low-probability-risks.pdf>

German Advisory Council on Global Change. (1998). *World in transition: Strategies for managing global environmental risks*. Springer. <https://link.springer.com/book/10.1007/978-3-642-56958-6>

Grayson, W. (2014, September 19). *Geniuses wrap themselves in rope, let an excavator sling them through the air*. Equipment World. <https://www.equipmentworld.com/construction-equipment/video/14954000/geniuses-wrap-themselves-in-rope-let-an-excavator-sling-them-through-the-air>

Guyton, G. (1999). A brief history of workers' compensation. *The Iowa Orthopaedic Journal*, 19, 106-110. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1888620/>

Health and Safety at Work Act 2015. <https://www.legislation.govt.nz/act/public/2015/0070/latest/whole.html>

Health and Safety Executive. (n.d.-a). *Construction physical ill health risks: Vibration*. Retrieved October 18, 2023, from [https://www.hse.gov.uk/construction/healthrisks/physical-ill-health-risks/vibration.htm#:~:text=What%20you%20should%20know,Arm%20Vibration%20Syndrome%20\(HAVS\)](https://www.hse.gov.uk/construction/healthrisks/physical-ill-health-risks/vibration.htm#:~:text=What%20you%20should%20know,Arm%20Vibration%20Syndrome%20(HAVS)).

Health and Safety Executive. (n.d.-b). *Human factors: Managing human failures*. Retrieved October 23, 2023, from <https://www.hse.gov.uk/humanfactors/topics/humanfail.htm>

Health and Safety Executive. (n.d.-c). *Performance influencing factors*. Retrieved October 23, 2023, from <https://www.hse.gov.uk/humanfactors/assets/docs/pifs.pdf>

Health Direct. (2021, October). *Workers' compensation*. <https://www.healthdirect.gov.au/workers-compensation#what-does>

Heery, E., & Noon, M. (2017). Policies. *Dictionary of human resource management* (2nd ed.) Oxford University Press. <https://www.oxfordreference.com/display/10.1093/acref/9780199298761.001.0001/acref-9780199298761-e-947?rskey=QNM7rV&result=1221>

Holland, K. (2023, March 16). *Amygdala hijack: When emotion takes over*. Healthline. <https://www.healthline.com/health/stress/amygdala-hijack#how-to-stop>

Hollnagel, E., Wears, R., & Braithwaite, J. (2015). *From*

Safety-I to Safety-II: A white paper.
<https://www.england.nhs.uk/signuptosafety/wp-content/uploads/sites/16/2015/10/safety-1-safety-2-whte-papr.pdf>

Hopkins, A., & Palser, J. (1987). *Industrial Relations Journal*, 18(1), 26-39.

Hounshell, D. (1988, November). The Same Old Principles in the New Manufacturing. *Harvard Business Review*, 66(6), 54-61. <https://hbr.org/1988/11/the-same-old-principles-in-the-new-manufacturing>

Hudson, P. (2007). Implementing a safety culture in a major multi-national. *Safety Science*, 45(6), 697-722. <https://www.sciencedirect.com/science/article/pii/S0925753507000227>

Icare. (n.d.). *Calculating the cost of your workers insurance premium.* Retrieved October 25, 2023, from <https://www.icare.nsw.gov.au/employers/premiums/calculating-the-cost-of-your-premium#gref>

International Labour Organization. (1996). *Management of alcohol- and drug-related issues in the workplace.* https://www.ilo.org/safework/info/standards-and-instruments/codes/WCMS_107799/lang-en/index.htm

International Labour Organization. (2017, November 29). *Violence and Harassment in the Workplace.* [Audio podcast]. https://www.ilo.org/global/about-the-ilo/multimedia/audio/WCMS_603281/lang-en/index.htm

International Labour Organization (2021, July 17). *Exposure to hazardous chemicals at work and resulting health impacts: A global review.* https://www.ilo.org/global/topics/safety-and-health-at-work/resources-library/publications/WCMS_811455/lang-en/index.htm

International Labour Organization. (n.d.-a). *History of the ILO.* Retrieved October 20, 2023, from <https://www.ilo.org/inform/online-information-resources/research-guides/history/lang-en/index.htm>

International Labour Organization. (n.d.-b). *The ILO in New Zealand*. Retrieved October 20, 2023, from https://www.ilo.org/asia/WCMS_399591/lang-en/index.htm

Inquest into the death of Vijay Singh. CC New South Wales 2013/130661, 23 June 2015. https://coroners.nsw.gov.au/documents/findings/2015/Finding%20-%20Vijay%20Singh_2015_06_23_08_45_53_326.pdf

International Organization for Standardization. (n.d.). *ISO standards are internationally agreed by experts..* Retrieved September 27, 2023, from <https://www.iso.org/standards.html>

Institution of Occupational Safety and Health. (2021, March 31). *10 reasons why health and safety is important to your business*. <https://iosh.com/news/why-health-and-safety-is-important/#:~:text=By%20protecting%20your%20workers%2C%20you,committed%20to%20health%20and%20safety>

Kauppila, O., Härkönen, J., & Väyrynen, S. (2015). Integrated HSEQ management systems: Developments and trends. *International Journal for Quality Research*, 9(2), 231-242. <https://www.proquest.com/docview/2555386627?pq-origsite=primo&parentSessionId=HiWdfzwZ%2Br3xJcIxmZrt3V1ZZvgQfXIJ4MCLX%2BfMez8%3D>

Kenton, W. (2022, March 25). *What is Business Risk?* Investopedia. Retrieved October 12, 2023, from <https://www.investopedia.com/terms/b/businessrisk.asp#:~:text=Business%20risk%20usually%20occurs%20in,operational%20risk%2C%20and%20reputational%20risk>.

Kenton, W. (2023, September 26). *Social license to*

operate. Investopedia. Retrieved October 12, 2023, from <https://www.investopedia.com/terms/s/social-license-slo.asp>

Khieu, T., Hannan, T., & Mohammad, K. (2021). *New Zealand psychosocial survey 2021*. WorkSafe. <https://www.worksafe.govt.nz/research/new-zealand-psychosocial-survey/>

Li, F., Chao, M., Chen, N., & Zhang, S. (2017). Moral judgment in a business setting: The role of managers' moral foundation, ideology, and level of moral development. *Asia Pacific Journal of Management*, 35, 121-143. <https://link.springer.com/article/10.1007/s10490-017-9529-9>

Lindhout, P., & Reniers, G. (2021). Involving moral and ethical principles in safety management systems. *International Journal of Environmental Research and Public Health*, 18(16), 8511-8526. <https://www.mdpi.com/1660-4601/18/16/8511>

Lovelock, K. (2019). *Psychosocial hazards in work environments and effective approaches for managing them*. Worksafe. <https://www.worksafe.govt.nz/dmsdocument/5417-psychosocial-hazards-in-work-environments-and-effective-approaches-for-managing-them>

McNulty, E., & Marcus, L. (2020, March 25). *Are you leading through the crisis ... or managing the response?* Harvard Business Review. <https://hbr.org/2020/03/are-you-leading-through-the-crisis-or-managing-the-response>

McNulty, E., Marcus, L., & Henderson, J. (2019). Every leader a crisis leader? Prepare to lead when it matters most. *Leader to Leader*, 94, 33-38. <https://insperoteam.com/wp-content/uploads/2020/03/Every-Leader-a-Crisis-Leader.pdf>

MD+Calc. (n.d.). *Injury Severity Score*. Retrieved

October 22, 2023, from <https://www.mdcalc.com/calc/1239/injury-severity-score-iss>

Medical University of South Carolina. (n.d.). *When is being “too tired” a problem?* Retrieved October 22, 2023, from <https://muschealth.org/medical-services/geriatrics-and-aging/healthy-aging/being-tired>

Merriam-Webster. (n.d.-a). Fatigue. In *Merriam-Webster*. Retrieved October 23, 2023, from <https://www.merriam-webster.com/dictionary/fatigue>

Merriam-Webster. (n.d.-b). Crisis. In *Merriam-Webster*. Retrieved October 23, 2023, from <https://www.merriam-webster.com/dictionary/crisis>

Miller, K. (2020, December 12). *The triple bottom line: What it is & why it’s important*. Harvard Business School. <https://online.hbs.edu/blog/post/what-is-the-triple-bottom-line>

Ministry of Business, Innovation and Employment (n.d.-a). *Drugs, alcohol and work*. Retrieved October 23, 2023, from <https://www.employment.govt.nz/workplace-policies/tests-and-checks/drugs-alcohol-and-work/>

Ministry of Business, Innovation and Employment. (n.d.-b). *International Labour Organization*. Retrieved October 20, 2023, from <https://www.mbie.govt.nz/business-and-employment/employment-and-skills/our-international-labour-relations/international-labour-organisation>

Ministry of Business, Innovation and Employment (n.d.-c). *Protecting employees who work alone*. Ministry of Business, Innovation and Employment. October 21, 2023, from <https://www.employment.govt.nz/starting-employment/rights-and-responsibilities/protecting-employees-who-work-alone/>

Ministry for Business, Innovation and Employment. (2022). *A New Zealand Income Insurance Scheme: A*

discussion document. <https://www.mbie.govt.nz/dmsdocument/18666-a-new-zealand-income-insurance-scheme-a-discussion-document>

Ministry of Business, Innovation and Employment (2023, July 31). *Modern slavery and worker exploitation.* <https://www.mbie.govt.nz/business-and-employment/employment-and-skills/plan-of-action-against-forced-labour-people-trafficking-and-slavery/modern-slavery/>

Mishra, T. (2018, November 11). *What does emergency response mean?* Safeopedia. <https://www.safeopedia.com/definition/195/emergency-response>

Modern Slavery Act 2018 (Cth). <https://www.legislation.gov.au/Details/C2018A00153>

National Association of Safety Professionals. (2018, December 26). *Types of hazards.* <https://naspweb.com/blog/types-of-hazards/>

Newman, A. (2010, May 7). Not the first time the ‘dead-man’ switch did its job. *The New York Times.* <https://archive.nytimes.com/cityroom.blogs.nytimes.com/2010/05/07/not-the-first-time-the-dead-man-switch-did-its-job/>

Nordlund, W. (1991). The Federal Employees’ Compensation Act. *Monthly Labor Review.* <https://www.bls.gov/opub/mlr/1991/09/art1full.pdf>

Oxford English Dictionary. (n.d.-a). Educate. In *Oxford English Dictionary.* Retrieved October 28, 2023, from https://www.oed.com/dictionary/educate_v?tab=meaning_and_use#5743274

Oxford English Dictionary. (n.d.-b). Inform. In *Oxford English Dictionary.* Retrieved October 28, 2023, from https://www.oed.com/dictionary/inform_v?tab=meaning_and_use#413833

Oxford English Dictionary. (n.d.-c). Train. In *Oxford English Dictionary.* Retrieved October 28, 2023, from

https://www.oed.com/dictionary/train_v1?tab=meaning_and_use#17894860

Parliament Counsel Office. (n.d.). *New Zealand Legislation: Glossary*. Retrieved October 21, 2023, from <https://www.legislation.govt.nz/glossary.aspx#s>

Paulus, D., de Vries, G., Janssen, M., & Van de Walle, B. (2022). The influence of cognitive bias on crisis decision-making: Experimental evidence on the comparison of bias effects between crisis decision-maker groups. *International Journal of Disaster Risk Reduction*, 82. <https://www.sciencedirect.com/science/article/pii/S2212420922005982>

Pearson, C., & Clair, J. (1998). Reframing crisis management. *The Academy of Management Review*, 23(1), 59-76. <https://www.jstor.org/stable/259099?type=AccessWorkflow=login&seq=2>

Porter, T. (n.d.). Probability and statistics. In *Encyclopaedia Britannica*. Retrieved October 22, 2023, from <https://www.britannica.com/science/probability/Risks-expectations-and-fair-contracts>

Protocol of 2014 to the Forced Labour Convention, 1930. May 28, 2014. <https://www.ohchr.org/en/instruments-mechanisms/instruments/protocol-2014-forced-labour-convention-1930>

Reason, J. (1997). Hazards, defences and losses. In *Managing the Risks of Organizational Accidents* (pp. 1-20). Taylor & Francis Group.

Reason, J. (1998). Achieving a safe culture: Theory and practice. *Work & Stress*, 12(3), 293 – 306. <https://doi.org/10.1080/02678379808256868>

Reason, J. (2000). Human error: Models and management. *British Medical Journal*, 320(7237), 768-770. <https://www.jstor.org/stable/pdf/25187420.pdf?refreqid=fastly->

default%3A6a5df5c60f14b4b42abf695c10df3b56&ab_segments=&origin=&initiator=&acceptTC=1

Renn, O., & Klinke, A. (2004). Systemic risks: a new challenge for risk management. *EMBO Reports*, 5(51), S41-S46. <https://www.embopress.org/doi/epdf/10.1038/sj.embor.7400227>

Checkpoint (2023 October 20). *Investigation into deaths of port workers finds industry safety issues*. [Radio programme] Radio New Zealand <https://www.rnz.co.nz/national/programmes/checkpoint/audio/2018912060/investigation-into-deaths-of-port-workers-finds-industry-safety-issues>

Radio New Zealand (2023, July 20). *Missing real estate agent: Door-knocking usually safe, 'standard' practice*. [News]. <https://www.rnz.co.nz/news/national/494248/missing-real-estate-agent-door-knocking-usually-safe-standard-practice>

Safe Work Australia. (n.d.-a). *History of the model WHS laws*. Retrieved November 18, 2023, from <https://www.safeworkaustralia.gov.au/law-and-regulation/history-model-whs-laws>

Safe Work Australia. (n.d.-b). *How to consult with workers*. Retrieved October 28, 2023, from <https://www.safeworkaustralia.gov.au/safety-topic/managing-health-and-safety/consultation/how-consult-workers>

Safe Work Australia. (n.d.-c). *Managing Risks*. Retrieved October 23, 2023, from <https://www.safeworkaustralia.gov.au/safety-topic/managing-health-and-safety/identify-assess-and-control-hazards/managing-risks>

Safe Work Australia. (n.d.-d). *Workers' compensation*. Retrieved October 25, 2023, from

<https://www.safeworkaustralia.gov.au/workers-compensation>

Safe Work Australia. (2011). *Key Worker's Compensation Information, Australia.*

https://www.safeworkaustralia.gov.au/system/files/documents/1702/wc_information_booklet_2011_web.pdf

Safe Work Australia. (2014). *Guide for Importing and Supplying Safe Plan.*

<https://www.safeworkaustralia.gov.au/system/files/documents/1703/guide-importing-supplying-safe-plant.docx>

Safe Work Australia. (2020, March 20). *national hazard exposure worker surveillance: Exposure to biological hazards and the provision of controls against biological hazards in Australian workplaces.* Safe Work Australia.

<https://www.safeworkaustralia.gov.au/resources-and-publications/reports/national-hazard-exposure-worker-surveillance-exposure-biological-hazards-and-provision-controls-against-biological-hazards-australian-workplaces>

Safe Work Australia. (2020, March 21). *Safe work method statement for high risk construction work – information sheet.* <https://www.safeworkaustralia.gov.au/resources-and-publications/guidance-materials/safe-work-method-statement-high-risk-construction-work-information-sheet>

Safe Work Australia. (2022, July). *Managing psychosocial hazards at work: Code of Practice.*

https://www.safeworkaustralia.gov.au/sites/default/files/2022-08/model_code_of_practice_-_managing_psychosocial_hazards_at_work_25082022_0.pdf

Safe Work Australia. (2023, March 10). *Model WHS Act cross-comparison table.*

<https://www.safeworkaustralia.gov.au/doc/model-whs-act-cross-comparison-table>

Safe Work Australia. (2023, August 14). *Model Work Health and Safety Act*.

<https://www.safeworkaustralia.gov.au/doc/model-work-health-and-safety-act>

Safe Work South Australia (n.d.). *Consultation & worker representation..* Retrieved October 28, 2023, from <https://www.safework.sa.gov.au/workers/consultation-and-representation>

Safety Culture. (n.d.). *Standard Operating Procedures (SOP)*. Safety Culture. Retrieved October 23, 2023, from <https://safetydocs.safetyculture.com/product-guides/standard-operating-procedures-sop/>

Safety Culture. (2023, November 22). *Risk assessment*. <https://safetyculture.com/topics/risk-assessment/>

Schauer, M., & Elbert, K. (2010). Dissociation following traumatic stress. *Journal of Psychology, 218*(2), 109-127. <https://oce.ovid.com/article/01369761-201021820-00001/HTML>

Shen, J., Botly, L., Chung, S., Gibbs, A., Sabanadzovic, S., & Shapiro, C. (2006). Fatigue and shift work. *Journal of Sleep Research, 15*(1), 1-5. <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2869.2006.00493.x>

Solomon, T., Hasanzadeh, S., Esmaeili, B., & Dodd, M. (2021). Impact of change blindness on worker hazard. *Journal of Management in Engineering 37*(4), 1-15. [https://doi.org/10.1061/\(ASCE\)ME.1943-5479.0000908](https://doi.org/10.1061/(ASCE)ME.1943-5479.0000908)

Sprague, F. (1932). Electric traction in space of three dimensions. *Journal of the Maryland Academy of Sciences, 3*(2), 1-18. https://www.brooklynrail.net/pdf/FSprague/FSprague_ElectricTractionInSpaceOF3Dimensions_Part2a.pdf

Standards Australia, & Standards New Zealand. (2001).

AS/NZS 4801 Occupational health and safety management systems – Specification with guidance for use.<https://au.i2.saiglobal.com/management/viewer/?doc=/management/onlineviewer/download/cbb894db07c53680aeb842791861e957.pdf&did=264020&pid=1014483&resid=185097&bookmark=0>

Standards Australia, & Standards New Zealand. (2018). *Occupational health and safety management systems – Requirements with guidance for use.* Standards Australia and Standards New Zealand. <https://www.standards.govt.nz/shop/asnz-iso-450012018/>

Sullivan, T., Edgar, F., & McAndrew, I. (2019). The hidden costs of employee drinking: A quantitative analysis. *Drug and Alcohol Review*, 38, 543-553. <https://onlinelibrary.wiley.com/doi/full/10.1111/dar.12935>

Talab, A., Meshkani, M., Mofidi, A., & Mollakazemiha, M. (2013). Evaluation of the perception of workplace safety signs and effective factors. *International Journal of Occupational Hygiene*, 5, 117-133. https://www.researchgate.net/publication/304396217_Evaluation_of_the_Perception_of_Workplace_Safety_Signs_and_Effective_Factors

The University of Queensland. (2022, August 31). *Occupational exposure to sunlight.* <https://ppl.app.uq.edu.au/content/2.30.10-occupational-exposure-sunlight>

Thompson, S., Armstrong, W., & Thomas, C. (1998). Illusions of control, underestimations, and accuracy. *Psychological Bulletin*, 123(2), 143-161. <https://psycnet.apa.org/doiLanding?doi=10.1037%2F0033-2909.123.2.143>

Tischler, M. (2018). Sunstrike: Beat the glare. *AA Directions, Winter.* <https://www.aa.co.nz/membership/aa-directions/driver/sunstrike-beat-the-glare/>

U.S. Bureau of Labor Statistics. (2023, October 6). *Industrial engineers*. <https://www.bls.gov/ooh/architecture-and-engineering/industrial-engineers.htm>

UK Parliament. (n.d.-a). *Early factory legislation*. Retrieved August 29, 2023, from <https://www.parliament.uk/about/living-heritage/transformingsociety/livinglearning/19thcentury/overview/earlyfactorylegislation/#>

UK Parliament. (n.d.-b). *Workplace compensation legislation*. Retrieved October 25, 2023, from <https://www.parliament.uk/about/living-heritage/transformingsociety/tradeindustry/industrycommunity/case-study-so-davies-and-workplace-compensation/workplace-compensation-legislation/#:~:text=Workplace%20compensation%20legislation%20places%20liability,in%20income%20or%20work%20capacity.>

University of New England. (n.d.). *Risk management tools*. Retrieved October 23, 2023, from <https://www.une.edu.au/safety/whs-forms/risk-management-forms>

UNHCR UN Refugee Agency. (2019). *Dealing with critical incidents and trauma (staff)*. Retrieved October 3, 2023, from <https://emergency.unhcr.org/staff-emergencies/health-and-wellbeing/dealing-critical-incidents-and-trauma-staff>

Unilever. (n.d.-a). *Employee health and wellbeing*. Unilever. Retrieved October 12, 2023, from <https://www.unilever.com/planet-and-society/responsible-business/employee-wellbeing/>

Unilever. (n.d.-b). *Product safety and quality*. Unilever. Retrieved October 12, 2023, from <https://www.unilever.com/search/?q=quality+management>

Unilever. (n.d.-c). *Sustainability reporting standards*.

Unilever. Retrieved October 12, 2023, from <https://www.unilever.com/planet-and-society/sustainability-reporting-centre/reporting-standards/>

Unilever. (n.d.-d). *Unilever at a glance*. Unilever. Retrieved October 12, 2023, from <https://www.unilever.com/our-company/at-a-glance/>

United Nations Department of Economic and Social Affairs. (n.d.). *The 17 Goals*. Retrieved October 14, 2023, from <https://sdgs.un.org/goals>

United States Geological Survey. (n.d.). *How can climate change affect natural disasters?* Retrieved September 26, 2023, from <https://www.usgs.gov/faqs/how-can-climate-change-affect-natural-disasters#:~:text=With%20increasing%20global%20surface%20temperatures,more%20powerful%20storms%20to%20develop.>

Vector Solutions. (2019, June 25). *Levels of a risk matrix*. <https://www.vectorsolutions.com/resources/blogs/levels-of-a-risk-matrix/>

Veljanovski, C. (2021). The impact of employers' liability on 19th-century U.K. Coalmining fatalities. *Journal of Empirical Legal Studies*, 18(3), 660-683. <https://doi.org/https://doi.org/10.1111/jels.12293>

Waka Kotahi:New Zealand Transport Agency. (n.d.). *Sunstrike*. Retrieved October 22, 2023, from <https://www.nzta.govt.nz/roadcode/heavy-vehicle-road-code/road-code/about-driving/when-conditions-change/sunstrike/>

Weick, K., & Sutcliffe, K. (2001). Managing the unexpected: What business can learn from high reliability organizations. In *Managing the unexpected: Assuring high performance in an age of complexity* (pp. 1-23). Jossey-Bass.

Windholz, E. (2013). The long and winding road to OHS

harmonisation. *Labour History*, 104, 169-188.
[https://www.jstor.org/stable/10.5263/
labourhistory.104.0169?seq=6](https://www.jstor.org/stable/10.5263/labourhistory.104.0169?seq=6)

Wolters Kluwer. (n.d.). *Risk Matrix*. Retrieved October 22, 2023, from <https://www.wolterskluwer.com/en/solutions/enablon/bowtie/expert-insights/barrier-based-risk-management-knowledge-base/risk-matrices>

Work Health and Safety Act 2011.
<https://www.legislation.gov.au/Details/C2023C00359>

WorkSafe. (n.d.). *Notifications*. WorkSafe. Retrieved October 25, 2023, from <https://www.worksafe.govt.nz/notifications/>

WorkSafe. (2017, September 5). *Metal turning lathes*.
[https://www.worksafe.govt.nz/topic-and-industry/
machinery/metal-turning-lathes/](https://www.worksafe.govt.nz/topic-and-industry/machinery/metal-turning-lathes/)

WorkSafe. (2018, February 8). *WorkSafe's role as a regulator*. [https://www.worksafe.govt.nz/managing-health-and-safety/getting-started/understanding-the-law/
worksafes-role-as-a-regulator/](https://www.worksafe.govt.nz/managing-health-and-safety/getting-started/understanding-the-law/worksafes-role-as-a-regulator/)

Worksafe. (2019, April 1). *Psychosocial hazards in work environments and effective approaches for managing them*.
<https://www.worksafe.govt.nz/research/psychosocial-hazards-in-work-environments-and-effective-approaches-for-managing-them/>

Worksafe. (2019, July 18). *Introduction to the Health and Safety at Work Act 2015 – special guide*.
<https://www.worksafe.govt.nz/managing-health-and-safety/getting-started/introduction-hswa-special-guide/>

Worksafe. (2022, September 8). *Dealing with earthquake-related health and safety risks: information for PCBUs and building owners*. Retrieved September 26, 2023, from <https://www.worksafe.govt.nz/laws-and-regulations/operational-policy-framework/operational-policies/dealing-with-earthquake-related/>

WorkSafe. (2023, November 29). *Prosecution policy*. <https://www.worksafe.govt.nz/laws-and-regulations/operational-policy-framework/operational-policies/prosecution-policy/>

Worksafe. (2017, October 17). *Fatigue quick guide*. <https://www.worksafe.govt.nz/topic-and-industry/fatigue/fatigue-quick-guide/>

WorkSafe Queensland. (2020, September 18). *Industry-specific psychosocial hazards and factors*. https://www.worksafe.qld.gov.au/__data/assets/pdf_file/0025/22957/industry-specific-psychosocial-risk-factors.pdf

World Vision. (2021). *Risky Goods: New Zealand Imports*. <https://www.worldvision.org.nz/getmedia/6904e490-14b7-4fbf-b11e-308ddf99c44a/WVNZ-research-risky-goods-nz-imports/>

Transcript Video 1: An introduction to work health & safety management (Chapter 4)

While following some basic safety rules at work might be easy, understanding how to achieve effective Work health and safety Management is much more complex.

This resource is designed to help you understand some key concepts in Work health and safety by exploring some of the complexities. We will refine important terms in our context. By exploring the theories we will try to explain why certain approaches are useful while others lead to serious injuries for workers.

So, what is work health and safety management?

In its simplest sense, WHS management is any action taken by the company to ensure a safe workplace. This means protecting the people, plant, and environment from harm.

In simple terms, it can be considered the approaches, processes, tools and techniques used by business managers to keep their workers safe so they can achieve their work.

More technically, the World Health Organization describes it as “*all aspects of health and safety in the workplace and has a strong focus on primary prevention of hazards.*”

But what then is health? According to the World Health Organisation “*Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.*”

So the ‘health’ in work health and safety is not just about preventing illness or injury but potentially about encouraging workers to be well.

Indeed, wellbeing promotion by business for workers is an emerging and growing area of work health and safety management.

What then does ‘safety’ mean in this work health and safety management context?

The World Health Organisation Standards Australia and New Zealand defines this as “*A state in which the risk of harm (to persons) or damage is limited to an acceptable level.*”

They go on to then define risk as “*The likelihood and consequence of injury or harm occurring.*”

This means that an employer is only expected to manage safety to an ‘acceptable level’ of risk for injury or harm to occur to their workers. Of course, if you are the employee who is injured it might be difficult to agree that your injury was acceptable!!!

Already you can see that there are complex concepts and terms that we use every day in undertaking work health and safety management.

While it is about safety in a ‘workplace’ even the idea of what a workplace means is changing and evolving over time.

For example, think about people who work for one company but who are sub-contracted or visiting many different sites – people who service machinery or perhaps even consultants. What about those who work a couple of days a week from home?

So rather than specifically focusing on defining the ‘workplace’ in work health and safety today we tend to focus on the people responsible for health and safety

management of workers these people are known as PCBUs (person conducting a business or undertaking).

Workcover NSW defines this as: “A ‘person conducting a business or undertaking’ (PCBU) is a legal term under WHS laws for individuals, businesses or organisations that are conducting business. A person who performs work for a PCBU is considered a worker.”

You can see that this definition removes the emphasis from specifically managing work sites towards thinking about worker health and safety wherever they are engaged in their work.

Under the work health and safety legislation in Australia it is anyone who “...performs work for a PCBU is considered a worker.”

This means that not only are permanent and casual employees workers, but volunteers and contractors and subcontractors are also classified as workers.

Also, some employers take their responsibilities one step further – they have really considered the World Health Organisation’s definition of ‘health’ as being well rather than be focused on avoiding injury or illness – these employers actively invest in their employees’ wellbeing. Wellbeing may be considered WHS taken to the next level, where now the employer is not only protecting the health of their people in the workplace, but also outside of work. This may include healthy life initiatives such as quit smoking programs, subsidised or fully funded gym memberships, and even activities such as education programs. The whole idea is that healthy employees are more productive and less prone to harm at work. So managers are often interested in well-being initiatives.

Organisations that effectively manage work health and safety are focused on the ‘prevention of hazards’.

What is a hazard? “...it’s a source or situation with a potential for harm.”

An organisation investing in wellbeing is simply higher up the prevention scale than a business that is just managing the basics of injury avoidance.

But please note, no matter the work health and safety initiative, the one thing that these initiatives always have in common is that they are focused on the health of workers.

Even though we may discuss large workplace disasters that have impacted on the general public, the focus of our discussion will always be on the workers involved.

As managers we can only seek to influence the behaviours of ourselves and our workers – not the general public.

Transcript Video 2: An introduction to work health & safety management (Chapter 4)

In this video we are going to consider why health and safety isn't consistently implemented both between organisations and between countries around the world.

So, at the organisational level, why might one organisation be very proactive about work health and safety (doing wellbeing for example) and another may only do the minimum or try to avoid any focus on worker safety?

Some factors to consider might be:

- Size – the number of employees and/or the financial capacity might affect work health and safety management. For example, a small business might have a different practical approach towards work health and safety compared to a large organisation (even if both organisations are trying their best to protect their workers).
- Danger – Some jobs might be physically or psychologically more dangerous than others. It might be physically more dangerous to work in a mine compared with working in an office. It might be psychologically more dangerous to work as an air traffic controller due to stress than being a shop attendant (unless you have

problems with your customers!!!). So some businesses – just to get the job done – may need a stronger safety focus than others.

- Legislation – different parts of the world have different laws so work health and safety requirements might just be different

So, there may be some scenarios where an employer could get the job done more cheaply without safe work practices (perhaps in a developing country without legislation and with many available workers), alternatively, in a knowledge economy (where employees are valued for thoughts and ideas) an employer might want to support wellbeing as they require relaxed and thriving employees to achieve the company's aims. Every situation and response to work health and safety will be different.

Likewise, employees come with different attitudes towards work health and safety. Firstly, consider their varied past experiences – perhaps they have ‘gotten away with’ doing a dangerous practice successfully many times in the past (like the employee who takes a shortcut across the factory floor to leave work 5 minutes earlier to make sure they get to catch their bus) or perhaps the employee is very safety conscious (they may have seen someone having a serious injury at work and experienced the consequences of that loss) and are now safe work champions.

You can already probably tell from these scenarios that another key factor influencing work health and safety in an organisation are employer and employee values – the attitudes and beliefs towards work health and safety that either prioritise it or deprioritise it in a particular business.

Values and goals are a bit tricky because in an organisation there is a combination of top-down values

or priorities but also bottom-up behaviours – what the employees think and do.

To try to explain why people might have different values and goals towards work health and safety Hopkin's proposes his 'Binary Approach'.

Hopkin's suggests that you either blame-the-victim (and believe that the worker causes the situation and/or injury) or you blame-the-system (and believe that the situation and/or injury occurred because of an error in the safety management system). Put simply, you either tend to blame the worker or blame the manager!

Every decision from then on is based on which of these two approaches you have towards work health and safety management and, subsequently, create a proactive or reactive safety culture.

If you blame the victim, you believe as an employer that you cannot improve your workplace safety unless you stop recruiting 'dangerous' people – when people are injured they are considered 'high risk' people and you would try to remove them from your company. Ideally you believe that human resource managers can avoid them during the recruitment process.

If you are an employee who blames the victim you would simply think that you are a safe person and it won't happen to you whilst ever you are working around other safe people – you might even victimise 'dangerous' people who have had accidents and exclude them from your workgroup or social group.

If you blame the system, you will try to understand how the person came to be injured and what might have gone wrong in the practices and processes that led to that injury. In this case it is less about blame and more about learning to avoid similar consequences in the future.

The key difference is that when you blame the victim no

learning takes place and potentially more people will go on to be injured. In the second scenario learning takes place and improvements to safety management ideally result in less people getting injured.

Our course endorses a blame-the-system approach. The reasons behind this will be presented using current theory and case studies. In particular we will use James Reason's Swiss Cheese Model which helps us to try to explain and understand how system errors can lead to workers being at increased risk of injury or harm.

However, before discussing the systems approach and its related theories, it is important to know the difference between an 'accident' and an 'incident'.

An 'accident' is "*...an undesirable or unfortunate happening that occurs unintentionally and usually results in harm, injury, damage, or loss; casualty; mishap.*" This definition from Dictionary.com is similar to what we all know and understand – an accident is when you get hurt but it's unpredictable and, importantly, unpreventable. So, if we think back over an accident we realise that nothing could have changed.

In work health and safety management it would be impossible to prevent accidents...it is important to understand that we cannot manage random, unpredictable, workplace injuries. Even insurance companies have an exit clause and do not pay out for 'Acts of God' which are legally defined as "*An event that directly and exclusively results from the occurrence of natural causes that could not have been prevented by the exercise of foresight or caution; an inevitable accident.*"

In this course we cannot manage accidents but we DO manage incidents.

An incident is defined in Australian Standard on work health and safety (4801) as: "*Any unplanned event*

resulting in, or having a potential for injury, illhealth, damage or other loss.”

At first this may not sound different from an accident as both accidents and incidents are both unplanned, however, an incident is believed to be preventable while the accident “*could not have been prevented by the exercise of foresight or caution.*”

In work health and safety we do not manage Acts of God but, instead we manage the Acts of Humans and we believe that by taking a systems approach we might be able to observe, measure, learn and improve so that incidents resulting in serious injury or harm occur do not occur (or, at least, occur as rarely as possible).

Now, if you focus even more on the definition for an incident you will notice it says “*Any unplanned event resulting in, or having a potential for injury, illhealth, damage or other loss.*”

This, too, is a key difference. Incidents are not always harmful – they do not always go catastrophically wrong – but, instead, they are indicators of issues in the work health and safety management system.

Transcript Video 3: An introduction to work health & safety management (Chapter 5)

In this video we are going to learn about James Reason's Swiss Cheese model. This theoretical model tries to explain the relationship between a hazard and a workplace injury. It can be used two different ways. Firstly, after an incident has occurred, it can be used to help us understand what went wrong so we can learn and immediately improve our safety system. Alternatively, we can use it before an incident occurs and it can help us identify any weaknesses developing in our safety system so we can fix these before something serious happens.

But who is James Reason and why did he develop this model? After much research and analysis on critical incidents (large scale ones resulting in many fatalities), UK-based Professor James Reason started thinking about what causes an incident – how do hazards and people interact? How does a potential hazard actually end up hurting people at work? Where does it go wrong? And, ideally, what strategies could we use to prevent an incident?

First we need to think about a hazard – a source of potential for harm.

Every workplace has many hazards – they are everywhere...machinery with blades that could cut off a worker's hand, ladders that a worker could fall off or

computer keyboards that might cause repetitive strain injury.

But, while hazards are everywhere; they are not injuring workers all the time or at the same rate – some organisations have catastrophes while others have low rates of injury even when workers are doing the very same job with exposure to the same hazards.

So while the threat of getting injured or harmed is always there, the risk to the worker (“*The likelihood and consequence of injury or harm occurring.*”) is not the same.

What could explain why some workers get injured and other do not? This is particularly interesting when workers are exposed to the same hazard while doing the same job. What is the difference about the individual or the workplace where the work is occurring?

Professor Reason and others concluded that it depends on the effectiveness of the organisation to identify the hazard, assess its risk (the actual potential for an injury to occur to a worker) and undertake measures to reduce the risk to the workers.

Interestingly, blaming the individual did not explain the incident nor did it lead to better safety outcomes.

What is unique to James Reason is that he had analysed workplace catastrophes he had learned that it was never just one person’s fault. Different issues in and around organisations affect the people involved and led to the incident. He was looking for a way to explain that we really shouldn’t blame-the-victim – because he could see that there were patterns – systems failures – and these were to blame. But how could he explain this?

Then, the idea of Swiss cheese model came to him!

James Reason first proposed that if a workplace were

considered a block of cheese, then slices of cheese might represent layers of defence in a safety system including:

A people layer – safety focused workers with relevant values, behaviours and safe decision making

An engineering layer – with alarms, physical barriers and automatic shutdowns

A procedural layer – with instructions on safe work practices

An Administrative layer – ensuring people are hired with the right skills and provided the right training to perform tasks safely and are also, for example, given a safe work uniform.

However, Reason believes that there would be weaknesses in these layers occurring at any given time due to internal and external factors putting pressure on the organisation and its workers.

So James Reason proposes that we are not really looking at a solid block of cheese but, instead, we are looking at something like Swiss cheese. The first thing you notice with Swiss Cheese is that it has holes in it.

When workplaces develop weaknesses in their safety defence layers we can imagine the cheese getting holes in it. These holes are not always predictable or static they pop up when safety issues arise and disappear when safety issues are resolved, they can occur in different defence layers and within different parts of the organisation.

So, let's imagine a block of cheese cut into slices – we are viewing the safety system in its distinct safety defence layers. Then, let's pretend a hazard is like an arrow trying to shoot through the cheese to cause an incident. Fortunately the hazard can only shoot through the cheese when all the holes in the defence layers line up.

In each of the defence layers, holes are constantly appearing and being repaired. Most of the time holes in

each layer do not line up but when they do, you have an incident. The hazard will have had its opportunity to make contact with the worker and injury or harm will occur. Essentially when multiple layers of safety defences are weak, there are more holes in the cheese and a greater probability that the hazard arrow can shoot through more often to cause more incidents.

Organisations striving for good safety management try to repair the holes in the Swiss cheese as promptly as possible to minimise the probability of all the holes lining up and the hazard arrow shooting through.

So what specifically causes the holes in our safety cheese?

Professor Reason suggests that holes are created in safety defence layers by active failures and latent conditions combining.

Active failures are the unsafe acts committed by people who are in direct contact with the hazard. If you blame-the-victim this is all you would consider as it would just be that person's fault. You would only examine the 'people' safety defence layer. They are either safe or unsafe people.

But with a systems approach we also examine Latent conditions – any decisions, processes and procedures that have the potential to weaken our safety defences and impact on a worker's safety. This considers the engineering, procedural and administrative layers.

Active failures are 'active' – immediate and easily visible. Unless we are proactively using the Swiss Cheese Model to review our safety defence layers systematically and regularly, latent conditions can lay dormant in the system, they might only obviously emerge when the holes in the Swiss cheese match up causing an incident.

For example a manager decides to operate double shifts with the same crew. This management decision leads to

tired workers. One worker hits a button on a machine –the hazard – out of sequence (an active failure) and this results in a colleague having his hand crushed (the incident). A procedural weakness is overlooking the fatigue in the operator who pressed the button. An engineering weakness is the fact that there was no layer of defence, no safety guard, to prevent the colleague’s hand being in the machine.

So how do we repair the holes in the Swiss cheese to stop the arrow shooting through?

Active failures are complex human-centric factors which makes them difficult to predict and control. However latent conditions can be identified and fixed before an incident occurs.

Keeping latent and potential active factors in check is key to safety management.

So how do we manage our safety defence layers? How do we avoid a blame-the-victim approach?

Most organisations choose to use a systems approach and therefore choose to have a safety management system.

In our next video we will learn about safety management systems, what they are comprised of and the different steps involved in setting one up. We will learn how to use safety management systems to identify and repair holes in the cheese.

Transcript Video 4: An introduction to work health & safety management (Chapter 6)

In this video we examine Work Health and Safety Management Systems.

These systems are expected to eliminate latent conditions and minimise the risk of active failures, but what is a safety management system and how do they do this?

The Australian Standard 4801 for Occupational health and safety management systems states that a work health and safety system has five steps:

1. Ensuring commitment to safety and undertaking relevant policy development
2. Planning how to roll out the system within the organization and industry context
3. Implementing safety initiatives and practices
4. Effective measurement & evaluation of safety initiatives and practices; and, finally,
5. Reviewing safety indicators to further improve implementation.

Ideally a work health and safety system is like a wheel – it goes round and round (repeating the steps over and over) while constantly moving forward (achieving continual improvement).

These five steps help organisations to identify their safety defence layers and repair any holes that have emerged. Keeping records of near misses, for example, helps identify where the weaknesses are so that serious incidents can be avoided.

So how might we work to address active failures using a safety system?

This requires a focus on the “People” defence layer and people are often more complex than machinery or the procedures required to use them.

While not specifically linked or discussed in the Australian Standards, active failures (the actions of workers that lead to immediate consequences in an incident) might be influenced via the development of a strong safety culture that influences safe managerial decisions and worker behaviour.

Here it is proposed that this safety culture might be embedded in an organisation and work in parallel with each of the steps of the work health and safety management system.

Hopkins (2005) states that *“Safety culture is one of a number of ideas currently seen as offering organisations a way to achieve higher standards of safety...The attention now being paid to the cultural approach to safety stems in part from a recognition of the limitations of safety management systems as a means of achieving safety.”*

While a system provides a strong framework for managing safety, a cultural approach considers people’s values and behaviours and therefore enhances the system rather than replacing it.

How to develop a safety culture concurrent to the safety system is a core concept in our learning so it is important, first, to understand what, technically, a safety culture is.

James Reason, after using Swiss cheese to try to

understand how incidents might occur, spent time thinking about how individual worker values, attitudes and behaviours might be brought together and aligned in order to support work health and safety. He has coined this group approach to safety as being the organisation's 'safety culture'.

A business can have a positive safety culture (with workers looking out for each other and themselves and are engaged in safe work practices) or a negative safety culture (where they blame-the-victim and no effort is put into worker safety).

Reason's Safety Culture Theory comprises four key elements (Reporting, Just, Learning and Flexible) each of these will interact to generate an overarching 'Informed' Safety Culture where employees are closely engaged and aligned with the organisation's work health and safety management system to achieve maximum safety outcomes and avoid serious incidents.

Now let's examine the four culture sub-components which will engineer an ideal Safety Culture (Reporting Culture, Just Culture, Learning Culture and Flexible Culture).

A *Reporting Culture* considers the confidence of employees to report workplace incidents – particularly near misses which might otherwise go unnoticed but are an important source of information on weaknesses in our safety defence layers.

The key to achieving a successful Reporting Culture is establishing trust and Reason proposes a 'no blame' approach, where employees report even their own mistakes in order to provide relevant safety-related information to their employer. Practitioners then need to think about how to motivate employees to report incidents that did not have

consequences as most people won't want to do paperwork which they consider 'unnecessary'.

A *Just Culture* creates an atmosphere of trust between the employee and employer, and between staff, because everyone understands acceptable safety behaviours.

In a Just Culture it must be acceptable to make mistakes while, at the same time, deliberately unsafe activities must not be tolerated.

Employee perceptions of organisational reactions towards employees who mistakenly or deliberately engage in activities leading to safety incidents become very important for maintaining the trust between the employer and employees. So a Just Culture supports a Reporting Culture.

A *Learning Culture* ultimately determines whether an organisation can generate change based on prior incidents to prevent future occurrences. A strong Learning Culture will encourage change based on information collected for and emerging from the safety system. So the Learning culture is informed by the Reporting culture but can also be proactive when hazard identification and assessment takes place in organisations.

Finally, the *Flexible Culture* is the ability of an organisation to respond to change and empower people to make decisions at the right time and place to achieve better safety outcomes.

Reason proposes that in emergency response scenarios the person with the most expertise or information in that moment should move to the top of the chain of command – there should be a hierarchical shift – so that this person becomes the key decision maker as they are best equipped to generate the best safety outcome.

So, overall, if we blame-the-system rather than blame-the-victim we can focus on the continual improvement of

safety in our business by using a work health and safety management system to actively maintain our safety defence layers (that is to repair the holes in the cheese) and further reinforce the “people” layer by recognising a cultural element and therefore also focus on generating an ‘ideal’ safety culture.

In such an organisation, people learn from the mistakes of the past and, by taking action to remediate safety issues, reduce the risk of injury or harm to workers over time.

Organisations would aspire to being safe because of their moral values (workers have the right to return home unharmed by work) combined with the potential productivity benefits achieved by becoming a desirable employer fostering healthy and effective employees.

Transcript Video 5: An introduction to work health & safety management (Chapter 11)

What is risk management? Initially, risk management might sound simple:

- You identify some risk
- You work out how big the risk is
- And then you try to prioritise different risks and find ways to control them so that incidents and their consequences don't eventuate.

This is the basis of risk management but there are many more complexities that need to be understood. For example, there are different ways to apply risk management. So, achieving a deep understanding of risk management to apply it in practice is more difficult than it first looks.

Consider, what I think is risky you might think is OK?

Or what I think is a tolerable risk you might think is completely unacceptable

Also – should risk management be confined to circumstances when the risk might lead to hurting people or should you consider all of the possible consequences of an incident?

Does risk always have a bad, or negative, outcome? There is risk in buying shares in the stock market but you don't buy shares thinking you are going to lose your money

– you want to make money and have a positive outcome. If risk outcomes were always negative there would be no investment! Sometimes ‘taking a risk’ can then be a good thing so all this needs to be considered within the broader context of risk management.

What impacts our perceptions of risk can depend on our experience, education, whether the risk is voluntary or imposed on us, that is, whether we feel that we are in control and what benefit we think we will get from taking the risk.

Risk is a part of everything that we do from getting up in the morning

We are all making risk-based decisions, all the time. Using instinctual risk management in our daily lives is what we do to make sure we stay safe.

So why study risk management?

What I might think of as severe or catastrophic consequence you might think of as only a minor or moderate consequence. Because my perceptions of risk are different to yours, my tolerability or acceptability of risk may be different to yours and my experiences are different to yours – we need to have a way that we can communicate about risk in a way that takes away all of the emotion and gives us a common language.

Also if we can learn some simple tools then we can make sure that when we “do” risk management we are much more likely to identify all of the risks. Then we can have a better understanding of the causes, consequences and likelihoods to then develop controls that will be effective in managing those risks to get good outcomes we are after.

More advanced risk management also helps you to know what to do when you have a long list of risks and controls – it will guide you on what to do next.

So let’s start with establishing a common language?

The terms hazard and risk are often used interchangeably in the English and other languages. This is because our understanding risk varies depending on our culture and context. Even some WHS professionals use the words interchangeably but they are different.

In a WHS context a Hazard is a situation or thing that has the potential to harm a person. Hazards in a workplace can include: noisy machinery, a moving forklift, chemicals, electricity, working at heights, a repetitious job, bullying and violence.

The International Standard for Risk management principles and guidelines, ISO 31000, replaced the term “hazard” with “risk source”. This then means that risk sources maybe considered to be elements acting either alone or in combination with an intrinsic power to generate a risk.

Risk may then defined any effect of uncertainty on objectives.

What is uncertainty? It can be the likelihood, frequency or probability of something occurring.

Risk = consequences X frequency

Risk = dying in a road incident X number/year

Thinking about it another way...

A good way to remember this is to think of a shark – A shark maybe a source of harm but does it pose a risk?

Given our new understanding of the word risk – for a shark to pose a risk, the shark has to pose a risk to something – it has to have an effect over something

For example, if you put a swimmer near a shark – the shark now poses a risk to the swimmer. But how much risk does it pose?

To understand the level, scale or size of risk that the shark poses to the swimmer there are many factors to consider:

- How far away is the person from the shark? Are they isolated by distance or some other barrier such as a shark proof fence?
- What type of shark is it and how big is it? (baby or a fully grown white pointer)
- How fast can the person swim? Can they get away from the shark once they know it is there?
- What PPE is the person wearing? This could be a mesh suit to resist any bite?
- What engineering controls are in place? Is the person in a shark proof cage, are there other deterrents such as acoustic measures?

By thinking about the person, the shark and the situation – you are starting to do risk management.

So if risk is the effect of uncertainty on objectives, in this case, the risk could be defined as chance of getting bitten by a shark while swimming in waters where sharks have been sighted. All of the other considerations are controls that impact on the level or size of the risk. Risk management is simply a way to explain all of this complexity.

The actual risk for any person facing a shark is therefore dependent on many factors – so now you can see why risk and its management is such a complex topic!

Risk Prioritisation

Now that you know the basics of risk management but how can we use it because we can't fix everything at once!

By understanding levels of risk we can prioritise different scenarios to see where we are best off spending our money. A common way to do this is to rate the level of consequence (impact) and likelihood (how often you get the impact) and prioritise the risks based on a score.

Risk tables can be used for WHS but are also a useful tool to examine Environmental, Financial, Legal, Cultural, reputation and other types of business risk.

The common idea is that they provide a way of saying which risks are really important (big risks) and which ones are less of a concern (little ones) and they often have rules on what to do if you have different sized risks.

Having a list or a chart so that people understand what is important to be focussed on is an important tool for businesses as it doesn't matter how good you are you can't do everything at once.

Why is risk management important?

By understanding and applying risk management you can identify problems, determine how to control them and make assessments as to whether the risk is acceptable. In a WHS context you can make things safer for people by understanding what can go wrong and how to prevent it.

It also provides you a common language by which to compare different risks and prioritise them so that you can spend (or use) limited resources including people, time and dollars wisely to most benefit the largest number of people or, put simply, to keep the greatest number of people safe within budget constraints.

Transcript Video 6: An introduction to work health & safety management (as excerpts in Part III)



One or more interactive elements has been excluded from this version of the text. You can view them online here:

<https://oercollective.caul.edu.au/conceptual-guide-whs-hr-managers-nz-au/?p=1308#oembed-1>

Source: Sheridan, L. (Author / Producer) & Treadwell, L. (Author). (2019). *Video 6: An introduction to work health & safety management*, Preston, A., audio engineer; Orvad, A., artist and Franks, R., animator, Learning, Teaching and Curriculum. University of Wollongong, Australia.

What are some other Risk Management Words and concepts that are important in this common language we are now starting to speak?

SFAIRP

Causes

Controls

Scenarios

Risk Assessments

Hierarchy of Controls

Safe work Method Statements

And Human Factors

Let's start learning this "new Language" or at least words used in specific ways that have specific meanings.

SFAIRP (so far as is reasonably practicable)

Is any level of risk acceptable?

Clause 17 of the NSW Work Health and Safety Act 2011 specifies that a duty holder can ensure health and safety by managing risks, which involves:

- – eliminating the risks, so far as is reasonably practicable, and
- – if not reasonably practicable—to minimise the risks, so far as is reasonably practicable.

How do you defined reasonably practicable?

In this context, *reasonably practicable* means that which is, or was at a particular time, reasonably able to be done to ensure health and safety, taking into account and weighing up all relevant matters including:

- – the likelihood of the risk concerned actually happening
- – the degree of harm that might result from the hazard or the risk
- – what the person concerned knows, or ought reasonably to know, about the hazard or risk, and ways of eliminating or minimising the risk
- – the availability and suitability of ways to eliminate or minimise the risk, and
- – after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of

eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.

Causes

– a list of ways an event can happen

Controls

– actions, procedures, processes or systems that help to manage the risk to a level that is reasonably practicable

Scenarios

- Describing the scenario is like setting the scope for the risk being considered
- A good scenario describes
 - – The target being affected by the risk (in safety this is usually a person but it could also be the environment, community, plant or equipment).
 - – How the event occurs and the consequence to the target – for example how and what would injure the person?
 - – Potential magnitude of the injury (if that's known at this stage).
 - – Example, one scenario: A person is run over by a forklift resulting in death of the person

Risk Assessments – tools

Take 2 or Take 5

– Simply means a few minutes before you start a job to

think about what you are doing, where you are doing it and what might go wrong.

Checklists

Checklists are lists of features to consider when assessing a situation

- – Types and properties of materials
- – Job tasks – heights, depths, manual handling
- – Design features – safety devices, pressures, temperatures, volumes
- – Maintenance – access, how and when?
- – Operation
- – Shutdown
- – Natural events – wind, floods, day and night

Work Method Statements

From SafeWork NSW the purpose of a work method statement is:

- to outline a safe method of work for a specific job
- to provide an induction document that workers must read and understand before starting a job
- to meet legal requirements, that is, hazard identification and control
- to program work, materials, time, staff, and to anticipate possible problems
- to use as a tool in quality assurance.

Brainstorming

Brainstorming is a way to:

- Get ideas quickly
- Involve everyone
- Allow people to think creatively

Rules:

- All ideas are included
- Don't analyse each idea as you go
- Everyone should get time to speak
- Limit time from 5 to 10 minutes

What If

Ask a series of logical predetermined questions

Hierarchy of Controls

There are many ways to control risks. Some are more effective than others. Hierarchies of control rank risk from those that offer the highest protection and are the most effective to those that offer the least protection and are the least effective.

Remember that you need to have a mix of controls. If you only use engineering controls without training or maintenance these will not be effective. Multiple controls can give you layers of protection – that's what the Swiss Cheese model aims to show us. In a best case scenario managing the risk associated with hazards is like wearing pants with belts and braces and then also holding your pants up!

You should also consider whether the layers are independent or whether they can all fail in a "common way" often called a "common mode failure" for example your set of engineering controls all rely on

electrical power. If you lose the electrical power all controls fail.

The hierarchy of control works well for:

- – Separating physical risks
- – Plant
- – Chemicals

The hierarchy of control doesn't work so well for:

- – Psychosocial risks
- – Risks that require a combination of controls
- – Considering unintended consequences for elimination or substitution for example eliminate human involvement (automate a process) needs consideration of the introduced risk – short term, long term and even emergency situations
- – Or risks that depend on a time sequence

Personal Protective Equipment as a control

Regulation 44-47 in the WHS Regulations includes specific requirements if PPE is to be used at the workplace, including that the equipment is:

- Selected to minimise risk to health and safety
- Suitable for the nature of the work and any hazards associated with the work
- A suitable size and fit and reasonably comfortable for the person wearing it
- Maintained, repaired or replaced so it continues

to minimise the risk

- Used or worn by the worker, so far as is reasonably practicable

A worker must, so far as is reasonably able, wear the PPE in accordance with any information, training or reasonable instruction

Human Factors – How people are involved in the actions, processes and systems. Humans are a big source of risk and often unpredictable but there are documented ways to understand how human errors can occur.

For example, did you know that if a person is faced with a process involving creative thinking, the process is unfamiliar, complex and time is short, then the person is likely to have high stress levels and fail 1 in 10 times. Imagine they are running a process in a heavy industry that could kill someone!

To conclude, these are not every single risk management term that you might come across but you now have an overview of some commonly used risk management terms – you are on the way to joining us in using shared risk management language.

Transcript Video: Moving up the Culture Ladder (Chapter 6)

Moving up the Culture Ladder

Professor Patrick Hudson

Delft University of Technology, The Netherlands

Patrick Hudson speaking:

Accidents happen because of a culture. Every recent big accident such as BP's Texas City and Deepwater Horizon disasters, Longford and NASA's shuttle disasters has been directly linked to poor safety culture. When we look back, it always was the culture. Not just the big accidents but most of the smaller ones as well. People are trying to get the job done – so all too often, they were allowed to get away with dangerous behaviours.

When things go well, like Qantas QF32 or the Miracle on the Hudson, we get to see just how big a role a positive culture plays in averting disaster. Culture plays both ways. So a better culture is the place to be especially when danger is your business. The best organisations know this. They look at their own cultural of safety. They ask how they can improve. That is what I want to talk about today.

My name is Patrick Hudson. I was Professor of the Human Factor in Safety at Delft University of Technology in the Netherlands and have been working in the safety business for the last 28 years, mostly in oil and gas, aviation, mining and pharmaceuticals. There's a list of what makes a good culture culled from numerous studies such as Jim Reason's seminal study and my own work with companies such as BHP, Shell, BP and Exxon.

These are, first of all, leadership. Leaders are not afraid to do difficult things. Everyone knows where leaders stand on managing risks – either taking the risks or running them. Secondly, respect. Individuals are respected as are the dangers they face. Experts are listened to, even when they are low in the hierarchy. This leads to being informed. Managers know what is really going on and the workforce is willing to report their own errors and near misses – which is pretty hard for them to say and for managers to hear. These create a culture that is mindful. Everyone is wary and always ready for the unexpected.

Also, a respectful culture is one that is just and fair, a culture with clear lines between what is acceptable and unacceptable, ones that everyone agrees upon. What makes it just, is that there are well understood consequences, both positive and negative. What makes it fair is everyone from top to bottom agrees where the lines are drawn and the consequences of crossing them. Finally, the organisation is learning. Willing to adapt and implement necessary reforms even when they feel expensive and even when holy cows have to be overthrown based upon what they've learned.

Organisations with these characteristics have many clear advantages, not only in safety but also commercially. The advantages are that such organisations are flexible. They operate according to need rather than tradition. Reliable – they always deliver on time, on quality, on demand because they manage the risks better than anyone else. This makes them profitable. All their stakeholders benefit. Finally, people like working in that sort of organisation. The problem is this is a daunting list for leaders. How can they do this?

Most studies of safety culture wind up with something like this, such as the High Reliability Organisation

program. The problem is that most organisations are nowhere near this level and if they were, they wouldn't need help and advice. Most organisations that want to achieve this list need a roadmap. This is what the safety culture ladder offers – providing a structure to help decide:

- where you are now;
- where you want to go to; and
- support the process of getting there.

We can describe a sequence of distinct cultures that differ in many ways, including how they regard safety. First and definitely not a culture of safety, is the pathological. Safety seems a problem caused by workers. The main driver is the business and a desire not to get caught by the regulator. Then we have four levels of increasing improvement often called 'maturity', starting with the reactive. Organisations start to take safety seriously but only after incidents is there action. Whenever they see a problem, they want to fix it. Then, we progress to the calculative. Safety is driven by management systems with much collection of data. Safety is still primarily driven by management but all agree, systems are the way to go.

Beyond that however, there's the proactive. With improved performance the unexpected is more of a challenge. Workforce involvement starts to move the initiative away from a purely top-down approach. And finally, generative. There is active participation at all levels. Safety is part of the business and organisations are characterised by chronic unease – "We're doing so well. What are we missing?"

I have learnt that this ladder is very attractive to those who want to do their best but it turns out to be more difficult to improve than most people imagine, which I

have to admit can be frustrating, especially when the organisation's leaders want to get to the top, and quickly – an admirable attitude but one that needs to be tempered lest it be doomed to failure. The good news is that knowing how to proceed, can help to speed things up quite a lot.

The first lesson people need to learn is that fine speeches and motivational speakers don't really help. The feel-good factor they create usually has a very short half life and dissipates maybe by the next morning. Furthermore, they create unrealistic expectations, possibly making things worse rather than better. The good news however, is that that the motivation is already there.

In my experience of asking many companies in different industries, ranging from oil and gas and mining to pharmaceuticals, to aircraft engineering, is that people can recognise where they are on the ladder and always want to be higher. From top to bottom. In all such organisations, there's a built-in desire to be better. The problem is day-to-day reality. They have good values and impeccable attitudes when surveyed but their behaviours are what let them down. One of the common simple definition of culture is "how we do things round here". This is where aspiration meets reality – where the rubber meets the road.

What I have found does work is discovering what they could do or change ie, their activities, processes or systems which would first, be characteristic of more advanced safety cultures. Secondly, be fairly easily be made to be how things are done and by using standard management skills for ensuring change takes place. When people say, "We could certainly do that," then we can use standard management approaches with deliverables and accountabilities that nevertheless impact on the culture. If they behave this way for long enough, they become what they wanted to be.

To help in the process of going up the ladder, I made a discovery that can help. I found talking to many organisations, not only did they think they were higher up the ladder than I suspected them to be but when challenged they'd say, "But we have this in place and that in place," and I realised that they thought having things like reporting systems or communication strategies in place, was going to be enough. Certainly, they were reacting to demands from regulators, the industry and internally to be compliant with the requirements and often, having things in place kept the auditors happy. But I realised that actually putting them into operation was a distinctly new challenge that will be characteristic of having the management system actually running. So the first stage was rather typical for reactive cultures, while calculative cultures actually both have a process and used it.

For example, a country's aviation regulator set up an aircraft accident investigation bureau which in turn, put a confidential reporting system in place for their aviation industry. At the end of the first year, there were two reports. In place? Yes. Operational? No. They passed the audit.

So putting processes and systems in place is what happens when a pathological organisation makes the move to becoming reactive. Along with this is a tremendous commitment to safety, the decision to mend one's ways and do the right thing. Here, we already measured good attitudes and optimistic beliefs. To make the transition from a reactive to a calculative culture however, requires actually putting these processes and systems into operation – making them work.

But what next? The transition to becoming a proactive organisation becomes clear. It involves making the processes and systems that are now in operation truly effective because often they're not, or they no longer have

the impact that was expected when they were put in place. What may have worked at first no longer has the effect originally intended after the kick-off effect. For instance, the first reports may have a great impact, “Wow, do we do that?” but they just become reports to be counted, giving numbers to be reported quarterly.

On the Deepwater Horizon, 110 staff on board were submitting an average of over 100 stock cards every day – nearly one per person, per day – not that it helped. This transition to a proactive culture is hard, harder than people imagine, including myself – and I’m going to come back to this.

Finally, it’s essential to ensure that what has become a number of effective habits generating stellar safety performance as well as environmental and quality outcomes, become permanent. Only then can we speak of “How we do things around here” in ways that mean that the organisation has become a true culture of safety. This is when the best habits are ingrained so operations are more than safety first. Safety is no longer a priority but the true value, meaning far more than just an answer in a survey. At the generative level, safety overrides the temptations for both workers and managers to do it dangerously, “just this once”.

There are challenges to both going higher up the ladder and staying there if you got there in the first place. The safety ladder has snakes. One of these, from my own experience, was when a very advanced organisation, an Australian coal mine, was taken over by a foreign company that insisted that they throw away their old processes that worked really well for them and replace them with their own that objectively were actually not producing such good performance elsewhere for the new owner.

Fortunately, the culture was strong, the processes embedded and they carried on, but quietly.

Another problem is when success in part of an organisation means they no longer get the senior management attention that was helping them be good in the first place. This can lead to reversion and in the worst case, a drop from the top right down to the very bottom. The case reported in the Harvard Business Review of the Nut Island sewage works in Massachusetts that went from the best, to actually pumping out raw sewage into Boston Bay, is also a story we need to hear.

The simple sequence in place, in operation, effective, permanent can be mapped onto the transitions of the ladder from pathological right up to generative, so wherever we are, what's stopping us. The first transition requires getting out of the pathological mindset. I don't want to say a lot about this here, but uncompromising regulation, messages from the markets or, unfortunately the most frequent impulse, a big disaster – Exxon has never been the same since the Exxon Valdez – these can be enough to get things in place, change attitudes, instil some values that this safety stuff is worth taking seriously. It is not enough to achieve stellar goals but represents the hardest change of all.

The next stage is still really hard because reactive organisations already have good attitudes. Their problem is a shortage of managerial skill to get the performance they, and others might demand of them. The fight is between how things get done and the systems that are in place but may not be used. This means that the major driver has to come from management, right from the top. Management has to concentrate on ensuring that everyone – and this includes top management themselves – gets into the habit of doing things the way they say they should. They have to have the discipline to keep on using processes and systems

until they become the norm. That's another word for culture. Self-discipline has to be applied by senior managers to ensure that everyone else becomes disciplined as well. This is hard. The temptations to backslide, "just this once" are many but disastrous for progress in the right direction.

Nevertheless, many organisations have done this and are predominantly calculative nowadays. They can invariably be recognised by their performance as well as how they do things. What I have found, time and time again, is that the best of these calculative organisations recognise that there is such a thing as being too system driven and they want to make the move to becoming a proactive culture. This is where it gets really hard and I find a metaphor useful to understand why the transition to a proactive culture is so difficult.

I see calculative organisations as being like caterpillars. Steadily munching their way through the leaves, very organised and efficient but the caterpillar looks up to the sky and sees a beautiful butterfly floating past and thinks, "I wish I could be like that." Little does the caterpillar know that a caterpillar is the resource that's needed. How would you know? Where in a caterpillar are the butterfly's wings? What do all the legs become? When the caterpillar has become large enough, a miracle occurs – pupation, when the caterpillar turns into butterfly soup. You have all the ingredients. What you need to do next is to change to become something completely new.

The lesson for organisations is that to make their safety systems effective, everything has to be challenged and re-examined. What was good enough for a reactive culture and appeared to operate for a calculative one, is no longer good enough. What worked to get you there is no longer enough to take you further. For instance, the knowledge

accumulated by a calculative culture, aggregated at the corporate centre, has to be pushed back out to be used by managers and workers, not just hoarded. Those individuals require a radically different sort of training and the expansion of roles and responsibilities in a proactive organisation. Top management can feel comfortable in having got their safety management systems to work. Now they'll have to make themselves deliberately uncomfortable learning to resist the cry that, "It was working fine. Don't change it."

Let's take an example of an incident database. This is crucial for creating an informed culture. It is the repository of the reports from a reporting culture and provides the data for a learning organisation. First, you need to have a database available with ways of getting incidents in and information out, but people may be loathed to report. Investigations may be summary to the point of useless except for counting purposes. Still, it's in place. Next, you need to operate the database by ensuring that people actually put incidents and reported hazards into the database. This is the discipline senior managers must exercise.

You also need to train the workforce so that people know what's worth reporting and how to both investigate and also analyse incidents usefully. Often we want, or we even have a confidential reporting system required but we have to show that reporting leads to change rather than blame, if anyone's going to report at all. The database and associated processes may, nevertheless only serve superficial requirements. To be truly effective, the data inside has to be turned into information. Especially, it must have the opportunity to surprise us, "I didn't know we were working like that" and properly inform our decision-making processes, "Where do we spend our resources?" Not just

justifying decisions after the event. Finally, the system has to become standard. No alternative is envisaged.

This may all sound unnecessarily complicated but consider that the financial culture has usually got all these facets long in place, in operation and effective for financial information which is more than just the raw finance data. Consider what happens to your expenses claim. Does a change of manager change that system? Maybe a good safety system should learn from the success of the financial systems within organisations.

So, what's hard about becoming generative then? Wasn't the hard bit just becoming proactive? In the generative culture all these elements come to fruition. In the proactive culture, the top of the organisation is still driving safety but have created the potential to let those who are the subject matter experts take responsibility and accept it as well. Thinking about generative organisations and the very few I have seen and heard about, I realised that they could be described as saying that the lunatics are running the asylum. Top management stood back and it looked as if they had nothing to do as far as safety was concerned or indeed, in production either. But then I realised that they have the hardest job of all – designing asylums to be run by lunatics.

This captures the deck crew on USS Carl Vinson where the officers watched but could not intervene. This was what the General Manager of the coal mine intended when he set up operations so the miners had to use their brains, all day long. This can be hard for senior managers to let others stand out and often take the glory. Pathological leaders use the organisation to polish their glory. Generative leaders glory in the achievements of their workforce.

So, when we ask where we are on the ladder, we can pose a number of challenges about the safety processes and

systems, and we do safety. “What are you actually doing?”, “Are things just in place or in operation?”, “How would you know if it was working?”, “Is it data or information?”, “What would people do if you stopped right now?” A takeover may change everything. A new broom can sweep clean and clean away. “Who’s behaviour are we talking about? Is it just the workers, the managers, the executive management or everybody together?” But this shouldn’t be that hard. So why don’t more people or organisations get to the top of the ladder? People don’t believe cultural change is like this. Surely, we have to win hearts and minds? Yes. The best way to win hearts and minds is by proven success by yourselves not by others.

Success requires implementation, actually doing what you decided to do. Many organisations however, see strategic planning as having a higher status than mere implementation. Events overtake plans and we discover that the senior management commitment was not as strong as it was during the opening speeches of the culture initiative. Cultural change takes time. Senior managers are impatient and may be moved on before the fruits ripen. It probably takes two years at a minimum to change from old, bad safety habits to new and better ones.

Another set of disablers include authoritarian leadership styles who cannot give away hard-earned power:

- corporate loss of nerve shown by withdrawal of permission to try new things;
- imposition of top-down control because of a lack of trust;
- a fear that the workforce will run away and be irresponsible;
- managerial failure to learn to like bad news – an

essential part of their diet;

- corporate flexibility and possibly regulatory inflexibility as well.

The benefits are clear because the kind of organisation that makes it to the proactive level runs better. The people who work enjoy it more, staff turnover is less. Another advantage of the advanced culture is a consequence of increased trust, “You do your job and I’ll do mine,” that results in reduced supervisory costs and increased flexibility in operation. Finally, having fewer incidents help keep costs down as well but advanced cultures do spend more to glean the maximum information from the few incidents they have.

The most important ingredient in moving up the ladder is the commitment and actions of leadership, primarily senior leaders, but also those safety leaders throughout the organisation who together develop the trust that things will be done properly, both top-down and bottom-up.

In my next talk I’ll cover leadership, safety leadership in particular and how leadership and culture are intimately intertwined.

In conclusion, it’s possible to climb the ladder but it’s hard and probably harder than people expect when they start. The good news is that I have never found anyone who wanted to go down the ladder but lots of people at all levels who wanted to go up.

Finally, if you do make it up there, everyone benefits – commercially, environmentally, socially and you all get to go home in one piece – every time.

[End of Transcript]
<https://www.safeworkaustralia.gov.au/resources-and-publications/video-and-audio/safety-culture-and-leadership-professor-patrick-hudson>