Learning Objectives

After reading this chapter, you will be able to:

- Understand the principles of hazard recognition and the process for identifying hazards in a workplace.
- Identify the ways to assess the seriousness of a hazard.
- Discuss the assumptions built into a “risk” approach to controlling hazards.
- Describe the different types of hazard controls and their relative merits and shortcomings.
- Consider the challenges in identifying hazards in non-standard work environments.
On July 25, 2008, 15-year-old Andrew James was working as a labourer for Interlake Paving in Stony Mountain, Manitoba. Interlake, a small company owned by Gerald Shepell, had been contracted to pave a parking lot. James was standing on the box of a semi-trailer, scooping out asphalt with a shovel. The trailer gate unexpectedly swung open, shaking the truck. James lost his footing and fell into the asphalt in the trailer, which quickly poured out through the trailer gate onto the ground, burying him. James died almost immediately from the intense heat of the asphalt. Shepell tried to dig James out, sustaining severe burns to his own hands, arms, feet, and legs. Shepell later pled guilty to breaches of the Workplace Safety and Health Act and the Employment Standards Code (James was under-age) and was fined $34,000.

The key to preventing workplace injuries and fatalities is to identify hazards and control them. In the case of Andrew James, the process of Hazard Recognition, Assessment, and Control (HRAC) would have identified the risks posed by the trailer’s inadequately latched gate, the unsafe unloading practices, the absence of an emergency plan, and other issues. It might also have raised questions about the adequacy of the training provided to James, the legality of his employment, and the OHS complexity of mobile workplaces—workplaces where the hazards are ever-changing.
This chapter examines how workers and employers identify, prioritize, and control workplace hazards. As we saw in Chapter 1, a workplace hazard is anything that might harm, damage, or adversely affect any person or thing under certain conditions at work. It can be an object, process, context, person, or set of circumstances which has the potential to create injury or ill health. While this definition may seem vague, it is intentionally vague in order to ensure that anything that could potentially harm a worker is included. **Hazard recognition** (which is sometimes called hazard identification) is the systematic task of identifying all hazards present, or potentially present, in a workplace. It is the first step of any HRAC process. The second step is **hazard assessment** (which is sometimes called hazard analysis). In a hazard assessment, workers and employers determine which of the hazards needs to be addressed most urgently. Finally, the **hazard control** process sees preventive and corrective measures implemented to eliminate or mitigate the effect of the hazard(s).

The core purpose of HRAC is to methodically identify and control workplace hazards. Some hazards are easier to identify than others. For example, it is easy to see that an extension cord lying across a busy hallway may cause someone to trip. It is more difficult to determine if a cleaning agent is toxic or if a machine is producing too much noise. Even more challenging is identifying factors that are increasing stress among workers or are the precursors of harassment. Similarly, some hazards are also easier to control than others. Eliminating the hazard posed by the extension cord is a quick and easy fix. Other hazards may be much more expensive to control or may reflect a core aspect of the production process. Some controls may be complex, requiring multi-faceted solutions. Further complicating the HRAC process are the conflicting interests between workers and employers around hazards discussed in Chapter 1. Employers and workers might disagree over what constitutes a hazard, how serious the hazard is, and what the most appropriate control should be. As set out in Box 3.1, even the language around HRAC can be both contested and confusing.

**Box 3.1 The language of risk: Accidents versus incidents**

The terminology around hazards and HRAC can be inconsistent and confusing. The terms accident and injury are often used interchangeably. **Accident** is most often used to mean an event that leads to some
Hazard Recognition, Assessment and Control

degree of harm. Yet the HRAC process asks us to think more broadly than just in terms of injury events. The term *incident* is most often used to mean any undesired event that leads to or could have led to harm to workers. This includes injury events as well as *near miss* events (i.e., where the event did not lead to harm but only because of happenstance or luck). When talking about incidents, we also need to be mindful that incidents can include specific, time-bounded events (e.g., a slippery floor) as well as general conditions or the presence of something harmful (e.g., long-term exposure to a carcinogen).

Recently, some practitioners have advocated eliminating the use of the word accident in the workplace context. This group contends that the term accident implies the injury event was unforeseeable and, therefore, not preventable. This runs counter to the logic of HRAC, which argues that “accidents” arise from uncontrolled hazards and thus can be prevented. Further, the use of the term accident leads toward a focus on what the worker was doing and away from what root causes may have contributed to the event, entrenching the care-less worker myth. While industry practice varies, this textbook will refer to incidents as the catch-all phrase for undesired events.

HAZARD RECOGNITION

The HRAC process starts with comprehensively identifying all the hazards in a workplace. As noted in Chapter 1, there are five broad categories of hazards:

1. Physical hazards typically (but not always) entail a transfer of energy from an object, such as a box falling off a shelf, which results in an injury. These are the most widely recognized hazards and include contact with equipment or other objects, working at heights, and slipping. This category also includes noise, vibration, temperature, electricity, atmospheric conditions, and radiation. All of these hazards can create harm in certain contexts.

2. Ergonomic hazards occur as a result of the interaction of work design and the human body, such as work-station design, tool shape, repetitive work, requirements to sit/stand for long periods, and
manual handling of materials. Ergonomic hazards are often viewed as a subset of physical hazards. For the purposes of hazard assessment, it is useful to consider them separately because they are often overshadowed by more obvious physical hazards. We examine both physical and ergonomic hazards in more detail in Chapter 4.

3. Chemical hazards cause harm to human tissue or interfere with normal physiological functioning. The short-term effects of chemical hazards can include burns and disorientation. Longer-term effects of chemical hazards include cancer and lead poisoning. While some chemical substances are inherently harmful, ordinarily safe substances can be rendered hazardous by specific conditions. For example, oxygen is essential to human life, but in high doses can be harmful.

4. Biological hazards are organisms—such as bacteria, molds, fungi—or the products of organisms (e.g., tissue, blood, feces) that harm human health. We examine both chemical and biological hazards in more detail in Chapter 5.

5. Psycho-social hazards are social, environmental, and psychological factors that can affect human health and safety. These hazards include harassment and violence but also incorporate issues of stress, mental fatigue, and mental illness. We examine psycho-social hazards in Chapter 6.

In Chapter 7, we will also look at how the structure of work and the employment relationship can pose a hazard to workers’ health. Recognizing each type of hazard requires different methods and approaches. Analyzing each category of hazard separately allows us to consider the specific issues associated with the category.

There are many ways to identify hazards in a workplace. There are many companies and consultants offering commercial hazard assessment packages to employers for a fee. The pre-prepared packages can help establish a framework upon which to build. There are also free resources available from reliable organizations, such as the Canadian Centre for Occupational Health and Safety and the Occupational Safety and Health Administration in the United States, which allow the hazard assessment process to be tailored to specific workplaces. A common feature of robust hazard recognition systems
is that they examine the workplace from multiple perspectives to ensure that all hazards are identified.

It is useful to start the hazard assessment process by considering the nature of the work and workplace. The context of work affects the type of hazards in the workplace. For example, recognizing that work takes place at a remote workplace—such as a tree-planting operation or oil-field drilling site—raises issues of emergency response times, travel hazards, and working alone. Similarly, if workers are hired on a part-time or temporary basis, this may affect communication and training. Vulnerable workers—such as newcomers to Canada or youths—may be reluctant to identify hazards for fear of losing their jobs. These examples demonstrate that hazards do not merely reside in the task of working but also in the wider context of the employment relationship. One of the common omissions in hazard recognition is ignoring the underlying factors that lead to the creation of hazards. A narrower scope of recognition fits the employer’s interests in limiting safety to proximate causes but it can undermine the effectiveness of the HRAC process.

There are a variety of hazard-identification techniques, and these are often used in combination to create a fuller picture of a workplace’s hazards:

- Inspecting the workplace: Physically observing the workplace and how work is performed within it is a powerful step in identifying hazards. The inspection should not be limited to considering physical objects, such as machines, tools, equipment, and structures, but should also include observing processes, systems, and work procedures.

- Talking with workers: Passive observation can miss many important aspects of how work is performed. Getting the perspective of the people conducting the work will reveal other insights. This can be done informally through discussions or through more formal means such as surveys or interviews.

- Job inventory: Acquiring job descriptions and specifications can also reveal hazards. Mapping out the flow of work to create a task analysis allows for a systematic examination of how a job is supposed to be conducted. It is important to compare this data with worker interviews to identify instances where work practices differ from formal procedures.
• Records and data: Reviewing records of previous workplace incidents, safety reports, and other documentation can yield useful information about the hazards in a workplace.

• Measuring and testing: Sometimes, to discover if something is a hazard, you will need to measure or test it. This is particularly true for noise, chemical hazards, and biological hazards.

• Research: Knowing something is present in the workplace may be insufficient to determine if it is a hazard. You may need to conduct research on a substance, material, design, or environment to assess its potential for harm.

The hazard identification process must be carefully documented. Hazard identification forms should break the identified hazards into their main types as well as by work area, job, or process performed. There are many generic forms available online. It will be necessary to adapt these to reflect the nature of the work and the workforce.

It is important to remember that hazard recognition is not simply a technical task of cataloguing potential dangers. The process of hazard recognition is situated at the core of the conflict over what is defined as a workplace hazard. As such, the assumptions that are adopted and the interests that are served can have a profound impact. If we return to the carpal tunnel syndrome example from Chapter 1, assumptions about the nature of women’s work caused a failure to recognize hazards to which women were being exposed to, and as a result those hazards went uncontrolled for longer than was necessary.

Box 3.2 Hazard identification in small enterprises

Small enterprises—those with fewer than 100 workers—have higher rates of workplace incidents. There are many reasons for this heightened risk of injury, including the highly personalized nature of the employment relationship in smaller enterprises (we’ll discuss this further in Chapter 7) and a lack of safety resources, knowledge, and capacity. Small enterprises are less likely to conduct hazard evaluations, which leads to higher levels of incidents. Smaller employers also often lack access to information and resources that can facilitate
effective hazard assessment. They do not have in-house safety professionals to lead the process, and they lack training capacity.

In general, the lack of knowledge and experience found in small enterprises decreases the likelihood that a thorough hazard assessment will be conducted. Compounding this problem is that many of the existing hazards assessment processes and resources are aimed at larger enterprises and may be ill-suited for a small operation. Small employers are also more likely to leave issues of workplace health and safety in the hands of their employees, which discourages effective HRAC.⁶

The challenges to implementing an effective HRAC in small enterprises can be significant. There are issues of resources as well as incorrect perceptions. Small employers possess fewer resources (in terms of time and money) for conducting HRAC, which leads to inadequate assessments. Further, the cost of implementing controls can be more challenging for a smaller employer. Small employers (and their workers) may also feel that the requirements written into legislation don’t apply to their small operation and may instead rely on “informal” mechanisms for ensuring safety. These informal measures are less effective than formal HRAC processes. In general, small employers do not devote sufficient time and energy to safety.⁷

In addition to being legally required across Canada, hazard identification is important for small enterprises because they have less room for error than larger enterprises. Work processes tend to be completed by fewer people and in less time. This means there are fewer opportunities to consider safety issues and fewer people to monitor compliance. As we saw in the vignette at the start of this chapter, the distance between employer and worker can also be short—often the employer performs substantially the same work alongside the workers.

One of the ways to overcome the challenges of HRAC in small enterprises is to start early. It is smart to ensure that safe work processes are established at the beginning of operation because these processes can be difficult to alter once they are established.⁸ Formalizing safety processes is also very important in order to overcome peer pressure to let safety issues slide. While formal safety processes
might feel “strange” at first, they are a crucial step to ensuring a safer workplace in small enterprises.

The closer ties between workers and employers can also aid employers in identifying hazards and hazard mitigation strategies, as it is easier for worker concerns to reach key decision makers. That said, workers in small enterprises may be reluctant to raise safety concerns when their employment is dependent upon their direct relationship with the employer. This speaks, once again, to the importance of establishing formal mechanisms for addressing safety issues.

HAZARD ASSESSMENT

Once hazards have been identified, it is necessary to prioritize which hazards will be controlled first. Much like hazard recognition, hazard assessment is not just a technical practice. Through prioritizing, certain hazards will be brought to the forefront, and will therefore be more likely to be controlled, while others will be downgraded and likely receive little or no attention. It is important to be mindful of who benefits and who is harmed by the prioritization decisions.

Risk assessment is a common tool used by those determining the priorities in hazard assessment. Risk is the likelihood that a hazard will result in injury or ill health. A risk assessment quantifies the likelihood of injury or ill health by assessing the probability, consequences, and exposure posed by the hazards:

- **Probability** is the likelihood that the hazard will result in an incident.
- **Consequences** refers to the severity of injury or ill health that will result from an incident.
- **Exposure** refers to how often or regularly workers come in contact with the hazard.

Figure 3.1 gives an example of a simplified tool for assessing the probability, consequences, and exposure associated with a hazard. Assessors use the description (e.g., rare, possible, probable, or likely). Each descriptor is then assigned a numerical value (e.g., 1, 2, 3, or 4).
Once the probability, consequences, and exposure of a hazard have been quantified, they can be inputted into a mathematical formula to quantify the risk:

\[
\text{risk} = \text{probability} \times \text{consequences} \times \text{exposure}
\]

The greater the final number, the greater the risk posed by the hazard. Quantifying risk allows us to compare the relative risk of several hazards. For example, workers in a gas station face all manner of hazards, including slippery surfaces, gasoline fumes, and the potential for robbery. Without looking at the assessment below, which of these three hazards should the employer control first? Most people tend to say robbery. Yet quantifying the risks suggests that robbery poses the least risk of the three hazards:

1. Slippery surfaces: Possible (2) × Significant (3) × Frequent (3) = 18
2. Exposure to gasoline fumes: Possible (2) × Significant (3) × Continuous (4) = 24
3. Robbery of cash on premises: Rare (1) × Catastrophic (4) × Continuous (4) = 16

Risk assessment tools allow the assessor to compare hazards, either overall or on a factor-by-factor basis, in order to identify which hazards should have the highest priority for control. It may be important, for example, to note that robbery poses the least risk of the three hazards but has the highest level of consequence and is a hazard to which workers are continuously exposed. These features may influence the type of control that is appropriate (see below).
There are several criticisms of this approach to risk assessment. Quantifying risk imparts a veneer of objectivity that can obscure underlying assessor bias and support decisions that have already been made (which tends to benefit the employer). Consider the gas station analysis that identified exposure to fumes as the hazard with the highest risk. Despite the high risk posed by the exposure, employers have made little effort to control it. This may be because such controls would be very costly. This may also reflect the fact that the health consequences of the exposure have a long latency period and are difficult to relate to the exposure. In this way, risk assessment contributes to employers’ cost-benefit approach to hazard control.

Risk assessors may also possess imperfect information and struggle to fully consider all possible outcomes. For example, risk assessment can entrench existing biases toward more acute, easier-to-solve hazards (e.g., trips and falls) and downplay risks that have longer-term consequences (e.g., repetitive strain injuries). This reproduces a long-standing bias in the OHS regime that “favours” acute injuries over ill health.

Risk assessment may also entrench biases against certain types of workers or work. For example, many doctors will diagnose lateral epicondylitis (i.e., tennis elbow) after a few hours of casual tennis play but will be reluctant to make a similar diagnosis for workers who have pulled and stripped wire 50 hours per week for six months. Both activities require forceful exertions of the wrist and elbow joints. The explanation for this different treatment may be as simple as the fact that doctors have first-hand experience with tennis but not manual work.

Workers who are members of traditionally undervalued groups may face similar bias. Consider the delay in recognizing carpal tunnel syndrome that we read about in Chapter 1. This delay was directly caused by a refusal to recognize the demanding nature of so-called women’s work (e.g., clerical tasks, housekeeping). This dynamic has significant potential consequences for women, Aboriginals, youth, and visible minorities who tend to possess lower social status and who disproportionately have jobs that are less socially valued. Diminishing the effect of systemic bias against particular kinds of work or workers is one reason most jurisdictions require worker involvement in hazard assessment (see Box 3.3).

Similarly, risk assessment has a tendency to individualize risk, which means that decisions focus on the number of people potentially affected rather than
the broader social goals of reducing risk overall. This focus results in indi-
viduals bearing disproportionate degrees of risk depending on their social
position and how unusual their exposure is. If few people are likely to be
affected, risk assessment can downgrade the importance of the hazard.  

These shortcomings are not necessarily caused by conscious choices on the
part of practitioners. They are a product of certain assumptions built into the
model that reproduce existing biases in the OHS regime and narrow the scope
of what is considered a legitimate hazard requiring attention. It is important to
recognize the shortcomings of adopting a risk assessment model and consider
alternatives that allow for a broader understanding of how to assess the con-
sequences of not controlling a hazard. At a minimum, risk assessments should
be complemented by more qualitative analyses, including reports produced by
workers who experience the hazards. An effective, simple approach is to have
affected workers complete their own risk assessment and blend those results
with others. Safety professionals should also ensure they do not blindly follow
the numbers that result from quantitative risk assessment tools without con-
sidering other factors when determining appropriate priorities and controls.

More broadly, a conceptual alternative to risk assessment (discussed in
more detail in Chapter 6) is the “precautionary principle,” which calls for
action to be taken even if the negative consequences of inaction are not fully
understood. While it is not always easy to implement in a workplace, the
precautionary principle does provide an alternative lens through which
to view a workplace hazard and may bring to the surface hazards that go
under-prioritized in the risk assessment process.

Box 3.3 Worker involvement in hazard assessment

Worker participation can improve the effectiveness of HRAC. Most
jurisdictions require worker involvement in all steps of the HRAC
process, including determining the appropriate controls. For example,
Alberta’s Occupational Health and Safety Code mandates worker par-
ticipation:

8(1) An employer must involve affected workers in the hazard assess-
ment and in the control or elimination of the hazards identified.
8(2) An employer must ensure that workers affected by the hazards identified in a hazard assessment report are informed of the hazards and of the methods used to control or eliminate the hazards.\textsuperscript{14}

Research conducted for the Alberta Workers’ Health Centre in 2013 found that only 19% of workers reported being always asked for input to hazard assessment when work changed or new equipment was introduced. In short, only one in five workers reported experiencing statutorily required participation. A further 21% of workers reported frequently being asked for input while the remaining 60% were occasionally, rarely, or never asked for input. Women were less likely than men to be asked for input. The report concludes that employers are not adequately involving workers in the hazard assessment process and that although workers are aware of their rights there are significant barriers to the exercise of that right.\textsuperscript{15}

The study also found that industries broadly viewed as hazardous, including oil, mining, and construction, were more likely to conduct hazard assessments and include worker participation. In industries that are typically seen as less hazardous, such as finance, compliance rates were below 50%. Further, 45% of workers stated they were not provided adequate time from the employer to permit them to become more involved in safety in their workplace.

HAZARD CONTROL

The final step in the HRAC process is to determine and implement the most appropriate control for each hazard. Hazard control is a regulatory requirement in every Canadian jurisdiction and entails implementing measures to eliminate or reduce the potential of a hazard causing an incident. As we saw in Chapter 2, employers must exercise due diligence in the HRAC process in order to avoid prosecution for any workplace injuries under OHS law. Some forms of hazard control are more effective than others, and, consequently, a hierarchy of controls (with five levels) has been established:

- **Elimination** removes the hazard from the worksite. For example, relocating work performed at a height to ground level eliminates the
risk of falling. This control is most easily implemented at the design stage, thereby preventing the hazard from entering the workplace.

• **Substitution** entails replacing something that produces a hazard with something that does not. For example, we might replace chemical-based cleaning solvents with plant oil–based solvents. Substitution is similar to elimination but is less effective because the new object or process may introduce different hazards or fail to completely remove the original hazard.

• **Engineering controls** are modifications to the workplace, equipment, materials, or work processes that reduce workers’ exposure to hazards. For example, installing guards on machinery, building guard rails, installing ventilation systems, or purchasing ergonomically designed workstations all isolate workers from hazards, but they do not eliminate the hazard. These controls can be incomplete, become inoperative due to lack of maintenance, or be overridden and therefore are less effective than elimination or substitution.

• **Administrative controls** are changes to work process, policies, training, or rules designed to reduce exposure to hazards. For example, policies restricting the time workers spend in contact with a chemical hazard, “no-go” zones that restrict workers’ movements in certain locations, mandatory training sessions, permit systems to control access to equipment or spaces, changes to schedules to prevent excessive shift work, or working-alone procedures that require regular check-in are all administrative controls. Administrative controls do not actually control a hazard. Rather, they attempt (via rules and processes) to limit workers’ exposure to the hazard.

• **Personal protective equipment** (PPE) is equipment worn by workers that is designed to protect them should they come into contact with a hazard. For example, helmets, goggles, gloves, and fall protection systems are forms of PPE. PPE is considered the least effective control because it does not control the hazard or restrict workers’ contact with the hazard and is heavily reliant upon human action for its effectiveness. PPE places the burden of implementation on the worker. Workers may choose not to wear or be pressured into not wearing the PPE. Further, most PPE has been historically designed for a male body, which can compromise its effectiveness when worn by women.
As noted in Chapter 2, when selecting a control, employers must justify applying controls lower on the hierarchy because they pass the reasonably practicable test. Reasonably practicable refers to precautions “that are not only possible but that are also suitable or rational, given the particular situation.”

Employers and workers sometimes have differing views about which hazard control options are optimal. Employers are more likely to prefer options lower on the hierarchy due to their lower cost and lesser impact on the work process. Workers, on the other hand, prefer controls higher on the hierarchy because they are more effective at keeping them safe. This tension will be discussed further at the end of the chapter.

Often multiple controls can be combined to provide a higher degree of control. For example, receptionists may face harassment, violence, or other inappropriate behaviour from clients. A locked door that the receptionists can unlock remotely (an engineering control) can help exclude clients known to be a risk. This hazard control can be made more effective by combining it with other controls:

- **Engineering**: A glass barrier that separates the receptionist from visitors reduces the possibility of physical violence.
- **Administrative**: Policies regarding when and to whom to allow entry provides the receptionist with authority to deny an individual’s entry. Policies against working alone, training on handling difficult people, and procedures for responding to perceived threats may also help control the hazard.
- **PPE**: In addition to the security door, the receptionist could be provided with a panic button (with appropriate response procedures) to provide a last layer of defence.

Finally, different levels of control may be appropriate at different times. For example, when first addressing a hazard it may be necessary to use PPE until a more permanent engineering control can be implemented. That said, it is important to not unduly delay the implementation of the (likely more effective) engineering control. Employers have flexibility in how they control hazards, but that flexibility should not be interpreted as permission to disregard their due-diligence obligation to implement the most effective hazard control.
Box 3.4 Hazard control in telecommuting

Telecommuting—working away from the main worksite—is a growing trend. This trend is enabled by technological change (e.g., mobile devices), worker demands (e.g., to improve work life balance) and employer desires to minimize cost (e.g., by reducing office space). In Canada, employers continue to be responsible for the safety of their workers regardless of the location of work. This means that employers have obligations around hazard recognition, assessment, and control when telecommuters work from home, cafes, or other locations.

One of the complexities this expanded obligation raises is the issue of authority over the telecommuting worksite. If the worksite is the worker’s property (or that of a third party), the employer likely does not possess the authority to conduct a hazard assessment or implement any specific controls. Further, the employer may find it difficult to provide appropriate oversight and supervision, protection against the hazards of working alone, and emergency response for telecommuters. Should an employer be able to require (and be required to pay for) renovations in a private home? How do we distinguish between work-related hazards and non-work-related hazards in home offices? Who does a telecommuter working in a cafe turn to in case of emergency?

Most employers cope with these challenges via administrative controls such as policies directing the employee to act in particular ways or to have certain systems in place. Often, the employer will not reimburse workers for the cost of having required equipment (e.g., first-aid kits, fire extinguishers). Interestingly, there is rarely any follow-up to ensure compliance with such policies. This reflects employers’ inability to demand access to a private dwelling and, coincidentally, eliminates the cost of inspection. Most governments refuse to inspect home offices or third-party locations, even though they are defined as workplaces under law.

While telecommuting may entail benefits to workers, such as better work-life balance (which can reduce stress), the reality is that teleworkers have less health and safety protection than if they worked
on their employer’s property. The growth of telecommuting has taken place with little discussion of how to best manage the hazards associated with it.

There are numerous critiques of the hierarchy of control approach:

- Hazard focused: The hierarchy focuses on the hazard, rather than on who experiences the negative consequences of a control failure, leading to a tendency to dehumanize the control process. For example, in the case of the receptionist experiencing harassment, the focus is on locked doors and panic buttons rather than on the receptionist’s experience working in a vulnerable situation.

- Technology over process: The hierarchy tends to focus on implementing technological controls rather than process controls, which can overlook important possibilities. For example, grocery store employers may redesign checkout stands to reduce repetitive strain from scanning items but are less likely to examine the benefits of job rotation (switching up tasks frequently).

- Traditional hazards: The hierarchy does a better job at controlling hazards long associated with safety on industrial worksites (e.g., preventing contact, falls, and exposure to industrial chemicals) but works less well in service-sector jobs (often held by women and youth) and with less recognized hazards such as stress, harassment, or repetitive strain.

A more worker-centered approach is to consider the location of the control. In this approach, the focus is on where and when the hazard is controlled in the context of where the worker is in the production process. In this approach, hazards can be controlled at three locations:

- **Control at the source** addresses the hazard where it first occurs. This type of control prevents the hazard from entering the workplace via elimination, substitution, or some types of engineering controls.

- **Control along the path** addresses the hazard at some point between its source and when workers encounter the hazard (i.e., it prevents
the hazard from reaching the worker). Some types of engineering controls (e.g., machine guards, local ventilation) control the hazard along the path.

- **Control at the worker** implements controls over the hazard only after it reaches the worker. These controls are designed to prevent or reduce the consequences of the hazard, rather than control the hazard itself. PPE and administrative controls are both examples of control at the worker because they both require that the burden of the control be placed almost exclusively upon the worker.

Examining controls by considering their location relative to the worker changes how we assess whether a control is effective by emphasizing the burden placed on workers with each control option. Box 3.5 provides two examples of location-focused hazard control. Note how the effectiveness of the control increases as the control moves closer to the source of the hazard.

The location approach allows for a more nuanced understanding of how different groups of workers can be differentially affected by a hazard. When attention is turned to the worker, rather than the hazard, differences between workers become more evident. For example, administrative controls are less effective for new workers, because they are less familiar with the rules and have not yet developed the skills required to work safely (see Chapter 8). Looking at how those administrative controls are located relative to the worker makes it more likely that their shortcomings for new workers will be identified. Similarly, the location approach draws more attention to the consequence of control failure and emphasizes the harm that can occur to workers when the system fails.

**Box 3.5 Two examples of location-focused hazard control**

**Example 1: We Care Hospital**

Hazard: Personal care attendants are sustaining injuries resulting from manually lifting patients for transfer and other care needs.

Control at worker: Training in proper lift techniques. Policies ensuring that lifts are performed by more than one personal care attendant at a time.
Control along path: Install a portable powered patient lift system to assist in the lifting process.

Control at source: Install hydraulic beds with sufficient range of movement to prevent the need for the most common lifts (e.g., bed transfers).

Example 2: Moonbeam Cafe

Hazard: Baristas are getting burns from the espresso maker when they steam milk for lattes due to fugitive steam and splashing hot milk.

Control at worker: Training on how to use machine without contacting steam and milk. Require the use of gloves, long sleeves, and padded aprons.

Control along path: Replace steaming vessel with a better-designed vessel to reduce the amount of splashing and escaped steam.

Control at source: Purchase an espresso maker with built-in guards or an enclosed steamer system.

THE POLITICAL ECONOMY OF HAZARD RECOGNITION, ASSESSMENT, AND CONTROL

Workers and employers will sometimes have different views about optimal hazard control. This disagreement arises from the conflicting interests of employers and workers around health and safety. Workers want to maximize personal safety. Employers, while they may want to keep their workers safe, must keep an eye on profit and productivity.

This conflict manifests itself in each step of the process. First, workers and employers are likely to disagree over what constitutes a hazard. Employers are motivated to minimize the number of hazards identified in the workplace. This, in turn, reduces the number of hazards employers are legally obligated to control and thus the cost of hazard control. Workers—those who will bear the consequences of uncontrolled hazards—are likely to seek to identify a greater number of hazards.

While it can be hard for employers to ignore traditional hazards (e.g., a tripping hazard), chemical, biological, ergonomic, and psycho-social hazards are
often less obvious and thus more easily ignored. For example, the long latency periods of many occupational diseases can make it difficult to determine that a substance is toxic. Many hazards also have unclear causation: Are excessive levels of stress exhibited by workers due to work-related issues or personal ones? Incidents of harassment can sometimes be regarded as personnel issues rather than safety issues.

Workers and employers may also disagree on the assessment of hazards. Employers will wish to prioritize hazards that will lead to significant lost production time. Workers may be more interested in hazards that may lead to longer-term health effects or that reduce quality of life in the medium term.

Finally, workers and employers may disagree on how to control hazards. As we saw above, there are many ways of controlling a hazard. Some are more permanent, more difficult to implement, or more costly. Employers have an interest in minimizing the cost of hazard control, and thus they tend to prefer administrative controls and PPE implemented at the level of the worker. Such controls allow the employer to report they are complying with regulations, which rarely mandate a specific control, while minimizing the disruption to productivity and profit.

Workers may see things differently. PPE can be uncomfortable because it is often designed for the most common body types, making it poorly fitted for women, smaller or larger bodies, or workers with disabilities. Some PPE has only limited effectiveness against a hazard. For example, fall protection systems prevent catastrophic injury from a fall but can still cause significant injury to the worker because the PPE only prevents the worker from hitting the ground, rather than preventing the fall itself. Moreover, load bearing calculations for fall protection regulations are based on the average male, and therefore systems may not fully prevent injury in some workers (e.g., larger workers).

Money certainly plays a role in this conflict: more effective engineering controls are generally (but not always) more expensive than PPE. But the conflict is also about who will bear the greater burden of controlling (or being exposed to) hazards. PPE and administrative controls place the bulk of the burden on workers, requiring them to follow orders, wear equipment, or take active measures to protect themselves. Controlling hazards at the source puts the burden on employers to prevent exposure to hazards in the first place. Who carries the burden of safety is at the core of conflict between workers and employers regarding hazards.
Controlling hazards in workplaces is more complex and difficult than the principles laid out in a textbook. The challenge for OHS professionals is to learn how to apply those principles in real life situations, a topic we return to in Chapter 11.

SUMMARY

Fifteen-year-old Andrew James died under a pile of hot asphalt because his employer failed to identify, recognize, and control workplace hazards. While the HRAC process doesn’t guarantee that workers will never be injured on the job, it can dramatically reduce the incidence of workplace injuries and fatalities. Following the HRAC process should have changed the work processes James’s employer used and, in turn, would likely have saved James’s life despite the challenges posed by the mobile nature of the worksite.

That said, the HRAC process is not without its shortcomings. Recognizing, assessing, and controlling hazards is not an objective process. Embedded within the process is a set of assumptions about what a hazard is, who is affected by it, and how it is best controlled. HRAC processes were designed at a time when OHS focused predominantly on industrial workplaces (occupied mostly by men) where most hazards were physical, and thus risk assessment tended to most effectively engage those types of hazard. The process is not as effective at identifying and controlling hazards in non-traditional workplaces, such as retail outlets or offices, and thus workers found in those occupations are less protected. These workers are more likely to be women, youth, and other groups who have multiple factors working against their safety (discussed further in Chapter 7). Standard HRAC methods are also less able to address long-term health issues resulting from chemical exposure, stress, harassment, and other factors, therefore all workers continue to be vulnerable to incidents arising from those hazards.

Finally, HRAC is not immune from the conflicts inherent in the employment relationship. Employers and workers each have vested interests in the outcomes of an HRAC process, and those interests will often come into conflict, which means that hazard identification and control will always be a complex and contested terrain of OHS.
DISCUSSION QUESTIONS

▷ What are the main steps in the HRAC process? What is the underlying goal of HRAC?
▷ Why is it necessary to prioritize hazards? What are the potential concerns about applying a risk analysis perspective?
▷ How would employers and workers perceive the relative merits of PPE versus engineering controls?
▷ How might looking at the location of hazard control affect the decisions made about which control is most appropriate?
▷ What challenges arise in hazard control for telecommuters?

EXERCISES

A Reread the vignette that opens this chapter and write 150-word answers to the following questions. Be sure to save your answers as we will return to this vignette later in the book.

1. What hazards were present at the worksite?
2. How would you prioritize the identified hazards?
3. What controls should have been implemented?

B Write two to three paragraphs providing your opinion on the following statement:

“Some accidents are unavoidable. There is only so much we can do to control hazards.”

NOTES


17 All jurisdictions define workplace in broad enough terms that all forms of telework apply. The Ontario *Occupational Health and Safety Act* offers a good example: “(s. 1.1) ‘workplace’ means any land, premises, location or thing at, upon, in or near which a worker works.”
