

INTRODUCTION TO HAZARD IDENTIFICATION AND CONTROL

This section introduces the role of hazard identification and control in the prevention of workplace injury and illness.

High school teachers using the “Co-operative Education: Workplace Health and Safety Module”, will recognize the curriculum general outcome, ‘Learners will recognize the main types of workplace hazards and be able to identify their source.’ And as referenced, a brief overview of “incident causation theory” can be found in ‘Additional Information’ at the end of this section. It is recommended that teachers and students become comfortable with foundational OHS concepts and terminology before moving to incident causation theory.

Community and workplace educators are encouraged to consider hazard recognition and identification as a key part of their occupational safety training with youth and young workers. If seeking a regulatory explanation of hazard identification and control, ie. “What are expectations and requirements for reporting serious hazards in the workplace?”; employers, educators and trainers must call the OHS Division or visit their website. See the Resources for contact information.

Most working Nova Scotians believe there is nothing they can do to make their workplaces safety... only 43% said they felt there was something they could do... more than half of Nova Scotians consider workplace injury an inevitable part of life.

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The belief that workplace injury, illness and even death should be expected and – in some settings – accepted as a “cost of doing business” is one that many Nova Scotians still hold. By engaging learners to consider and discuss their thoughts about how this sort of belief came to be, and how it can be changed, educators are supporting students to question, and work toward changing, the attitude that workplace injury is inevitable. Doing this means that teachers are influencing how young people work now and how they’ll work in the future.

HAZARD IDENTIFICATION

A workplace hazard is something that can hurt you, or has the potential to hurt you. There are hazards in every type of job and every type of workplace. Everyone at the workplace: workers, managers and the employer, share in the responsibility to identify and control hazards. For workers, this first step means recognizing what a workplace hazard is (or could be) and how to report it to the employer. For employers, the first step is to inform workers of potential hazards, to have control systems in place to decrease the risk of injury. But what if you’re not quite sure what to look for? What is a workplace hazard, anyway?

WORKPLACE HAZARDS: CLASSES

Even though hazards look different in every workplace and in every type of industry, there are five defined classes. Here's a list and introductory definitions for each.

- **Physical**

Physical hazards are things or agents that may come into contact with the body with potential for harm. Many physical hazards are things that can be seen, like a slippery work surface, a loose railing on a scaffold, or a missing guard on a meat slicer. Other physical hazards are referred to as 'physical agents'. These are sources of energy that can't always be seen, but still have potential to harm the body. Physical agents include things like level and nature of noise, vibration, radiation, temperature and pressure.

- **Chemical**

Chemicals are in everything around us. They can be natural or manufactured, and come in the form of liquids, gases, vapours, solids or particulates (very small pieces). Naturally occurring and manufactured chemicals both carry potential for harm for people working around them. This potential is based on the level and type of exposure that someone may have to a chemical or chemical product. In Canada, laws like WHMIS (Workplace Hazardous Materials Information System) and Transportation of Dangerous Goods are in place to support the safe handling and transportation of certain chemical products.

- **Biological**

Biological hazards are typically in the form of bacteria and viruses transmitted by contact with insects, birds, animals, plants and fungi, and other humans. Unprotected exposure to biological hazards can result in a range of infections and illnesses. Some may appear fairly commonplace, like catching a cold or a skin rash from the customer served at lunch,

but have serious side effects such as a poor recovery. Other types of biological hazards, like body fluid-borne diseases or bacteria carried by some fungi, can be extremely dangerous.

- **Ergonomic**

Ergonomic hazards are caused by the way work tasks are designed and carried out. The injuries that result from ergonomic hazards always affect the muscles and the skeleton, and are the most common type of workplace injury in Nova Scotia. These injuries may happen suddenly, but are more likely to form over very long periods of time. Ergonomic hazards can be seen in work that involves awkward body postures (working in the same body posture for long periods), high body force (lifting or carrying heavy or awkward loads), and high task repetition (same movements over long periods). Improper or poorly designed work stations, tools and equipment are also a part of ergonomic hazards.

- **Psycho-social**

Psycho-social hazards can arise out of the many different ways that people interact with each other. This type of hazard may show up as negative workplace conditions like bullying, violence or sexual harassment. It can be due to stress outside or inside the workplace, the type of work being done or because of the attitudes and behaviours that different people bring to their jobs. Psycho-social hazards have the potential to harm our physical and mental health and safety, and the health and safety of the workplace. Nova Scotia's Workplace Violence Regulation is one example of safety law that guides employers and workers to recognize and deal with psycho-social hazards as seriously they would any other class of hazard.

WORKPLACE HAZARDS: CONTRIBUTING FACTORS

When thinking about workplace hazards and how to prevent or control them, it's important to consider that there are always other factors contributing to how hazards impact a workplace and the people in it. There are the four types of contributing factors; they can be remembered by the acronym **PEME**.

- **P**eople as contributing factors to workplace hazards means considering how the action or non-action of people, influences workplace hazards and situations. Sometimes this seems easy to see. For example, during the supper hour rush at a fast food restaurant two workers crash into each other in the kitchen, one falls and breaks her elbow. It seems clear that people's actions of rushing, combined with the hazard of a slippery floor, clearly led to the serious injury. However, we need to remember that it is people who design work process. In this example it will be important to question why people were rushing, and whether the risk for injury could be decreased by improving the process for safely dealing with rush hour work.
- **E**quipment as contributing factors to workplace hazards means determining whether equipment, tools and even protective equipment or clothing, are proper for the job. Using a fast food setting again, many employers do use raised non-slip mats to reduce the risk of slips and falls. However, if the mats are not properly cleaned with an appropriate floor brush, food residue can build up and pretty soon the mats themselves become a hazard. Equipment can also refer to personal protective equipment or clothing. If workers are wearing protective gear that doesn't fit them, isn't in good condition or appropriate to the task, then the equipment itself can be a contributing factor to the risk for injury.
- **M**aterials as contributing factors to workplace hazards means thinking about whether a material is proper for the job and/or if it's being properly used and handled. One example is how cleaning products are used. Not all cleaners are appropriate for all settings. Using a strong de-greasing product designed for industrial kitchens, on the counters of a clothing store, creates the potential for injury to both workers and customers. The existing hazard of germs and spread of illness in a public place, is worsened by the improper handling and use of a material. Safe work requires proper materials and the proper use of those materials.
- **E**nvironment as a contributing factor refers to how conditions around workers and supervisors further impact hazards and workplace safety. Some aspects are more obvious than others. Are work areas too cold or too hot? Is lighting correct, or is it not suitable for the work being done? Are work areas cluttered, crowded or dirty? Other factors may not be as easy to see. Are key pads on computers or cash registers clean? Is the air in workplace healthy? It is important to recognize that many jobs are carried out in difficult, and sometimes quite hazardous, settings. To make sure that the workplace environment isn't creating even more harm, workers and employers should come together to identify when further hazard controls are needed.

All workplaces and types of work have different hazards. This is normal. Working safely means recognizing hazards and contributing factors, talking to your supervisor about how to work safely around those hazards, and then doing everything possible to work safely and prevent injury and illness.

WORKPLACE HAZARDS: REPORTING

Analyzing and controlling hazards first requires that employers have a process in place for identifying and reporting hazards. This information usually comes in three different ways:

- hazard **reporting** by workers and supervisors,
- through workplace safety **inspections**, and in
- results of **investigations** done after an incident in the workplace.

Identifying and reporting hazards are crucial first steps to preventing workplace injury, and reporting can be done face to face, in writing, over the phone, or even by email or text message. For employers, Nova Scotia safety law requires they have a process in place for receiving and following up on hazard reports, and that workers are told about this. For workers, our safety law requires that hazards are reported to supervisors. Everyone at the workplace shares responsibility, everyone has a part to play.

For more information about workplace safety inspections and investigations, go the OHS Division web site.

WORKPLACE HAZARDS: ANALYSIS AND CONTROL

A part of employer health and safety responsibility is to ensure there is a hazard-reporting system in place, that reports are acted upon, that appropriate controls are put on the hazard, and that workers are trained how to safely work with or around that hazard. Understanding the need to report and control hazards begins on the first day of the job. Talking about workplace safety should be an ongoing part of every workday.

Controlling hazards requires employers to do a job or task **hazard analysis**. Many workplaces involve the employees who are in contact with the hazards of a particular task or job, in the analysis. Hazard analysis can look at a thing, a work process, or even a whole job description. Task or job hazard analysis ends with a safe work procedure designed to meet health and safety needs, and to control or eliminate the potential for injury.

Hazard analysis has six basic steps:

1. Select the item/task or process to be analyzed.
2. Break the task, process or use of the item into a sequence of steps.
3. Observe an experienced worker/s using the item or performing the task or process.
4. Identify potential and/or immediate hazards.
5. Put hazard controls in place to protect the health and safety of workers and of the business (* see next page for a brief explanation of hazard controls).
6. Write the steps in a safe work procedure and train workers. Review it on a regular basis.

* **Hazard controls** can be thought of in three ways. Each describes how and where the controls are placed on the ‘path’ between the worker, and the hazard.

- **Control at the Source:** The best way to control a hazard is to eliminate it. If this is not possible, the next step is the substitution of a non-hazardous or less-hazardous material or process. If there is no acceptable substitution, then the hazard is enclosed or isolated from workers. An example of this may be enclosing a high-voltage electrical panel and sealing it off from workers in an office. This would be controlling the hazard ‘at the source.’
- **Control Along the Path:** Some hazards, and the work processes that they are part of, cannot be enclosed or isolated. Placing a control ‘along the path’ means different protective measures are put in place between the hazard and workers. In the electrical panel example, office workers have been sealed off from the hazard but electricians will still have to be able to safely work on the panel. To protect the electricians, controls ‘along the path’ would probably include using energy lockout procedures and devices and non-conductive tools.
- **Control at the Worker:** If controls ‘at the source’ and ‘along the path’ may not be enough to prevent injury, then placing controls ‘at the worker’ will be necessary. Control at the worker often consists of personal protective clothing and equipment that must be worn while performing certain tasks. Common types of this control are wearing gloves to protect the hands, hearing protection, or masks or respirators to protect airways. ‘At the worker’ is often the first type of hazard control that businesses put into place. Employers always need to consider controlling hazards ‘at the source’ and ‘along the path’ as well.

WORKING TOGETHER TO BUILD A CULTURE OF WORKPLACE SAFETY

Educators have a great opportunity to directly impact how students and workers view workplace safety. Teachers working with youth, and with young workers, are in the unique position to directly influence youth attitudes and assumptions about occupational safety – attitudes and assumptions that shape how they work now, and how they’ll work in the future. Working together is not only about employers and workers coming together. It’s also about individuals, and public and private agencies, working together to change the attitude that nothing can be done to make a difference when it comes to workplace safety. Together, we can make this attitude history.

SUGGESTIONS FOR ACTIVITIES: EDUCATORS AND LEARNERS

Group exercises

- *“How Do I Know if I’m Working Around a Hazard?”*
Answering yes to these questions means a type of hazard is present, what could it be?
 - Could it burn you? What will burn you?
 - Are you working more than 3 metres up? What kinds of work in what kinds of settings?
 - Does it have sharp or pointy bits? What can go in between you and the pointy bits?
 - Could it crush or squish you? What body parts do you think are hurt most this way?
 - Are there poison symbols? What could it mean if there are no poison symbols present?
 - Are you exposed to teeth? What kinds of work and what’s the risk for injury/illness?
 - Do you have to deal with bad attitude? What can this lead to?
 - Is it the same action over and over and over and over? What happens to minds and muscles?
 - Is it a dumb thing to do? How can ‘not thinking’ lead to workplace injury?
- Preview and show the WCBNS advertisements on www.worksafeforlife.ca. Discuss how the incidents depicted could have been prevented with hazard identification and reporting and control.
- Split into small or large groups. Have five stations around the room for each class of hazard: chemical, physical, biological, ergonomic and psycho-social. Have the students rotate from station to station and fill them with their own examples of hazards. Encourage learners to think about hazards and workplaces that may be unfamiliar to them.
- Create collages, posters, or murals displaying samples of workplace hazards, then display them for classmates to identify the hazard(s).
- Create collages, posters or murals showing samples of personal protective clothing, display and discuss.
- Role play reporting a hazard to a supervisor; one who’s a good listener and one who’s not!
- Discuss possible reasons for why hazards aren’t reported or followed-up.
- Identify and discuss the kinds of objects, attitudes, behaviours, and equipment that pose hazards in the workplace. Learners can use personal work experience, interview relatives, friends and neighbours, or collect newspaper and magazine articles for information about what may be considered hazardous in specific workplaces.
- In small groups, examine the role of stress in creating hazardous conditions. Think about what causes stress.
 - What are some differences between positive and negative stress?
 - What conditions or attitudes could lead to positive and negative stress?
 - What trends in the workplace have led to increased stress?
- As a large group, brainstorm different examples of protective measures that would fit as ‘at the source’, ‘along the path’, and ‘at the worker’ hazard controls.
- Write a hazard analysis of a work placement or job, and include a safe work procedure.
- Discuss the possible reasons for why the word “accident” is never used in this binder. Ask for examples of workplace injuries and think about how the injuries could have been prevented.

- Complete online safety programs such as Passport To Safety.
- Use the WHMIS section for further examples of hazard identification and control.

ADDITIONAL INFORMATION:

What is “Incident Causation Theory” and how is it related to “Hazard Identification and Control?”

Incident (sometimes called “accident”) causation theory is related to the investigation of incidents that did, or had the potential to, result in injury, illness or death. Incident causation theory is often used in the investigation of how and why serious workplace events have occurred. Covering and understanding hazard identification and control, as discussed in this section and throughout the binder, is absolutely necessary in order to understand incident causation theory.

There are several different types of causation theory. In addition many are broken into sub-set models designed for specific types of industries or events. Incident causation theories are complex, and typically grouped into six main categories:

- causal-sequence models
- process models
- energy models
- logical tree models
- human information-processing models, and
- safety, health, environmental models

The intent of this resource binder is to support the introduction of foundational occupational health and safety concepts and rules to youth and young workers. Teachers and educators who wish to move beyond to explore theoretical models of incident causation, are encouraged to seek out textbooks such as:

- *Practical Loss Control Leadership*. F.E. Bird Jr. & G. L. Germain
(International Loss Control Institute, Georgia, USA.1985)
- *System Reliability Theory: Models and Statistical Methods*. A. Hoyland & M. Rausand
(Wiley, New York, USA. 1994)
- *Modern Accident Investigation and Analysis 2nd Ed.* T.S. Ferry
(Wiley Interscience Publications, USA. 1988)

Or to look for papers and comparative literature reviews in academic journals such as:

- Accident Analysis and Prevention
- Journal of Occupational Accidents
- Hazard Prevention
- Safety Science

SUGGESTED RESOURCES

The following are directly related to hazard control; check the Resources list in the Contents section for a full description of each item.

Videos

- WCBNS – advertisements and videos on www.worksafeforallife.ca.
- WorkSafeBC – *The Supervisor*
- WorkSafeBC – *Lost Youth*

Web Sites and Online Programs

- www.passporttosafety.com
Passport to Safety – online safety program
- www.gov.ns.ca/lwd/
Nova Scotia OHS Division of Labour and Workforce Development
- WCB Nova Scotia:
www.wcb.ns.ca – Corporate site
www.worksafeforallife.ca – Work Safe For Life
- www.ccohs.ca
Canadian Centre for Occupational Health and Safety (CCOHS)
- www.gov.ns.ca/lwd/pubs/
Nova Scotia OHS Act and Regulations

Nova Scotia Industry & Safety Associations

Many industry and safety associations in Nova Scotia offer health and safety programs and advice to their members, and to the general public. Contact information and overviews of associations can be easily found on industry-based web sites, provincial government departmental web pages, and in the telephone book. For an industry-specific view of the tool kit information, educators and teachers are encouraged to contact individual associations.