CONSTRUCTION SAFETY

Basics of Supervising

Modules 4-6

Home Study

Basics of Supervising
Home-Study Training Program

Modules 4–6

4–Health and Safety Programs

5–Site Emergencies and
Accident Investigations

6–Construction Injuries and Fatalities

Developed by the

Construction Safety Association of Ontario

in conjunction with the

Provincial Labour-Management

Health and Safety Committee

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ISBN 0-919465-78-1

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Basics of Supervising Home-Study Training Program

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Module 4

Health and Safety Programs

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Module 4
Health and Safety Programs

A. Background and Introduction

A comprehensive health and safety program ensures health and safety performance that meets high standards throughout every part of a company's operations.

As a supervisor, you are not the only one responsible for the quality of your company's health and safety program. Everyone—management, workers, and supervisors—holds part of the overall responsibility for safety. But *you* are the one who brings it all together and puts it into practice. You are responsible for seeing that conditions established on the worksite, and procedures followed on the job, will minimize the chance of accidents happening. To accomplish this, you work with management and crews to see that they all do their part.

There is no mystery to success in promoting health and safety. Like construction itself, it takes planning, organizing, leadership, control, and evaluation. In practice, it also requires the familiar activities of inspecting, investigating, recording, analyzing, and reporting. All of these have a place in the health and safety program which is designed to make the most of available time and resources to prevent accidents and occupational disease.

Note:

Information regarding health and safety programs is presented in CSAO Resource Document DS030 "Health and Safety Program Planning for Construction." You will be referring frequently to this resource document while completing this module.

B. Goal

The goal of the module is as follows:

Upon completion of this module you will be able to describe the main components of a health and safety program, including the tasks that fall specifically to the construction supervisor.

C. Objectives

You will be required to meet several objectives to achieve the goal of this module.

Upon completion of this module you will be able to:

1. *Locate in the Occupational Health and Safety Act and explain the legal requirement for a health and safety policy and program.*
2. *State six key components of a health and safety program*
3. *List five tasks in a health and safety program that a construction supervisor is required to perform.*
4. *Suggest ten ways to make safety talks effective.*
5. *List eight items a supervisor should include in a new worker orientation program.*

D. Legal Requirements

In Ontario workplaces, health and safety programs are required by law. The *Occupational Health and Safety Act* (OH&S Act), Section 25(2)(j) states:

> *"An employer shall prepare and review at least annually a written occupational health and safety policy and develop and maintain a program to implement that policy."*

Note: Employers with five or fewer employees are exempted from this requirement [s. 25 (4) OHSA].

The requirement for establishing a health and safety program is not always simply a legal one, however. The request will often come from the client, the developer, or the general contractor—the buyers of construction.

But the motivation to create a program and put it into practice does not have to come from outside the company. It may also come from inside, based on recognition of the many benefits that accompany a well-designed health and safety program.

At this point you may be asking yourself, "What exactly is the difference between a health and safety *policy* and a health and safety *program*?" The following should clear this up:

- The ***policy*** is a single-page document expressing senior management's active concern for health and safety.

- The ***program*** assigns responsibilities, sets out the specific requirements and defines activities to promote and maintain health and safety on a day-to-day basis.

1. Purpose of a Health and Safety Program

A good health and safety program is a complete system that ensures high health and safety standards throughout every part of a company's operations. A good program will:

- reflect a strong commitment from management
- encourage an equally strong commitment among employees
- help all employees understand their various responsibilities for preventing accidents
- ensure that employees are provided with what they need to allow them to work safely
- help employees develop the attitude that doing a job properly means doing it safely.

Because organizations differ, a program developed for one company or project cannot be expected to perfectly suit the needs of another. For this reason, health and safety programs have to be custom-designed to meets the needs and requirements of different companies and the different projects they work on.

In this module you will look at *basic* elements of health and safety programs..... elements that apply broadly across the construction industry as a whole.

Activity

Please read the box entitled "Legal Requirement" on p. 4 of "Health and Safety Program Planning for Construction," CSAO Resource Document DS030.

☐ Check

There are a number of concrete benefits that can derive from a good health and safety program. Some of these are listed in DS030.

Activity

Please read "Benefits" on p. 5 of "Health and Safety Program Planning for Construction," CSAO Resource Document DS030.

☐ Check

As you have read, there are a number of benefits that can come from having a good health and safety program. But they will only be achieved when there is a good health and safety team working to achieve them.

2. Promotion of a Health and Safety Program

There is no mystery to success in promoting health and safety. Like construction itself, it takes planning, organization, leadership, control, and evaluation. In practice, it also requires the familiar activities of inspecting, investigating, recording, analyzing, and reporting. All of these have a place in a Health and Safety Program which is designed to make the most of time and resources in preventing accidents and occupational disease.

The supervisor is not the only one responsible for the quality of a company's health and safety program, but he or she *is* in a very good position to influence it. And it is worthwhile for supervisors to take the initiative to do so, since they are legally and morally responsible for the safety of the people they supervise.

Even when a company has a good health and safety program in place, it should not be assumed that it is necessarily as good as it could be. A health and safety program can always be updated and refined and the supervisor is in a better position than almost anyone else to help do this. The supervisor is expected to have a broader overview of the job and a better understanding of the issues involved in the work than members of the crew. The supervisor should also have a better working knowledge of a project's day-to-day operations and conditions than senior management. In other words, when it comes to helping make the health and safety program the best it can be, the supervisor has a unique perspective, and a corresponding responsibility to use it.

3. The Health and Safety Team

The supervisor has a personal legal responsibility for health and safety in the workplace (see Module 3 "Legal Responsibilities"). But the supervisor's obligations and due diligence responsibilities are closely linked to the duties of other workplace parties.

Senior management, the supervisor's crew members, subcontractors, the Health and Safety Representative, Joint Health and Safety Committee Members, and the company safety advisor are all players on the health and safety team. As discussed below, management, workers and supervisors each have their own health and safety responsibilities.

a. Management

Among other things, management is responsible for establishing policies and making purchases that promote safety. For example management must:

- Make decisions to buy equipment that suits the job to be done
- Supply appropriate protective gear when and where it is needed
- Authorize regular maintenance and repairs to keep machinery and equipment in good working order
- Provide the time necessary for proper inspections and investigations
- Be willing to let projects take a little longer where necessary so that health and safety remain a priority.

b. Workers

Workers are responsible for making sure that every job they do on the worksite is done carefully. This means they must:

- do their work in a manner that does not endanger themselves or others
- report any unsafe acts and conditions so that they can be corrected.

To accomplish this workers must be made aware that safety is important to the company. They have to know that management will back them up if they make decisions in the interests of safety. The Health and Safety Policy and Program can go a long way towards providing this assurance.

c. Supervisors

It is the supervisor who brings everything together and sees that the company's health and safety policy and program is put into practice. Some jobsites have a designated *safety* person, but he or she can only be in so many places at once. The real key to the success of the Health and Safety Program is supervisors who are responsible for ensuring that *conditions* on the worksite, and *procedures* followed on the job, will minimize the chance of accidents happening.

Supervisors must work with management and crew members to ensure that everyone does their part to make the practices and procedures described in the Health and Safety Program more than just some well-meaning phrases on a piece of paper. They must strive to ensure that everyone works together to make the intentions of the health and safety program a reality.

As supervisor, the following are some important points to remember:

- Successful implementation of a health and safety program requires that safety must be ***seen*** to be promoted on the work site
- Besides the health and safety program document itself, items such as safety articles, bulletins and posters should be prominently displayed to help reinforce the program
- Supervisors themselves should make conspicuous efforts to comply with the company health and safety program and with all relevant safety legislation
- Supervisors must act immediately to stop violations of the Act and the regulations and of the health and safety program. They must make it clear that such behaviour will not be permitted.

4. Health and Safety Policy

As mentioned at the beginning of this section, a health and safety policy is a written statement of principles and goals giving expression to senior management's commitment to workplace health and safety. Senior management must be committed to carrying out the health and safety policy consistently and completely. Health and safety must enjoy the same high priority as the organization's other major goals.

The health and safety policy statement shown on the following page is included to give you an idea of what a typical policy statement might look like. It is taken from *A Guide to the Occupational Health and Safety Act*, published by the Ontario Ministry of Labour, Occupational Health and Safety Division.

ABC Contracting Ltd.

January 6, 1998

Management of ABC Contracting Ltd. is vitally interested in the health and safety of its employees. Protection of employees from injury or occupational disease is a major continuing objective. ABC Contracting will make every effort to provide a safe, healthy work environment. All supervisors and workers must be dedicated to the continuing objective of reducing risk of injury.

ABC Contracting, as an employer, is ultimately responsible for worker health and safety. As president (or owner/operator, chairperson, chief executive officer, etc.) of ABC Contracting, I give you my personal promise that every reasonable precaution will be taken for the protection of workers.

Supervisors will be held accountable for the health and safety of workers under their supervision. Supervisors are responsible to ensure that machinery and equipment are safe and that workers work in compliance with established safe work practices and procedures. Workers must receive adequate training in their specific work tasks to protect their health and safety.

Every worker must protect his or her own health and safety by working in compliance with the law and with safe work practices and procedures established by the company.

It is in the best interest of all parties to consider health and safety in every activity. Commitment to health and safety must form an integral part of this organization, from the president to the workers.

Signed: _____

President

Note that a health and safety policy statement should be:

- Dated and signed by the chief executive officer
- Stated clearly, in terms that are easily understood
- Posted in a conspicuous place in the workplace
- Distributed and explained to all employees
- Followed by every employee, including senior management, in all work activities
- Reviewed annually to keep it up-to-date and in tune with current activities of the organization and with the latest legislation.

5. Health and Safety Plan

So far we have talked about the *policy* and the *program* but we haven't said much about the *plan.* What's the difference between these three elements? The following should provide some clarification.

The **policy** *expresses senior management's active concern for health and safety.*

The **plan** *outlines the major components of a strategy to meet policy goals through the writing of a good program.*

The **program** *sets out in detail the contents of the plan and the tactics for implementing it to meet agreed-upon objectives.*

In other words, the plan is the road map you put together and follow to ensure the development of a good program.

Activity

Please read pages 6 and 7 of "Health and Safety Program Planning for Construction," CSAO Resource Document DS030, to see how the health and safety *Policy*, *Plan* and *Program* are related.

☐ Check

Once the policy has been written, the following procedure should be followed:

1. Develop the plan.
2. Develop the program.
3. Implement the program.
4. Evaluate the program.

In each procedure a number of steps should be taken. Developing the plan will be discussed here. Developing, implementing and evaluating the program will be discussed briefly in the next section.

First: Develop the Plan

1. Form a labour/management task force.
2. Analyze the firm's compliance with the law.
3. Review the company's accident history.
4. Set objectives.
5. Develop procedures.
6. Get a professional review and evaluation.

Activity

Please read pages 9 to 13 of "Health and Safety Program Planning for Construction," CSAO Resource Document DS030, for details on how to develop the Plan.

☐ Check

6. Health and Safety Program

After preparing the health and safety plan, the next phase is the development of the health and safety program.

a. Developing the Program

As suggested earlier, safety programs vary according to the company, and sometimes with the project but, in addition to the policy statement, they should all share the basic components outlined in the following box.

Second: Develop the Program

The program should address the following:

1. Health and safety policy statement
2. Responsibilities
3. Health and safety rules
4. Safe practices and procedures
5. Emergency procedures
6. First aid and medical services
7. Worker orientation
8. Reporting and investigating accidents
9. Inspections and hazard assessment
10. Joint health and safety committees
11. WHMIS.

Activity

Please turn to the "Contents" page (i.e., page 2) of "Health and Safety Program Planning for Construction," CSAO Resource Document DS030. In "STEP 3 – PROGRAM" you will see the same list of items as that described in Step Two above. In this module we will look at the first 4 of these components in detail.

☐ Check

Not counting health and safety policy (which has already been reviewed here) the first 4 of the above components (responsibilities, health and safety rules, safe practices and procedures, and emergency procedures) are detailed during development of the health and safety program. They are discussed briefly below.

(i) Responsibilities

Lying at the heart of any successful health and safety program is a detailed listing of health and safety responsibilities. In large companies, responsibilities are spread over many levels; in small companies, many responsibilities will be undertaken by one person.

Activity

To supplement the material presented in this section, please read pages 14 to 20 of "Health and Safety Program Planning for Construction," CSAO Resource Document DS030.

☐ Check

As you have learned, responsibility may be defined as an individual's obligation to carry out assigned duties. One of the main purposes of the health and safety program is to clearly set out responsibilities for each level of employee, from chief executive officer to worker. Once responsibilities are clearly defined, all parties are better able to understand how the components of the overall health and safety program fit together.

(ii) Health and Safety Rules

The construction regulations under the OHSA set out *minimum* requirements for health and safety in the workplace. In many cases, it may be necessary for an organization to supplement the Act and the regulations with specific *rules* to ensure a safe workplace (see also page 20 of "Health and Safety Program Planning for Construction").

Some important points about the addition of specific rules are:

- The Joint Health and Safety Committee or a worker representative should participate in formulating the rules.
- Rules should be stated in clear, positive and easily understood terms.
- Where the intent is not obvious, reasons for each rule should be stated.
- The rules must be enforceable.
- The rules should be available in writing to all employees.
- Compliance with health and safety rules should be considered a condition of employment. Rules should be explained to new employees when they start work (see Section I of this module regarding New Worker Orientation).

The question of how to deal with repeat violators must also be addressed in the program and supervisors must be supported in their duty to correct unsafe acts and breaches of the rules.

(iii) Safe Practices and Procedures

Safe practices and procedures must be addressed in any health and safety program. During the planning stage, hazardous jobs should be identified. During the development stage, safe work procedures must be developed for each job identified. As part of the program, these procedures must be explained in detail in writing and communicated to employees.

Since the supervisor will be responsible both for implementing the procedures and for communicating them to the crew, it is important that he or she participate in their identification and development.

When outlining procedures:

- Include the steps required to implement the procedure.

- Use easy-to-understand terms.
- Include applicable regulations and rules.

Activity

Please read pages 22 and 23 of "Health and Safety Program Planning for Construction," CSAO Resource Document DS030, for an example of a well-defined safe work procedure (Tagging and Lockout) and for a partial list of jobs that typically require development of general procedures.

☐ Check

(iv) Additional Components of a Health and Safety Program

So far you have looked at four of the major components of a health and safety program:

- Policy statement
- Responsibilities
- Health and safety rules
- Safe practices and procedures.

The remaining items on the list of components that should be included in a health and safety program are:

- Emergency procedures
- First aid and medical services
- Worker orientation
- Training
- Reporting and investigating accidents
- Inspections and hazard assessments
- Health and safety promotion
- Joint health and safety committees.

Activity

Please read pages 24 to 31 of "Health and Safety Program Planning for Construction," CSAO Resource Document DS030, for details on the items in the above list.

☐ Check

Activity

To see a detailed checklist of items that could be included for each of the health and safety program components discussed above please refer to Appendix A, "Written Procedures Checklist for a Health and Safety Program," at the end of this module.

☐ Check

b. Implementing the Program

After the program has been written it must be implemented or applied in the workplace. This Third Step has 5 basic parts.

Third: Implement the Program

1. Announce the program and distribute copies.
2. Instruct employees in their responsibilities.
3. Provide guidance and follow-up.
4. Establish a system for accident reporting and accident investigation.
5. Establish corporate and jobsite committees.

c. Evaluating the Program

After implementation comes evaluation. First, because it's important to know how successful the program is at both promoting and protecting health and safety in the workplace. And second, because it's important to review and "retool" the program whenever it is shown to be inadequate or when conditions in the workplace change. There are normally five parts to the implementation phase.

Fourth: Evaluate the Program

1. Review key elements frequently.
2. Identify weaknesses in the program.
3. Ensure prompt follow-up to correct deficiencies.
4. Compare statistics with previous years and previous jobs.
5. Involve site supervisors and health and safety reps/JHSC members.

d. A Final Word About Health and Safety Programs

Most people agree that a health and safety program must be practical and economical. It is generally accepted that if put into practice carefully, the key components of a health and safety program don't cost the company money in the long run. They may even save money by:

- Lowering the number of accidents.
- Reducing damage, wear and tear on equipment and materials.
- Cutting down on production losses.
- Avoiding fines.

As supervisor, you have a crucial role to play in ensuring the success of any health and safety program. Safety tasks you must perform are the subject of the next section.

E. Supervisor Safety Tasks

It's true that some project sites have designated safety personnel. Nevertheless, it is the supervisor who has overall responsibility to see that conditions on the worksite and procedures followed on the job reduce or control the causes of accidents. To this end, a company's health and safety program often includes something like the following:

> "A supervisor shall implement, support, and enforce the health and safety program at the crew level."

Supervising for health and safety involves various tasks at different stages in the life of a project. Some activities are done at the start of a new project, some are only done from time to time, others must be done at all times to be truly effective.

1. At the start

Initially, before a new job even begins, you need to:

- Lay a foundation for safety through job planning and hazard assessments.
- Establish safe work practices.
- Make a new-worker orientation program available for employees.

2. From time to time

Periodically you will have an obligation to:

- Hold toolbox safety meetings.
- Distribute safety information to workers.
- Conduct regular site inspections.
- Take part in safety audits.
- Conduct investigations of incidents and accidents.
- Enforce safety rules among employees.

- Follow up on any need for corrective action identified during inspections or investigations.

3. At all times

In an ongoing process that will become second nature to you, you will constantly:

- Monitor the worksite for unsafe conditions and unsafe acts.
- Comply with the Act and the regulations.
- Set a good example by making safety a top priority on the job.
- Obey the rules set out in the health and safety program.
- Pay attention to details such as housekeeping and materials storage.
- Remain neat, clean, and appropriately dressed for the worksite.

In very general terms, a supervisor is responsible for implementing, supporting and enforcing the health and safety program at the crew level. This means that, as supervisor, you must be able to:

- Perform worksite inspections.
- Provide workers with frequent safety talks.
- Give coaching and cautions where necessary.
- When required, enforce health and safety rules and procedures through the use of progressive discipline.

To reduce these many tasks to three simple and general terms, as supervisor your main safety tasks are inspecting, enforcing and communicating.

4. Inspecting, Enforcing and Communicating

Inspecting, communicating and enforcing health and safety on the job involve some or all of the following.

Inspecting

- Inspect all machinery and equipment.
- Ensure that workers are not endangered.
- Inspect the jobsite at least once a week.
- Comply with Reg. 213/91, sections 14(3) and 14(4).

Enforcing

- Enforce the health and safety program at the crew level.
- Report safety problems to your superior(s).
- Correct hazards immediately.
- Ensure housekeeping is done at least daily.

Communicating

- Provide orientation to new employees.
- Give weekly safety talks.
- Review the following with your crew: safety directives; MSDSs; safety aspects of each task; minutes of safety meetings; and MOL orders.

a. Inspecting

The fact that a supervisor must carry out inspections is made clear in subsection 14 (3) of the Regulation for Construction Projects (O. Reg. 213/91.) The regulation states:

> **14.** (3) A supervisor or a competent person appointed by the supervisor shall inspect all machinery and equipment, including fire extinguishing equipment, magazines, electrical installations, communication systems, sanitation and medical facilities, buildings and other structures, temporary supports and means of access and egress at the project to ensure that they do not endanger any worker.

The frequency at which formal inspections must be carried out is addressed in subsection 14 (4) of O. Reg. 213/91. That subsection states:

> **14.** (4) An inspection shall be made at least once a week or more frequently as the supervisor determines is necessary in order to ensure that the machinery and equipment referred to in subsection (3) do not endanger any worker.

To be duly diligent as a supervisor, you need the skills to conduct inspections and to identify and evaluate hazards within your jurisdiction. You also need to know how to eliminate or reduce identified hazards. Even if the needed control measure is beyond your capability or authority, you are responsible for ensuring that people senior in responsibility to you are told that action is necessary to control a hazard.

As the key person in any occupational hazard control program, you will act as a direct link between management and employees. To perform this role effectively, you must be able to (1) recognize, (2) evaluate, and (3) control hazards. The *workplace inspection* is the main activity that will enable you to perform these functions effectively; it is the primary mechanism for identifying, evaluating and subsequently controlling hazards.

Inspections *must* be a part of every phase in the development of a project. In fact, inspections are of such importance that they should be conducted on a more or less continuous basis. Such ongoing inspections mean that supervisors and their staff must be on a constant lookout for job hazards. But continuous inspections are not enough on their own. Supervisors should also conduct regular *formal* workplace inspections using a checklist to make sure that no part of the job is overlooked.

Activity

Please turn to Appendix A at the end of this Module and read the sample checklist of items that should be looked at during an inspection of the workplace.

☐ Check

b. Enforcing

Supervisors must enforce health and safety rules and procedures. If you see a situation that, in your opinion, presents a risk of serious injury or death, you have a right and a duty to take immediate action. If you ignore a danger, you will be seen as condoning it and will share responsibility for any accident or incident that may occur as a result. When it comes to what your perceive as a real danger, do not let others override you or talk you out of what you strongly feel to be true. Things that look unsafe usually are unsafe.

Infractions of the Act or the regulations should be dealt with through formal channels, by referring the matter to the following parties:

- the person in charge of the activity
- your manager
- your company safety advisor
- the Health and Safety Representative or Joint Health and Safety Committee.

And remember, the mandate of the Construction Safety Association of Ontario is to provide members of the construction sector with guidance on health and safety issues. Please feel free to consult CSAO if you cannot get the advice you feel you need from within your own organization.

c. Communicating

Supervisors must be able to show that workers receive frequent safety talks, cautions, and coaching. Many jurisdictions impose a specific obligation on supervisors to advise and instruct workers. Judges have stated that they want supervisors to engage in safety talks and informal toolbox talks. But when and how should these be carried out?

Supervisors should evaluate whether they have sufficiently trained and warned their workers about potential health and safety hazards in the workplace. They should always be asking themselves whether there is a new project, a new location, a new material, a new procedure or a new person requiring attention. And if there is they should deal with the situation. "First time safe" is what the law requires. To ensure that nothing is overlooked, take the following steps.

1. Take note of any new person, job, tool, procedure or material.
2. Identify any related hazards.
3. Evaluate the seriousness of the hazards.
4. Eliminate or control any hazards.
5. Determine what you need to talk to your crew about.

Training activities offered by supervisors can vary greatly in duration; a five-minute toolbox talk, a monthly one-hour safety presentation, or a more rigorous all-day workshop or classroom

session all have a role to play. A supervisor's training work is never done; it is an ongoing, integral part of what it means to supervise.

Most safety talks can be informal; however, for a supervisor to demonstrate due diligence, it is important to record the time, place, subject and parties involved. Documentation can include:

- Training schedules.
- Notices of safety events.
- Outlines of safety talks.
- Copies of memos to senior management regarding safety problems.
- Records of toolbox talks, coaching, counseling, and warnings.

These recommendations regarding safety talks and record keeping may give the impression that implementing a health and safety program involves a lot of paperwork. Indeed, a health and safety program, like any other formal system, does need to be detailed on paper. That doesn't mean, however, that the paperwork a supervisor has to do is complex or heavy. For example, one way to simplify the recording of toolbox talks is to use CSAO's pad of duplicate report forms (RF023).

To help you in your role as safety communicator the next section gives you some detailed information on safety talks.

F. Safety Talks – Guidelines for Use

As mentioned in the previous section, one of a supervisor's responsibilities is to provide safety talks to workers regarding on-site health and safety issues. If you have not done this before there are probably some questions in your mind regarding how to choose a relevant topic, how to put talks together, etc. The following paragraphs are designed to answer some of the more commonly asked questions regarding safety talks.

1. What is a safety talk?

A safety talk is a hands-on way of reminding workers that health and safety is important on the job. Safety talks are usually short talks that deal with specific problems on site. They do not replace formal training. Through safety talks you can inform workers about health and safety requirements for particular jobs, or for the tools, equipment, materials, and procedures they use on a day-to-day basis.

2. Why give safety talks?

In delivering safety talks, your objective is to help workers recognize and control hazards on a project. You have seen that as a supervisor, you have a legal duty to advise workers of danger or potential danger to their health and safety. Safety talks provide you with a means of doing that. They also provide an up-front way of demonstrating the commitment of employers and workers to health and safety on the job.

3. What makes a safety talk work?

There are a number of things you can do to make safety talks work. Generally, you want to make the talk an efficient and effective means of providing and spreading health and safety information on a project. Some of the things you should take into consideration when putting a talk together are listed below.

a. Choose a relevant topic

Prepare a talk on a topic that is suited to the site you are working on and to the conditions you are working under. Don't give a presentation on quick-cut saws when none are being used on the job.

b. Pick an appropriate location

Deliver your talk in a location that is appropriate. That could be the job office, out on the site, or near the materials, tools and equipment you are talking about.

c. Use a clear introduction

Introduce your subject clearly. Let workers know exactly what you are going to talk about and why it's important to them.

d. Use your own words

By all means refer to a written Safety Talk for information and to help you keep on track. But wherever possible, use your own words to get the subject across. You will sound more sincere that way and you will be more convincing.

e. Use familiar examples

Use practical examples, to connect key points in your talk to things your crew is familiar with on the project.

f. Pinpoint hazards

Talk about real hazards that often cause accidents or incidents. Use information from the written Safety Talks to explain how to control or prevent these hazards.

g. Use real tools, materials, and equipment

Wherever possible, use real tools, equipment, materials, and jobsite situations to demonstrate key points in your talks.

h. Get feedback

Ask your crew questions regarding the information you have provided. Sometimes it's helpful to get them to repeat in their own words some of the important elements of the talk. This can reassure you, and them, that they understand the information you have presented. When questions are asked, provide complete answers to the best of your knowledge. When necessary, find out more information and get back to the crew as soon as possible.

i. Demonstrate

Where appropriate, demonstrate what you are talking about and then ask workers to demonstrate what they have learned.

j. Keep records

Using your log book, *keep a record* of each talk delivered. Include the date, topic, and names of the attendees.

4. CSAO Safety Talks

CSAO Safety Talks (V005) give you five-minute presentations that you can use to help prevent injuries or save lives. Delivered by supervisors, Safety Talks provide a hands-on way of reinforcing accident prevention.

You can order Safety Talks to help you prepare safety talks for your projects. The talks cover a wide range of construction topics and are printed in a durable format so that they can be kept for use on different sites. (Please note that a full set of the Safety Talks is included in your home-study package.) Pads of Safety Talk Report Forms in duplicate (RF023) are available for recording the presenter's name, participants' names, the project name, the date, the topic, and the results.

Over the next three pages you will find:

a) an Index giving the titles of CSAO Safety Talks you can order
b) a copy of a Safety Talk Report Form.

From there we will go on to discuss one of a supervisor's most important functions—providing New Worker Orientation.

Index of CSAO Safety Talks

Safety Talk Report Form

Title and number of safety talk:_____

Company:_____ **Project:** _____

Talk given by: _____ **Date:** _____

Crew Members Attending Safety Talk		

Results of Inspection, Demonstration, or Other Activity During Talk

Signed:_____ **Title:**_____

Submit white copy to company office. Retain yellow copy for your records.

RF023

Construction Safety Association of Ontario

G. New Worker Orientation

A worksite starts from nothing, draws workers from several employers, then changes daily as the project progresses. Often a project is completed before people even get to know each other, or the site.

To cope safely with this kind of rapid change, orientation to any new construction job is critical. Workers who are properly introduced to a new job, and/or a new site, will work more safely and be more productive.

Providing workers with a proper orientation doesn't mean "holding their hand," or over-directing them in every detail of their job. But it does mean providing them with clear and detailed information that will enable them to avoid injury while doing their work.

1. The problem and the goal

The *problem* is that workers new to construction or even just new to a project may not be familiar with the tools, equipment, materials or site conditions they will have to deal with. In addition, they may not know the health and safety legislation that describes *how* they should work. These deficiencies can lead to a greater risk of injury.

The *goal* is to eliminate or reduce accidents and injuries involving new workers.

Work experience usually does increase safety awareness. But both early education and ongoing updating in health and safety and in job skills can help improve any worker's safety record. This is true whether a worker is new to construction, or just new to a particular job or a particular site. Health and safety awareness should start with orientation as soon as a worker joins an organization or is given new duties.

2. Who is the new worker?

Essentially, a new worker *is anyone new to the company or workplace, regardless of age or experience.* New workers can have a lot or only a little experience.

3. What does the new worker know?

.Don't assume that even experienced workers have full knowledge of the standards set by your firm, the type of construction you are in, the procedures you use, or the equipment and machinery you operate. A student or apprentice is even less likely to know these things. The conclusion? Every new worker should receive a proper orientation to his or her new job.

4. What are the supervisor's obligations?

The OHSA obliges supervisors to guarantee the safety of workers by providing them with adequate instruction. Specifically, subsection 27(2)(a) states that supervisors must advise workers of any danger or possible danger they know about that could affect workers' health or safety.

5. The solution

Providing new workers with a proper orientation to the workplace will reduce their chance of injury. In addition to dealing with the items listed in "Orientation Program" (see 6 below), a copy of the company health and safety policy and program should be issued to each new worker. But remember, simply handing a new worker a sheet of paper or a booklet of safety rules would likely prove to be ineffective on its own. Time must be spent with new workers:

- To explain the health and safety policy and program completely.
- To demonstrate clearly that both the company, and you personally, are interested in them and in accident prevention.
- To explain the new worker's new job responsibilities.

6. A final word on new worker orientation

Always keep in mind that a new employee can absorb only so much information in the first few days. An orientation program should cover (in no specific order) the following.

- Company policy regarding acceptable behaviour.
- The construction project and the worker's role in it.
- WHMIS requirements.
- Emergency procedures.
- Locations of first aid station(s), fire extinguishers, telephone(s), lunchroom, washroom, and parking.
- Site-specific hazards.
- Health and safety responsibilities.
- Immediate reporting of injuries and hazardous conditions to supervisor.
- Use of personal protective equipment.
- Tool handling and storage.
- The right to refuse hazardous work.
- A review of each health and safety rule applicable to the job.
- An introduction to health and safety representative(s).
- An introduction to supervisor.
- A site tour or map where appropriate.

A copy of the health and safety policy and program will help the new worker by repeating the points covered during the orientation. It will also help the person training the new worker by serving as a checklist of points to cover.

Activity

Please read the sample "New Employee Orientation Checklist" contained on the next two pages.

☐ Check

One last point worthy of note is that a buddy system can be used as a follow-up to an initial orientation. Pairing a new worker with a veteran worker can reinforce the new employee's training and raise the safety awareness of the buddy at the same time.

New Employee Orientation Checklist

Employee: _____

Supervisor: _____

Jobsite / Project: _____

Date: _____

No	Item	Employee's Initials	Supervisor's Initials
1.	Explanation of project and of employee duties.		
2.	Provision of copy of company safety policy and program.		
3.	Requirements for personal protective equipment.		
4.	Accident reporting procedures.		
5.	Location of first aid, fire extinguishers, fire exits, telephone, and emergency numbers.		
6.	Emergency procedure details.		
7.	Location and details of specific project hazards.		
8.	Location of parking, lunch area, and toilets.		

9.	Location of tool handling and storage area.		
10.	Project telephone number and absentee reporting.		
11.	Name of H & S representative or JHSC members.		
12.	Location of any hazardous substances and their MSDSs.		
13.	Confirmation of WHMIS training.		

Appendix A

Written Procedures for a Health and Safety Program

Written Procedures Checklist for a Health and Safety Program

1. Policy Statement Does the written policy statement meet the following requirements?			
		Yes	**No**
1.	Contain a statement of principles and goals		
2.	Recognize the need to comply with the *Occupational Health & Safety Act*		
3.	Acknowledge the right of every employee to work in a safe and healthy environment		
4.	Reflect management's commitment to providing a safe and healthy work environment by eliminating or minimizing the hazards		
5.	Recognize the priority of safety in relation to other organizational goals		
6.	Encourage cooperation with unions and workers to involve all employees in putting H & S policy into practice		
7.	Include signature of CEO		
8.	Include date signed		

2. Responsibilities Are health and safety responsibilities written for			
		Yes	**No**
1.	Managers?		
2.	Supervisors?		
3.	Workers?		
4.	Subcontractors?		

3. Enforcement Are there written disciplinary procedures to deal with H & S infractions and violations? **Yes ____ No ____**	
1.	Who will enforce the safety program?
2.	What penalties will apply?
3.	What procedure will be established to ensure compliance and to administer penalties?

4. Health and Safety Rules			
		Yes	**No**
1.	Are safety rules written in clear, easily understood terms?		
2.	Are rules written in positive terms?		
3.	Are written safety rules available to all?		

5. Safe Practices and Procedures (con't next page) Are there written procedures for:			
		Yes	**No**
1.	Tagging and lockout?		
2.	Hot work permits?		
3.	Manual and mechanical lifting?		
4.	Confined space entry?		
5.	Access and egress? (work platforms, ladders, scaffolds, etc.)		
6.	Housekeeping and mat'ls storage?		
7.	Vehicle safety?		
8.	Lifting and hoisting?		
9.	Equipment and machinery?		
10.	Designated substances?		

11.	Trenching and excavating?		
12.	Traffic control?		

6. Emergency Procedures Are written procedures established for unexpected events such as:			
		Yes	**No**
1.	Fire?		
2.	Critical injury?		
3.	Explosions?		
4.	Toxic spill or release?		

7. First Aid and Medical Care Are there written procedures or instructions:			
		Yes	**No**
1.	Requiring workers to report all injuries to the supervisor?		
2.	For transportation of injured workers?		
3.	Identifying the qualified first aider?		
4.	Specifying location of first aid stations?		

8. Worker Orientation			
		Yes	**No**
1.	Are there written procedures establishing an orientation program that will introduce the new worker to the company's health and safety program?.		
2.	Is there a standard checklist form for the worker orientation program?		

9. Training Is health and safety training provided for:			
		Yes	**No**
1.	WHMIS?		
2.	New worker orientation?		
3.	New management orientation?		
4.	Accident investigation & reporting?		
5.	5-minute site safety talks		
6.	Supervisory personnel?		
7.	OH&S Act and Construction Regulations?		
8.	First aid?		
9.	Personal protective equipment?		
10.	Specific accident problems?		
11.	Other?		
12.	Other?		

10. Reporting and Investigating Accidents Are there written procedures for an accident/incident?			
		Yes	**No**
1.	Use of a standard form?		
2.	Participation of the supervisor?		
3.	Interviewing the workers involved?		
4.	On-site assessment of the scene?		
5.	Identifying primary and secondary causes?		
6.	Recommended prevention and remedial action?		
7.	Ensuring recommendations are acted upon?		

11. Inspections & Hazard Assessments Are there written procedures for corporate site inspections that specify:			
		Yes	**No**
1.	The persons who are to perform the inspections?		
2.	The focus of their inspections?		
3.	The occasions for inspections?		
4.	The persons to whom inspections are to be reported?		
5.	Use of a standard checklist or form?		
6.	What records are to be kept?		
7.	How to follow up on deficiencies?		
8.	Classification of hazard potential?		

12. Health and Safety Representative			
		Yes	***No***
1.	*Selection?*		
2.	*Monthly inspections?*		
3.	*Recommendations?*		

13. Joint H & S Committees *Are there written procedures for Joint H & S Committee activities that include:*			
		Yes	***No***
1.	*Composition?*		
2.	*Selection?*		
3.	*Term of membership?*		
4.	*Meeting frequency?*		
5.	*Monthly inspections?*		
6.	*Recommendations?*		

14. WHMIS Are there written instructions that specify:			
		Yes	**No**
1.	Labeling requirements for supplier and workplace labels?		
2.	Worker training requirements?		
3.	Where MSDSs (Material Safety Data Sheets) will be located?		

Appendix B

Jobsite Checklists

Jobsite Document Checklist

Supervisor	Project	Date of Inspection

Are the following documents POSTED in the workplace?

Section #	Occupational Health and Safety Act	Yes	No	N/A
25 (2) (i)	OH&S Act, Construction Regulation, and any extracts			
57 (10)	Copy of MOL Inspector's orders or inspection reports			
33 (1)	Order from a Director			
9 (32)	Names and work location of committee members or health and safety representative			
25 (2) (j)	Occupational health and safety policy			
12 (2)	Annual summary of accidents			

Section #	Construction Regulation	Yes	No	N/A
13 (1) (b)	Constructor's head office information			
6 (5), (6), (7)	Notice of Project			

Section #	First Aid Requirements (Regulation 1101)	Yes	No	N/A
1 (1) (b) (i)	WSIB's poster known as Form 82			
(ii)	Certificate of valid first-aid attendant			
(iii)	Inspection card for first-aid kits			

Emergency Planning (Emergency Phone Numbers)	Yes	No	N/A
Fire Department			
Police Department			
Ambulance			
Hospital			
Walk-in Clinic			
Hydro			
Telephone Utility			
Gas Utility			
Water Department			
Poison Information Centre			
Head Office			
Ministry of Labour			

Location of nearest hospital (map)			
Site Planning Document (jobsite specific)			

Dangerous Areas (see Section 44 of Construction Regulation)	**Yes**	**No**	**N/A**
Warning signs			
Jobsite rules and procedures			

Jobsite Conditions Checklist

Firm name _____ **Project** _____

Supervisor _____ **Number of employees** _____

Inspector _____ **Date** _____

SITE ACCESS	OK	Substandard
Clean, level ground		
Adequate ramps		
Adequate stairs		
Adequate ladders		

PROTECTIVE EQUIPMENT	OK	Substandard
Hard hats worn		
Foot protection		
Eye & face protection: Worn		
Available		
Hearing protection available		
Respiratory protection: Worn		
Available		

GUARDRAILS, BARRICADES	OK	Substandard
Located where required		
Properly constructed		
Adequately secured		
Slab/roof openings guarded		

LADDERS	OK	Substandard
Secured		
Proper angle (extension)		
Proper size and type		
Safe, usable condition		
Properly used		
Proper hand rails and landings		
Non-slip bases		

HOUSEKEEPING	OK	Substandard
Clear walkways		
Clear work areas		
Clear access & landing		

FIRE PREVENTION	OK	Substandard
Extinguishers where required		
Fully charged extinguishers		
Adequately identified		
Master emergency site plan		

PUBLIC WAY PROTECTION	OK	Substandard
Properly located (within 4.5 m)		
Covered, where required		
Min. height, width requirement		
Proper rail on street side		
Proper lighting, where required		

FALL PROTECTION	OK	Substandard
Working from: Ladders		
Scaffolds		
Swing Stages		
Unprotected openings & edges		
CSA approved		
Properly worn		
Safe, usable condition		

STAIRWELLS AND RAMPS	OK	Substandard
Proper filler blocks in metal stairs		
Proper cleats on ramps		
Adequate lighting in stairwells		
Proper hand or guardrails		

SCAFFOLDS	OK	Substandard
Properly erected (all parts)		
Properly secured		
Properly planked		
Proper guardrails, toeboards		
Proper access to platform		
Acceptable loading		

POWER TOOLS & EQUIPMENT	OK	Substandard
General conditions		
Proper guards, cords, PPE		
Use of "Defective" tags		

EXTENSION CORDS	OK	Substandard
Outdoor type, rated over 300 volts		
General condition of casing, ends, and connections		

COMPRESSED GAS CYLINDERS	OK	Substandard
Properly located		
Properly secured		
Properly moved or lifted		

WORKER EDUCATION	OK	Substandard
WHMIS trained		
Company safety policy & program		
Injury reporting		
Hazard reporting		
OHSA and Regulations		
Personal H & S responsibilities		

FIRST AID REQUIREMENTS	OK	Substandard
Enough qualified first aiders on site		
First aid boxes: Adequate number		
Adequate contents		

TRAFFIC CONTROL	OK	Substandard
Trained traffic controllers		
Controller properly located		
Clean signs for regulating		
Properly dressed (including vest)		

COLLATERAL MATERIAL	OK	Substandard
OHSA & Regulations		
WSIB form 82		
WHMIS MSDSs		
Warning signs		

Emergency phone list		
Company safety policy		
MOL inspection reports		
Minutes of JHSC posted		
Name(s) of Rep/Committee posted		
Management/supervisor completed site inspection checklists		
H&S Rep/Committee-completed site inspection checklists		
Extracts from OHSA		

MATERIALS STORAGE	**OK**	**Substandard**
Properly located		
Safely piled, stacked, bundled		
Properly moved or lifted		
Properly labelled (WHMIS)		

TRENCHING & EXCAVATIONS	**OK**	**Substandard**
Properly angled, where req'd		
Excavated mat'l properly placed		
Appropriate shoring used		
Proper access and egress		
Proper storage of materials in and above trench		

HYGIENE	**OK**	**Substandard**
Cleanliness of facilities		

WELDING	**OK**	**Substandard**
Proper eye protection		
Cylinders upright and secure		

Fire extinguisher available		
Proper screens and exhaust		
Properly secured ground cables		
MSDSs readily available		
Rods & cylinders labeled (WHMIS)		

SUSPENDED SCAFFOLDS	**OK**	**Substandard**
Outrigger beam tied to fixed support		
Adequate counterweights		
All mechanical/electrical devices in good condition		
Independent lifelines (to ground) for each worker		
Engineer's drawings on site when required		
Properly attached & capable of at least 4X the maximum load		
Proper labels on beams		

WORKER EDUCATION	**OK**	**Substandard**
WHMIS-trained (site-specific)		
Oriented to company safety policy		
Duties & responsibilities of worker, H&S rep, & H&S committee		
Address injury/hazard reporting procedure		
OHSA and Regulations		
Emergency procedures		

CONFINED SPACES		
Proper access		
Entry permit system		

Rescue equipment on hand		
Safety harness & lifeline anchored		
Second person in attendance		
Air-testing before entry		
Continuous air monitoring		
CRANES, HOISTS, AND LIFTING DEVICES		
Competent operator		
Maintenance log & operator's manual		
Condition of wire rope slings and rigging hardware		
Safety clips on lifting hooks		
Tag lines used where req'd		
Safe condition, setup, operation of equipment		
Sufficient counterweights in place and secured		
Competent signaller where required		
Proper lifting containers		

ON-SITE TRAFFIC CONTROL	**OK**	**Substandard**
Proper dress (including vest)		
Trained backup signaller		
Posted speed limits		
Properly identified overhead powerlines		

WORK OVER AND AROUND WATER	**OK**	**Substandard**
Use of harness and lifeline where required		
Boat, life buoy, and line readily available		
Second person in attendance		
Proper wear/use of worker floatation devices		

Safety Audit Checklist

Supervisor	Project	Date of Inspection

	Basic Safety Activities	Yes	No	N/A
1.	OH & S Act posted and in good condition?			
2.	Safety orientation for all employees?			
3.	Regular safety meetings: Toolbox talks?			
	Joint health and safety committee?			
4.	Are subcontractors involved?			
5.	Training or instruction for: Supervisors?			
	Workers?			
6.	All equipment safety-checked before use?			
7.	Adequate safety promotion?			
8.	Company safety program communication: Reviewed?			
	Handed out?			
Comments:				

Module 5

Site Emergencies and Accident Investigations

Table of Contents

Module 5

Site Emergencies and Accident Investigations

A. Background and Introduction

A Health and Safety Program can dramatically reduce a company's losses from accidents and injuries. But it may not eliminate them entirely.

In spite of the best efforts of all parties in the areas of supervision, training, and inspection, unexpected problems may still occur on a jobsite. For this reason, supervisors need to know how to respond properly in an emergency. And they need to know how to prevent a similar emergency from happening again.

In an emergency, a proper response will help prevent the situation from getting worse and should isolate and secure the area to ensure that nothing is disturbed. A quick and appropriate response, together with an undisturbed accident scene, will greatly help the supervisor in making his or her subsequent investigation.

In an accident investigation, it's not really the injury or the damage that the supervisor should be investigating, as serious as these may be. After all, the injuries or damage are only the results, or *symptoms*, of the problem. What should really be taking place is a search for the underlying *causes* that made the accident happen in the first place. It is the problem itself, not the symptoms that need to be investigated.

If a supervisor does not look beyond the results of an accident to see *why* it happened, a similar accident may occur again. Then it's just a matter of time until a tragedy occurs.

B. Goal

The goal of the module is as follows:

> *Upon completion of this module, you will be able to list eight steps to take in the event of a site emergency, list four types of occurrences that require notification to the Ministry of Labour, and explain how to determine the underlying causes of accidents.*

C. Objectives

You will be required to meet several objectives to achieve the goal of this module.

Upon completion of Part One you will be able to:

1. *Name three types of emergencies that may occur on a construction site.*
2. *Identify the eight steps a supervisor should take in the event of a site emergency.*
3. *Name four types of occurrences that require notification to the MOL.*
4. *List the information that must be reported to the MOL in a Notice of Occurrence.*
5. *State and explain three requirements regarding the preserving of wreckage at an accident scene.*
6. *Locate in First Aid Requirements (Regulation 1101) and explain the first aid requirements for sites employing fewer than 20 people.*
7. *List the eight steps in an accident investigation process.*
8. *List two examples of immediate (direct) and underlying (indirect) causes of accidents.*

D. Site Emergencies

Site emergencies must be resolved quickly and efficiently. In many cases they must also be reported. This section discusses steps to follow in dealing with emergencies and discusses accident and incident notification and reporting requirements.

Activity

To put this Module into perspective and to start you thinking about the kinds of emergencies and accidents that can happen on construction sites, please turn to the Workbook and do Worksheet 1 for Module 5.

☐ Check

Activity

Please turn to the Workbook and do Worksheet 2 for Module 5.

☐ Check

1. Steps in dealing with site emergencies

When an accident happens, potential danger is not limited to those directly involved. When there is a gas leak or a fire for instance, other workers on site and the general public may also be threatened and an emergency situation has been created.

A supervisor's quick and efficient response to an emergency will help:

- Prevent the situation from getting worse.
- Protect workers and the public from further danger and injury.
- Provide first aid to injured workers.
- Protect material and equipment from further damage.
- Isolate and secure the area to ensure that nothing is disturbed.

When an emergency happens, you should do the following:

1. **Take command** (of the emergency site)
2. **Provide protection** (to all workers and the general public)
3. **Give first aid** (when required)
4. **Call an ambulance** (when required)
5. **Guide the ambulance** (to the accident site)
6. **Get the name of the hospital** (to which the injured will be taken)
7. **Advise management** (of the emergency)
8. **Isolate the accident scene** (to protect evidence of the cause of the emergency)

Details of what to do in each step and the reason(s) for the action taken are contained in the Table below.

EMERGENCY RESPONSE STEPS

Action	Reason for Action
1. Take command • Take charge of the situation. • Do not panic.	Reduces confusion and establishes control.
2. Provide protection Immediately assess seriousness of situation. First priority should be personal injury, followed by property damage. Questions to be answered immediately are: • Is anybody injured? • Can the present situation get worse? • How can damage be minimized?	Permits earliest possible corrective action.
Eliminate and contain hazards. • If necessary, remove non-essential personnel from danger area immediately. • Decide whether treatment of injured should wait until others in danger are warned and moved to safety.	Improves existing situation. Aftermath of an accident such as fire or gas leak may further endanger those already injured and threaten persons helping in the emergency or just watching. Attempts to save one life may cause injury or death to others.

3. Give first aid • Provide first aid as soon as safely possible.	Helps stabilize and improve conditions of injured persons.
4. Call an ambulance • Relay as much information as possible. • Give number of injured persons. • Describe nature and extent of injuries.	Allows medical personnel time to react to situation quickly and efficiently, thus giving injured persons better odds of survival.
5. Guide the ambulance • Have someone meet ambulance and guide it directly to accident scene. • Ensure clear access for the ambulance.	Construction sites can be confusing. Streets of new subdivisions may not yet have name signs installed. Guides save time and ensure rapid treatment for the injured.
6. Get the name of the hospital • Find out where injured persons are being taken.	Provides information for families, investigators and management.
7. Advise management • Inform senior management and MOL if necessary. • Handle the news media.	Meets regulatory requirement for notification when there has been a critical injury, when a worker has lost consciousness, or following any other situation as defined by legislation.
8. Isolate the accident scene • Keep crowds away from accident scene. • Direct them away to safe area.	Makes first aid easier to give and eases risk of crowd reaction. There are enough problems in an emergency without additional upset created by excited bystanders.

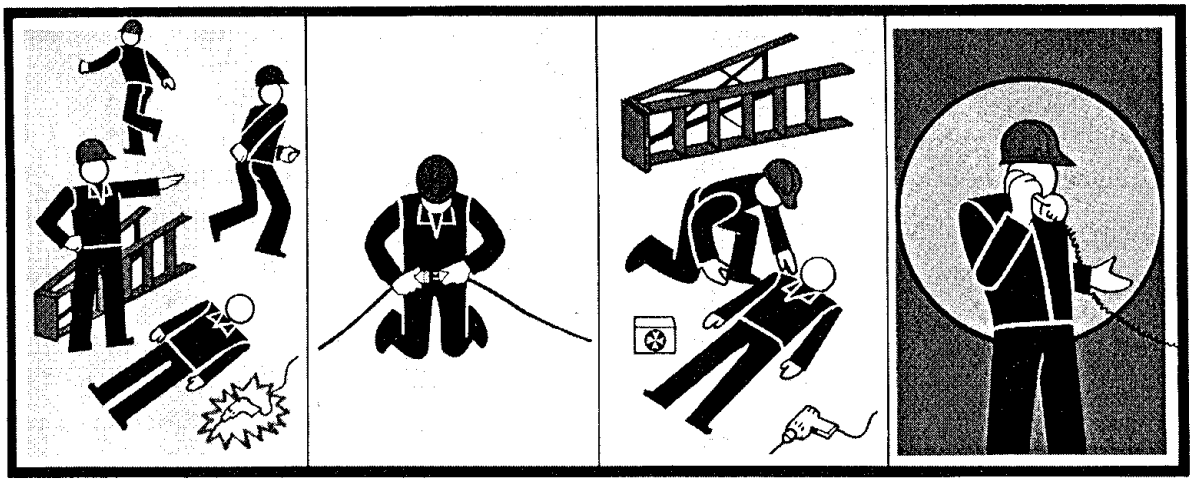
On the following page is a copy of "Emergency Procedures and Phone Numbers" (CSAO resource document P028). This sheet summarizes some of the above information on procedures and provides a format for storing emergency phone numbers.

Activity

Please turn to the Workbook and do Worksheet 3 for Module 5. Use "Emergency Response Planning for Construction Projects" (CSAO document B030) as a reference if necessary.

☐ Check

Emergency Procedures and Phone Numbers

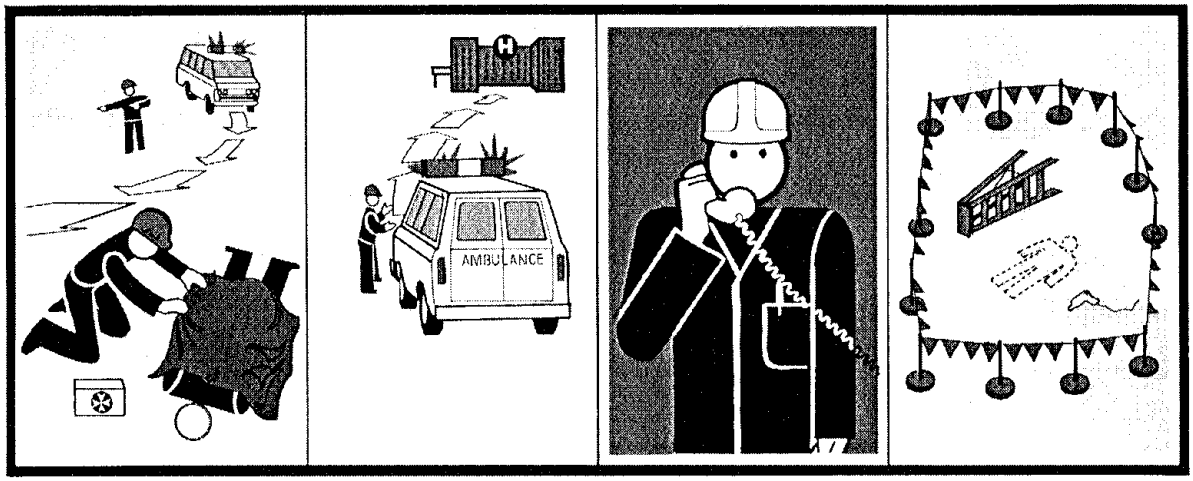


Take command. Assign the following duties to specific personnel.

Protect the accident scene from continuing or additional hazards.

Give first aid to the injured as soon as possible.

Call an ambulance.



Meet and direct the ambulance to the accident scene.

For follow-up, establish where the injured is being taken.

Inform senior management so that next-of-kin can be contacted, authorities notified and news media handled.

Isolate the accident scene for investigation.

Name	Phone Number	Name	Phone Number
Ambulance		Ministry of Labour	
Police		Gas	
Fire Department		Hydro	
Senior Management		Water	

2. Guide to Notice and Reporting Requirements

Legislation specifies that when a workplace accident or illness occurs, the employer (not the supervisor) has a legal duty to notify certain people. In small companies it may be clear who should do the notifying, since many responsibilities fall to the same person. But in large companies responsibilities are often spread over many levels. The employer is ultimately responsible for the notification; however, he or she may have delegated the job to a supervisor. To clarify for everyone just who is assigned the task of notification in the event of an accident, the details of specific responsibilities should be outlined in the company's health and safety program.

a. What must be reported

There are several categories of items that must be reported.

(i) Fatalities and critical injuries

If a person has been "critically injured" or killed on the job, the employer must immediately notify an *Inspector*, the *health and safety representative* or *Joint Health and Safety Committee*, and the *union*, if there is one. The notice must be by direct means, such as telephone, telegram or fax.

Within 48 hours, the employer must also notify, in writing, *a Director of the Ministry of Labour*, giving the circumstances of the occurrence and any information that may be prescribed (i.e., required) by Regulation.

(ii) Injuries causing lost time or requiring medical treatment

If an accident, explosion or fire occurs and a worker is disabled or requires medical attention, the employer must notify a D*irector of the Ministry of Labour*, the *health and safety representative* or *Joint Health and Safety Committee* and the *union*, if any, within four days of the accident.

This notice must be in writing and must contain any information prescribed by Regulation.

(iii) Occupational illnesses

In the case of an occupational illness, or when a claim for an occupational illness has been filed with the Workplace Safety and Insurance Board, the employer must notify a D*irector of the Ministry of Labour*, the *Health and Safety Representative or Joint Health and Safety Committee*, and the *union*, if any, within four days.

This notice must be in writing, and must contain any information prescribed by Regulation. The duty to notify applies not only to current employees but also to former ones.

(iv) Incidents prescribed by Regulation

Even if no one is hurt, written notice of an accident or unexpected event that *could* have caused an injury at a construction site or in a mine or mining plant is required from the constructor of the project or owner of the mine or mining plant.

This notice must be given to a *Director of the Ministry of Labour*, the *health and safety representative* or *Joint Health and Safety Committee* and the *union*, if any, within two days and must contain any information prescribed by Regulation.

(Note: the information contained in parts (a) to (d) of this section is summarized in Tables on the next two pages. See "Legal Requirements for Reporting Accidents or Incidents" and "Legal Requirements for Reporting Prescribed Incidents.")

LEGAL REQUIREMENTS FOR REPORTING ACCIDENTS OR INCIDENTS

Circumstances	How Soon	Reported By	Section(s)
Fatality or Critical Injury	• **Immediately**, by either telephone, telegram, fax, or any other direct means • Written report *within 48 hours* • Content: info. as outlined by Regs	• Constructor, if any, and employer • Written report by employer only	• OHSA **Section 51(1)** • *Critical Injury* defined in Reg. 714/82 • Reg. 213/91, **Section 8** *Note: OHSA refers to the Occupational Health and Safety Act* *Reg. 213/91 refers to the Regulation for Construction Projects*
Injuries causing lost time, or requiring medical treatment	• *Within 4 days* of the occurrence • In writing. • Content: info. as outlined by Regs.	• Employer (Copy of WSIB Form 7 is an acceptable report)	• OHSA **Section 52(1)** • Reg. 213/91 **Section 9(1)**
Occupational Illness (with *or* without a claim being filed by, or on behalf of, the worker)	• *Within 4 days* of being advised • In writing • Content: info. as outlined by Regs.	• Employer (Copy of WSIB Form 7 is an acceptable report)	• OHSA **Section 52(2)** • Reg. 213/91 **Section 9(2)**
• **Premature or unexpected explosion** • **Fire** • **Flood or inrush of water** • **Failure of any equipment, machine, device, article or thing** • **Cave-in** • **Subsidence** • **Rockburst, and** • **Prescribed incident (see next page)**	• *Within 2 days* of the occurrence • In writing • Content info. as outlined by Construction Regs.	• Constructor of the project	• OHSA **Section 53** • Reg. 213/91 **Section 11(1)** for *Prescribed* incidents • Reg. 213/91 **Section 11(2)** for content info.

LEGAL REQUIREMENTS FOR REPORTING PRESCRIBED INCIDENTS			
Circumstances	How Soon	Reported by	Section
A report must be provided when any of the following ***prescribed incidents*** occur at a project: • a worker falling a vertical distance of 3 metres or more • a worker whose fall is arrested by a fall-arrest system • a worker becoming unconscious for any reason • accidental contact by a worker or by a worker's tool or equipment with a live electrical conductor or live electrical equipment • contact by a backhoe, shovel, crane or similar lifting device or its load with an energized powerline rated at more than 750 volts • structural failure of all or part of falsework designed by, or required by Regulation 213/91 to be designed by, a professional engineer • structural failure of a principal supporting member, including a column, beam, wall or truss of a structure • failure of all or part of the structural supports of a scaffold • structural failure of all or part of an earth- or water-retaining structure, including a failure of the temporary or permanent supports for a shaft, tunnel, caisson, cofferdam or trench • failure of a wall of an excavation or of similar earthwork with respect to which a professional engineer has given a written opinion that the stability of the wall is such that no worker will be endangered by it • overturning or the structural failure of all or part of a crane or similar hoisting device	• *Within 2 days* of the occurrence • In writing	Constructor of the project	• OHSA **section 53** • Reg. 213/91, **section 11(1)** *Prescribed Incidents*

b. What the report must contain

The information that must be included in a report to the Ministry of Labour is prescribed (i.e., clearly stated and required) in the Regulation for Construction Projects (O.Reg 213/91.)

For each type of occurrence there is a corresponding section in the regulation.

(i) Fatalities and critical injuries

Critical injury and fatality reports are addressed in section 8 of the O.Reg 213/91.

The requirements are as follows:

- The name and address of the constructor and the employer, if the person involved is a worker
- The nature and the circumstances of the occurrence and the bodily injury sustained by the person
- A description of the machinery or equipment involved
- The time and place of the occurrence
- The name and address of the person involved
- The names and addresses of all witnesses to the occurrence
- The name and address of the physician or surgeon, if any, by whom the person was or is being attended for the injury, and
- The steps taken to prevent a recurrence.

(ii) Injuries causing lost time or requiring medical treatment

Reports regarding injuries causing lost time or requiring medical treatment are discussed in s. 8 (1) of the Regulation for Construction Projects. The reporting requirements are essentially the same as those listed above for critical injuries and fatalities.

(iii) Occupational illnesses

Occupational illnesses reports are considered in s. 9 (2) of the O.Reg 213/91. Again, the reporting requirements are essentially the same as those listed above for critical injuries and fatalities except that in this case the nature of the *occupational illness* must be reported.

(iv) Incidents prescribed by Regulation

Reports regarding prescribed incidents are dealt with in s. 11 (2) of the Construction Regulation. This regulation states that such a report must set out the circumstances of the occurrence and the steps taken to prevent a recurrence.

c. A final word on notice and reporting requirements

As you noticed above, all reports to the Ministry of Labour following a critical injury, death, lost-time injury, medical-aid injury or occupational illness must contain information relating to "*the steps taken to prevent a recurrence.*"

These "steps" will usually take the form of "recommendations" for future activity on the worksite. The recommendations are determined by conducting a thorough investigation of the accident and by providing specific answers to general questions often worded as follows:

- How can such an accident be prevented from happening again?
- What specific actions can be taken to prevent a recurrence?
- How can a similar accident be prevented in the future?

Activity

Please turn to the Workbook and do Worksheet 4 for Module 5. Use the *Occupational Health and Safety Act* and the First Aid Requirements (Regulation 1101) as references.

☐ Check

E. Accident Investigations

As a supervisor, sooner or later you will be required to conduct an accident investigation. This section of the Module deals with several subjects related to such investigations. It discusses:

- Why investigations are done.
- Steps to follow in conducting investigations.
- Supervisors' rights and duties regarding investigations.
- Determining causes of accidents or incidents.
- Preventing the recurrence of accidents or incidents.

1. Purposes of an Investigation

One purpose of an investigation is to meet the legal obligations regarding accident and incident reporting. But the prime objective of accident investigation is prevention—finding out what caused the accident or incident so that similar occurrences can be prevented from happening again.

The primary goal is therefore to gather information for the future, not to assign blame for what has already happened.

Investigations also help measure the effectiveness of a company's Health and Safety Program. An examination of actual events can reveal hazards not discovered through inspections; comparisons across time can reveal trends that might otherwise be missed.

2. Protecting Life and Preserving Evidence

When an incident or accident occurs, your first step as supervisor is to take control of the situation. You need to ensure that:

- No further injury or damage occurs.
- Injured persons are properly cared for.
- Physical evidence related to the event is not disturbed before you and/or Ministry of Labour Inspectors can examine it.

These requirements (along with the necessity of maintaining an essential public utility service or a public transportation system) are addressed in section 52 (1) of the Act which states:

> **51** (2).....Where a person is killed or is critically injured at a workplace, no person shall, except for the purpose of,
>
> (a) saving life or relieving human suffering;
> (b) maintaining an essential public utility service or a public transportation system; or,
> (c) preventing unnecessary damage to equipment or other property,
>
> interfere with, disturb, destroy, alter or carry away any wreckage, article or thing at the scene of or connected with the occurrence until permission so to do has been given by an inspector.

So you must act quickly to help the injured, to secure or cordon off the area, and to preserve any evidence. Also you must make sure that all immediate hazards have been removed and/or that conditions have been stabilized. This must be done to ensure that workers (or bystanders) will not be endangered by the conditions that caused the accident or incident.

3. The Investigative Process

Investigating an accident or incident involves much more than filling out a report form. It means going through a process of *gathering information* and *drawing conclusions*. The report form is only the documentation that summarizes this full process.

The investigative process includes *eight* steps (see next page.) But please note that the numbers associated with the steps do not indicate a rigid sequence that must be followed in a specific order. Often activities from several different steps will be going on at the same time.

Steps in the Investigation Process

1. Secure the Scene

Once the injured have been attended to and the threat of further damage is removed, control the crowd and isolate the accident scene. *Physically* isolate the scene by locking it up or fencing it in. Only move and/or remove what is absolutely necessary.

2. Identify Witnesses

Immediately make a list of everyone who was in the area at the time of the accident, or just before or just after it happened.

3. Survey the Scene

Make a record of the physical condition of the scene using a measuring tape, camera, sketches and notes. Try to imagine how the accident could have occurred. Consider weather conditions, the work site, accident surroundings, materials, tools, and equipment.

4. Gather Evidence

Evidence is of two kinds – physical objects and verbal testimony. The key to collecting evidence is to be thorough and inquisitive. Where possible, gather evidence as witnesses are interviewed.

5. Interview Witnesses

Conduct interviews as soon as possible after the accident, if possible at the accident site, but in private. Reassure witnesses that the purpose of your investigation is fact-finding, not fault-finding. Let each witness tell the story twice. The second time take notes.

6. Analyze the Facts

Accidents often indicate hidden problems or deficiencies. Your investigation needs to identify not only what happened, but also what caused it to happen. At this stage it is important for you to separate facts from opinions and/or guesses.

7. Prepare a Report

The final report is intended to help people learn from the accident or incident. To be effective, corrective action should be specific and must be applied to *underlying (indirect) causes* as well as to the *immediate cause.*

8. Follow Up

Circulate the results of the investigation to all company sites so that others can learn from your experience.

4. The Right and Duty to Investigate

The *Occupational Health and Safety Act* uses the word "investigate" very selectively. Where it does appear, it clearly indicates situations where someone **may** or **must** investigate.

a. Who has a ***right*** to investigate (i.e., who ***may*** investigate)?

The health and safety representative or a member of the Joint Health and Safety Committee **may** investigate a fatal accident or critical injury. If they choose to investigate, they must then file a report with the MOL, and the Joint Health and Safety Committee, if applicable.

b. Who has a ***duty*** to investigate (i.e., who ***must*** investigate)?

The *Occupational Health and Safety Act* does not specify a *duty* to investigate an accident or incident. The only circumstances described in the legislation where an employer or supervisor *must* investigate are *work refusals* and *dangerous circumstances.*

It should be noted, however, that section 8 (h) of the Regulation for Construction Projects does state that:

> *"A written report under subsection 51(1) of the Act respecting an occurrence in which a person is killed or critically injured shall set out, ... the steps taken to prevent recurrence."*

An *accident investigation* is the preferred method for doing exactly that, i.e., for determining what steps should be taken to prevent a recurrence.

Who Has a *Right* to Investigate? (i.e., "*may* investigate")

CIRCUMSTANCE	WHOSE RIGHT	REPORT TO	SECTION
Fatality or Critical Injury	• *Health & Safety Representative,* *or* • *Member of the JHSC, if there is one, at the site*	• Health & Safety Representative reports to MOL • JHSC member reports to Ministry of Labour and to the committee	• OHSA ***Section 8(14)** for H&S Rep. • OHSA ***Section 9(31)** for JHSC member

5. Causes of Accidents and Incidents

In an investigation many people tend to focus on the *immediate cause* of an accident or incident. But in order to prevent a recurrence, it is also important to identify the *underlying cause(s)* of what happened. As an investigator, you must determine what underlying factors set up the circumstances that led to the end result.

It may be tempting to pin the accident on something a worker did or did not do, and let it go at that. But there is rarely, if ever, a single cause behind an accident or incident. Even the simplest situation often comes about because of a combination of factors.

For example, "The employee did not wear eye protection and sustained an eye injury." If we stop at identifying an unsafe act as the cause and say that the employee should have known better, then the investigation will be finished in a couple of minutes. However, if the underlying causes were examined, we might find that *work standards* within the operation were less than adequate. We might also find that *purchasing*, *maintenance*, and *compliance standards* were unsatisfactory.

When mishaps occur, they are often symptoms of serious problems or deficiencies that downgrade work performance and production on the job. An investigation presents an opportunity to look at the entire work management system closely so that deficiencies can be revealed. The results of the investigation can lead to major changes in the way the work is done. This means that the benefits of an investigation may go far beyond simply correcting the *immediate* causes of one particular accident.

a. Immediate causes

The *immediate cause* is the unsafe act or condition that contributed to the accident. Some examples of immediate causes are:

- Poor housekeeping.
- Unsafe or defective equipment.
- Improper use of tools or equipment.
- Improvising (i.e., committing an unsafe act).
- Failing to follow prescribed procedures.
- Not understanding the job.
- Not being aware of hazards involved in the job.
- Deliberately failing to use protective equipment.

b. Underlying causes

Underlying causes are the reasons why immediate causes exist. What are the underlying factors that set up the unsafe act or condition? The factors might be personal or they might be job-related. Some examples are:

Job Factors

- Inadequate work standards.
- Poor project design.
- Poor maintenance.
- Abuse or misuse of tools and equipment.
- Inadequate inspection.

Personal factors

- Lack of skill or knowledge.
- Improper motivation.
- Improper planning.
- Physical or mental problems.
- Willful deviation from standards

c. Reasons for activities being out of control

When accidents happen some may say that control of the job or situation was lost and that this allowed the accident to happen. What are some of the reasons why control can be lost and activities can go uncontrolled? The following are some of the more common reasons.

- Standards are not known, not established, not communicated, or not enforced.
- Procedures are less than adequate.
- Ensuring compliance with the health and safety program or with safety legislation is inconsistently carried out.
- Enforcement of established procedures is insufficient.
- There is no worker orientation procedure.
- There is no equipment maintenance program.
- Purchasing or planning is inadequate.
- Worker training is inadequate.

d. Classification of causes

Causes of accidents and/or incidents can usually be related to five areas:

- People.
- Equipment.
- Materials.
- Environment.
- Process.

As a simple guide to determining causes, ask yourself the following series of questions along with a "why" or "why not" for each one. Of course, the questions listed below are not the only ones that you could ask and others might be appropriate in certain instances. Just let circumstances at the time of the investigation be your best guide to what questions need to be asked. (See below for questions relating to people, equipment, materials, environment and process.)

People

1. Were workers experienced in what they were doing?
2. Had they been adequately trained?
3. Were they physically capable?
4. What was the status of their health?
5. Were they tired?
6. Were they under personal/work stress?
7. Was adequate supervision given?
8. Were safety rules in effect?
9. If so, were they being enforced?

Equipment

1. Was there an equipment failure?
2. If so, what caused the equipment to fail?
3. Was the machinery poorly designed?
4. Was personal protective equipment called for?
5. If so, was it used?
6. Were appropriate tools and equipment available?
7. If so, were they used?

Materials

1. Were hazardous substances involved?
2. If so, were they clearly identified?
3. Was a less hazardous alternative substance available?
4. Were appropriate materials available?
5. If so, were they used?
6. Was the raw material(s) substandard in some way?

Environment

1. What were the weather conditions?
2. Was it too hot or too cold?
3. Was poor housekeeping a problem?
4. Was noise a problem?
5. Was there adequate light?
6. Were toxic gases, dusts, or fumes present?

Process

1. Was a safe work procedure being used?
2. Were regular safety inspections carried out?
3. Had conditions changed to make normal procedure(s) unsafe?
4. Were safety devices working properly?
5. Were lockout and/or tagging procedures used when necessary?
6. Had hazards been previously identified?
7. If so, had procedures been developed to overcome them?
8. Were unsafe conditions corrected?
9. Was regular maintenance of equipment carried out?

6. Preventing Recurrences

Corrective action should be recommended for each cause you identify. Whether the cause is a contributing cause or the immediate cause, the action you recommend should be practical, appropriate and specific. Below are examples of some of the kinds of recommendations which, when applied, could eliminate or help control causes of accidents or incidents.

1. Institute a formal training program.
2. Institute a mandatory personal protective equipment program.
3. Institute a proper job instruction program.
4. Institute or improve an inspection program.
5. Institute a "pre-use checkout of equipment" program.
6. Institute or improve a clean-up program.
7. Establish purchasing standards or controls.
8. Establish or revise the worker orientation program.
9. Establish design requirements for new equipment.
10. Provide personal re-training.
11. Temporarily or permanently reassign person(s).
12. Repair or replace equipment.
13. Eliminate unnecessary material(s) in the workplace.
14. Use a safer material.
15. Improve equipment or its design.
16. Improve or establish basic design standards.
17. Improve or install safeguards.

Remember, corrective action must be applied to *underlying causes* as well as to *the immediate cause*, and must be very specific. Your recommendations are not just another part of a report form to fill out. As supervisor, your knowledge of the work site and the crew gives you a perspective that no one else in the company may have. That perspective is crucial in making the best possible decisions to prevent recurrences.

Activity

Please turn to the Workbook and do Worksheet 4 for Module 5.

☐ Check

7. A Final Word About Investigations

An accident or a "near miss" is not something that just happens out of the blue. It is a signal that something is out of order with conditions on your worksite or with what your employees are doing. An investigation is necessary to find out what that "something" is.

As stated at the beginning of this Module, the goal of an investigation is not to find someone to blame for what happened. The goal is to conduct a thorough examination that will tell you not only *what* happened in a particular case, but also *how* and *why* it happened the way it did. The investigation should be a complete examination that will provide you with information you would not get just by doing a simple inspection.

An investigation is not just a reaction to a specific incident. It plays a much broader role as part of an overall Health and Safety Program. By providing information about what happens on the worksite, investigations can help you improve the quality of your training and the effectiveness of your supervision.

It is your responsibility as supervisor to see that work gets done on time, which means without delays due to incidents and accidents. Meeting this goal requires you to remain constantly aware of safety issues and do everything reasonably possible to maintain high safety standards throughout your site. Investigations will be a part of that effort—an important part when they lead to sound improvements that are maintained over the long term.

Module 6

Construction Injuries and Fatalities

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Module 6
Construction Injuries and Fatalities

A. Background and Introduction

As the other five modules of this Program have demonstrated, the role of the construction supervisor can be viewed from a number of different points of view. What the other modules have in common, however, is the primary responsibility of the supervisor to do everything possible to eliminate accidents, injuries, and fatalities.

With this in mind, it is useful to learn what various statistical databases have to say about injuries and fatalities in Ontario construction. Statistics kept by the Ministry of Labour (MOL), the Workplace Safety and Insurance Board (WSIB), and the Construction Safety Association of Ontario (CSAO), for example, provide many insights into who is being injured on construction sites, how often, and under what circumstances.

This module draws on statistics to illustrate the recurring problems in construction injuries and fatalities. The module also includes a look at how company size and lost-time injury rates are related.

B. Goal

The goal of the module is as follows:

> *Upon completion of this module, you will be able to identify the recurring problems that lead to injuries and fatalities, and explain the relationship between firm size and injury frequency.*

C. Objectives

You will be required to meet several objectives to achieve the goal of this module.

Upon completion of Part One you will be able to:

1. *List four recurring fatality problems in construction.*
2. *Name three common activities related to lost-time injuries in construction.*
3. *Describe the relationship between size of company and lost-time injury rate.*

D. Fatalities

Fatal accidents happen all across the construction industry. They occur on all kinds of projects, ranging from large petrochemical and industrial projects to minor repair and maintenance tasks on single-family residences. They have occurred with large employers and small employers and have affected every trade. Due to limitations in the data, it is difficult to determine relative risks for different occupations or types of projects. It is possible, however, to identify problems which have resulted in fatalities and which continue to present serious risks to construction workers.

The major recurrent fatality problems in construction in Ontario are:

1. Falls from heights
2. Electrocution/contact with power lines
3. Struck by or caught between objects or equipment (excluding reversing vehicles)
4. Reversing vehicles
5. Trench or excavation wall collapse

The remaining fatalities in any given year are widely distributed and inconsistent from year to year. These include such events as fire and explosion, compensable motor vehicle accidents, asphyxiation (i.e., suffocation) in confined spaces, and so on. The percentage of these causes of fatalities is presented in Table 1 below.

Table 1: Distribution of Fatal Accidents in Construction

Classification	Ontario *
Fall to different elevation	40 %
Struck by	10 %
Electrical contact	15 %
Reversing vehicles	8 %
Trench cave-in	6 %
Caught between	10 %
Other	11%

* based on analysis of 146 fatalities for 1988-92

Activity

Please turn to Appendix A, Figure 1 to see data on the "Distribution of Fatal Accidents in Construction" presented in graphical form.

☐ Check

1. Falls from heights

Falls from heights account for most (some 40%) of the fatal accidents in construction (see Table 1 above). This is true not only for Ontario, but for the U.S. as well.

In a detailed review of 63 fatal falls occurring in Ontario's construction industry, 53 (84%) happened in situations where there was an obvious fall hazard (e.g. working on partially completed structures or on suspended work platforms). Furthermore, *the fatalities could have been prevented if personal fall protection (safety harnesses or belts) had been in use.*

In many of the cases, safety harnesses *were* readily available on site but were either not in use or not being used properly at the time of the accident. Only one case involved the failure of a fall-arrest system. In that case an unsecured hoisting line (identical to lifelines in use on the project) was inadvertently used as a lifeline.

Eight other fatal falls (13 %) were the result of falling through unguarded or poorly guarded floor openings where personal fall protection would not normally have been required or worn.

Often, the opening in the floor was covered by an unsecured piece of plywood or other material. The fatality occurred when the covering was dislodged accidentally, or where the victim picked up the sheet of material to use for some other purpose and, not knowing that there was an opening beneath the sheet, stepped directly into the hole.

Table 2 below shows the distribution of working surfaces involved in fatal falls for the period 1989-92 in Ontario's construction industry.

Table 2 - Distribution of Working Surface for Fatal Falls in Construction

Working Surface	Ontario (1989-1992) (Number of fatals= 63*)
Skeletal structure*	25
Unfinished floor	24
Roof	18
Suspended scaffold	13
Scaffold	11
Ladder	6
Other	3

*Skeletal structure includes structural steel/precast concrete structural framework, roof trusses, transmission towers/antennae and similar open structures.

Activity

Please turn to Appendix A, Figure 2 to see data on the "Distribution of Working Surface for Fatal Falls in Construction" presented in graphical form.

☐ Check

2. Struck by or caught between objects or equipment

As with other types of fatal accidents, no particular type of project, occupation or activity appears to predominate in "struck by" accidents.

Data from 64 fatal accidents of this type occurring during 1983-92 showed that in 37 cases (58%), the victim was directly engaged in moving the material, tool or equipment involved in the activity. *Unexpected movement, an error in judgement concerning the amount of effort required to move an object*, or *equipment failure* were the common factors seen as contributing factors in these accidents.

Activity

Please turn to Appendix A, Figure 3 to see data on "Fatalities: Struck by Object or Caught Between Objects" presented in graphical form.

☐ Check

3. Electrocution or powerline contacts

Deaths from electrocution or powerline contacts include fatalities resulting from accidental contact with overhead powerlines and working directly on "live" electrical apparatus and using defective or ungrounded electrical tools.

One of the most common situations in which this type of fatality takes place is where a worker moves a conductive item such as an aluminum ladder, crane boom or scaffold and unexpectedly makes contact with an energized overhead powerline. In the 44 fatalities occurring in Ontario for the period 1983-92, 27 (approximately 60%) were the result of powerline contact. Fourteen cases (approximately 30%) were the result of work on energized (live) electrical systems and 3 cases (approximately 10%) were related to defective or improperly grounded portable electrical tools.

Activity

Please turn to Appendix A, Figure 4 to see data on "Electrocution Fatalities" presented in graphical form.

☐ Check

4. Reversing vehicles

Vehicles and equipment operating in reverse are a common hazard on many construction projects. Unfortunately, they frequently lead to fatalities. Reversing vehicle accidents are usually due to one or both of two things:

- site congestion and/or
- "blind spots" around a vehicle where the driver has no clear view of the intended path of travel.

While several different types of vehicles and mobile equipment have been involved in reversing vehicle fatalities, dump trucks are most commonly involved. Table 3 below shows the distribution of vehicle/equipment types involved in 22 fatal accidents of this type that occurred in Ontario during the period 1981-90.

Table 3 - Type of Vehicle/Equipment involved in Reversing Vehicle Fatalities

Vehicle/Equipment Type	Percentage of Total (Number of fatals = 22)
Dump truck	68
Other truck	9
Bulldozer	9
Scraper	5
Tractor/loader/backhoe	5
Pavement grinder	5

Activity

Please turn to Appendix A, Figure 5 to see data on "Reversing Vehicle Fatalities" presented in graphical form. (Note: every type of vehicle other than dump trucks is presented as one statistic labeled "Other.")

☐ Check

Table 4 shows the types of projects involved where the reversing vehicle fatalities occurred.

Table 4 - Type of Project - Reversing Vehicle Fatalities

Type of Project	Percentage of Total (Number of fatals= 22)
Road	65
Parking lot	5
Building excavation	5
Sewer/watermain	5
Airport runway	5
Hospital	5
Low-rise residential	5
Commercial building	5

5. Trench or excavation wall collapse/cave-in

Unshored or improperly supported or sloped trenches and excavations continue to present a serious risk of fatal injury in construction. Excavations in unstable soils that are loose, overly wet, or in some cases overly dry, are dangerous and require support systems or proper sloping to prevent collapse. Trench boxes or liners can be used in situations where sloping or shoring is not feasible.

Tremendous forces are generated by collapsing soil walls due to the weight of the soil (over 2700 pounds of weight per cubic yard), making survival unlikely if a worker is trapped or buried. Even relatively shallow trenches, for example, those less than 6 or 7 feet (1.8 or 2.2 metres) in depth, have collapsed, burying workers in them. In some cases, changing environmental conditions, such as recent rainfall or sudden thawing, can alter the stability of soils and increase the risk of cave-in.

Table 5 shows the depths of trenches involved in 239 trenching fatalities in the U.S. during the period 1985-89.

Table 5 - Analysis of Trench Depth

Trench Depth	Percentage of Total (Number of fatals = 239)
5 ft - 9 ft (1.5 metres – 2.7 metres)	38
10 ft - 14 ft (3 metres – 4.3 metres)	41
15 ft - 20 ft (4.5 metres – 6 metres)	16
deeper than 20 ft (6 metres)	5

Activity

Please turn to Appendix A, Figure 6 to see rounded-off data on "Trench Cave-in Fatalities" presented in graphical form.

☐ Check

E. Injuries

Fatalities are not the only safety concern in construction. Injuries happen far more frequently and take their toll in terms of pain and suffering to the individual and lost time to the company.

One interesting relationship that has been discovered in studying injury data is that there is an association between the frequency of lost-time injuries (LTIs) and the size of the firms in which the injuries occur.

1. LTI frequencies

Research conducted by CSAO clearly shows that in Ontario construction large firms have a consistently lower frequency of lost-time injuries (LTIs) than do smaller firms. This trend is evident over several years and appears to be unaffected by changing employment patterns in the industry.

a. Workplace Safety and Insurance Board data

CSAO bases its findings on non-fatal LTIs accepted by the Workplace Safety and Insurance Board (WSIB) for the years 1988–1993. (Figures for small firms registered in one or more construction rate classifications are included.) Drawn from the WSIB's experience rating data files, the information covers firm size, payroll, injury counts, and costs for compensation (wage replacement), medical aid, and pensions.

b. Relationship between firm size and number of LTIs

Interestingly, the very largest firms—those employing more than 100 workers—carry out **18.7%** of the work in Ontario construction, yet are responsible for only **13.5%** of the LTIs. At the other end of the spectrum, contractors employing the equivalent of one worker or less (i.e., fewer than 2000 hours worked per year) perform **5.1%** of the work in Ontario construction, but are responsible for **8.9%** of the LTIs. Table 6 shows the numbers mentioned above and reveals the relationship between firm size, injury rate and other factors.

Table 6 — Ontario Construction 1988–1993

Firm Size	Average number of active firms	Percentage of total active firms	Percentage of average hours worked/year	Percentage of total LTIs	Average injury rate[a]
> 100 workers[b]	164	0.4	**18.7**	**13.5**	25.87
51–100workers	275	0.7	11.2	8.7	27.85
26–50 workers	548	1.3	13.4	11.8	31.63
16–25 workers	886	2.1	10.0	10.1	36.04
8–15 workers	2,503	6.0	14.9	15.5	37.23
4–7 workers	5,326	12.9	14.3	15.8	39.49
1–3 workers	11,986	29.0	12.4	15.8	45.62
< 1 worker	19,696	47.6	**5.1**	**8.9**	62.51
All Construction	41,384	100.0	100.0	100.0	35.84

[a] Injury rate = number of lost-time injuries per million hours worked.

[b] Full time equivalent worker based on 2000 hours/worker/year calculated from reported payroll.

Data source = Workplace Safety and Insurance Board of Ontario CAD-7 Data System

When we calculate the annual rate of injuries per million hours worked for each firm size over the period 1988–95, the results show the same consistent relationship between firm size and injury frequency. As the firm size gets smaller the number of injuries per million hours worked goes up. For example, in 1995 the number of injuries per million hours worked for firms with 100 or more workers was **10.76** whereas the number of injuries per million hours worked for firms with 1 or less workers was **41.10** (see Table 7 below).

Table 7 — Injuries per Million Hours Worked

Firm Size	1988	1989	1990	1991	1992	1993	1994	1995
> 100 workers[a]	34.03	31.33	27.25	22.17	16.44	11.86	11.43	**10.76**
51–100 workers	35.28	34.55	28.69	24.99	19.34	14.40	12.81	10.81
26–50 workers	41.47	36.85	33.34	28.40	23.74	17.57	15.98	15.40
16–25 workers	46.93	40.08	39.16	31.12	25.71	21.88	23.00	19.02
8–15 workers	46.09	41.41	40.45	34.09	27.62	26.63	26.30	18.73
4–7 workers	47.27	43.13	40.71	36.71	34.35	29.90	29.90	26.60
1–3 workers	53.56	48.02	47.03	43.09	40.77	36.07	33.30	29.70
< 1 worker	68.70	64.20	67.84	70.06	59.32	47.90	42.05	**41.10**

[a]Worker = 2000 hours per year based on Workplace Safety and Insurance Board calculations from reported payroll

Tables 1 and 2 clearly show that as firm size increases, injury frequency decreases. Looking at the data above, would you say that this trend was consistent through both the boom period in the late 1980s and the period of recession in the early 1990s?

c. Change in injury rate over time

Injury *rates* for all sizes of firm declined over the period 1988–1993. In fact, the injury rate for all of Ontario construction was reduced by 44% during this period. This reflected a reduction in both the number of injuries and the volume of construction activity. The only group that showed an increase consisted of the very smallest employers—those employing the equivalent of less than one full-time worker.

But not only do large firms have a lower injury rate than small firms, they are also able to reduce their injury *rates* faster than small firms. Over the time period 1988-1993 firms employing 100 or more workers showed a percentage change in injury rate of **-73.3%**. The percentage change in injury rate in firms employing 1 or fewer employees only decreased by **30.0%** (see Table 8).

Table 8 — Rate of Change in Injury Rate

Firm Size	1988 LTI injury rate[b]	1993 LTI injury rate	Percentage change in injury rate 1988-1993	Annual average rate of change (LTIs/million h)	Annual average rate of change-percentage
> 100 workers[b]	34	12.5	**-73.3**	-3.6	-12.2
51–100workers	35.5	14.2	-60.0	-3.6	-10.0
26–50 workers	41.5	17.5	-58.2	-4.0	-9.6
16–25 workers	46	21.6	-53.1	-4.1	-8.8
8–15 workers	46.5	26.5	-43.0	-3.3	-7.2
4–7 workers	47.2	29.8	-26.9	-2.9	-4.5
1–3 workers	54.2	36	-33.6	-3.0	-5.6
< worker	68.5	48	**-30.0**	-3.4	-5.0

[a] Injury rate = number of lost time injuries per million hours worked.

[b] Full time equivalent worker based on 2000 hours/worker/year calculated from reported payroll.

Data source = Workplace Safety and Insurance Board of Ontario CAD-7 Data System

d. Reasons for differences in health and safety performance

Several reasons may explain why large firms demonstrate a better safety performance than small firms. Generally, large firms have:

- Better planning and organization
- In-house health and safety expertise or resources
- Access to and/or use of external support services related to health and safety
- More frequent government inspection
- Better training
- Greater awareness of health and safety issues.

e. Improving construction's health and safety performance

Whatever the reasons, these findings suggest that efforts made to improve health and safety should be targeted at small- to medium-sized companies since the larger firms are doing comparatively well. Such efforts could include:

- Improving job training (including providing new worker orientation)
- Providing health and safety information
- Developing regulations to address this issue
- Increasing the number of inspections of small projects
- Enforcing the Act and the Regulations more consistently on sites where small firms are working
- Improving the access of small firms to shared occupational health and safety resources.

(Note: Regarding the latter point, CSAO provides consultation and training for smaller companies and has developed and distributed a publication entitled "Safety for the Small Contractor.")

Again, if accident prevention is to significantly change the health and safety performance of the construction industry *as a whole*, a large part of the effort to improve health and safety must be made by supervisors in small firms. It is among the smaller firms that the greatest health and safety gains are to be made.

Appendix A
Fatality Statistics

Figure 1

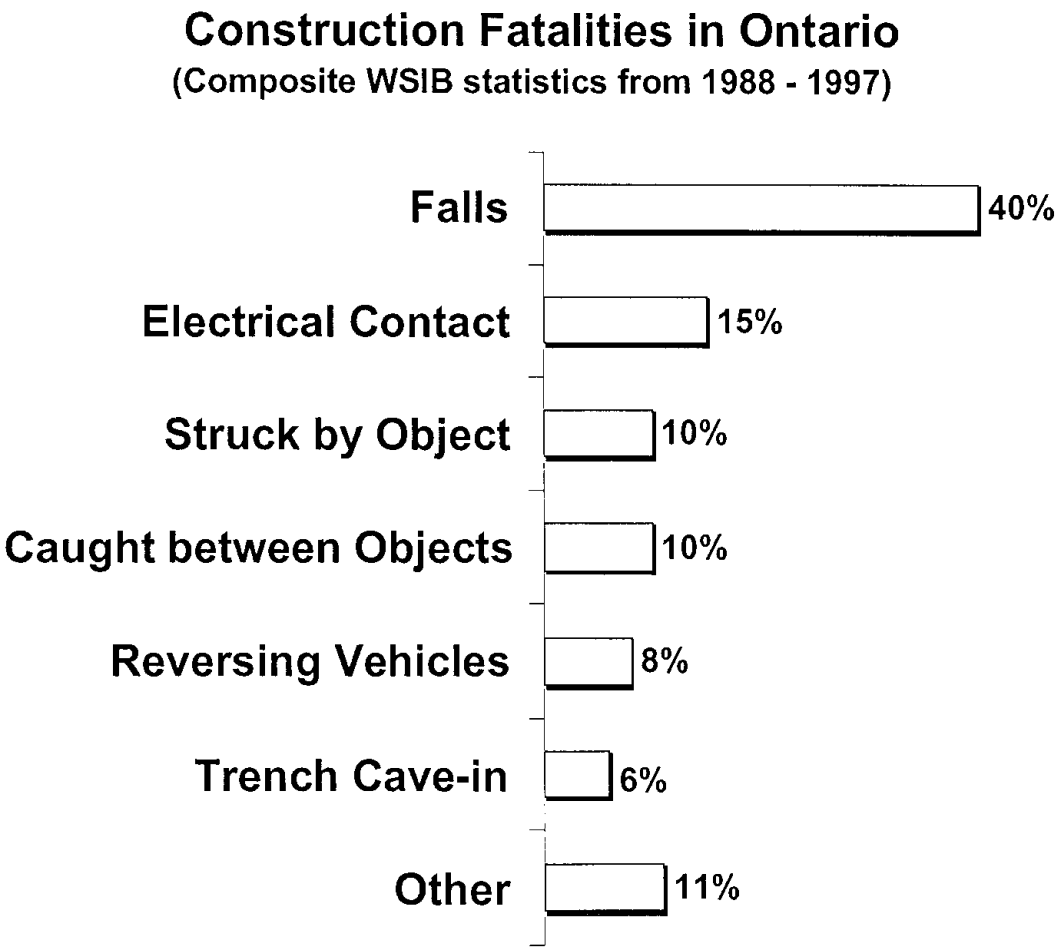

Construction Fatalities in Ontario
(Composite WSIB statistics from 1988 - 1997)
Falls
40%
Electrical Contact
15%
Struck by Object
10%
Caught between Objects
10%
Reversing Vehicles
8%
Trench Cave-in
6%
Other
11%

Figure 2

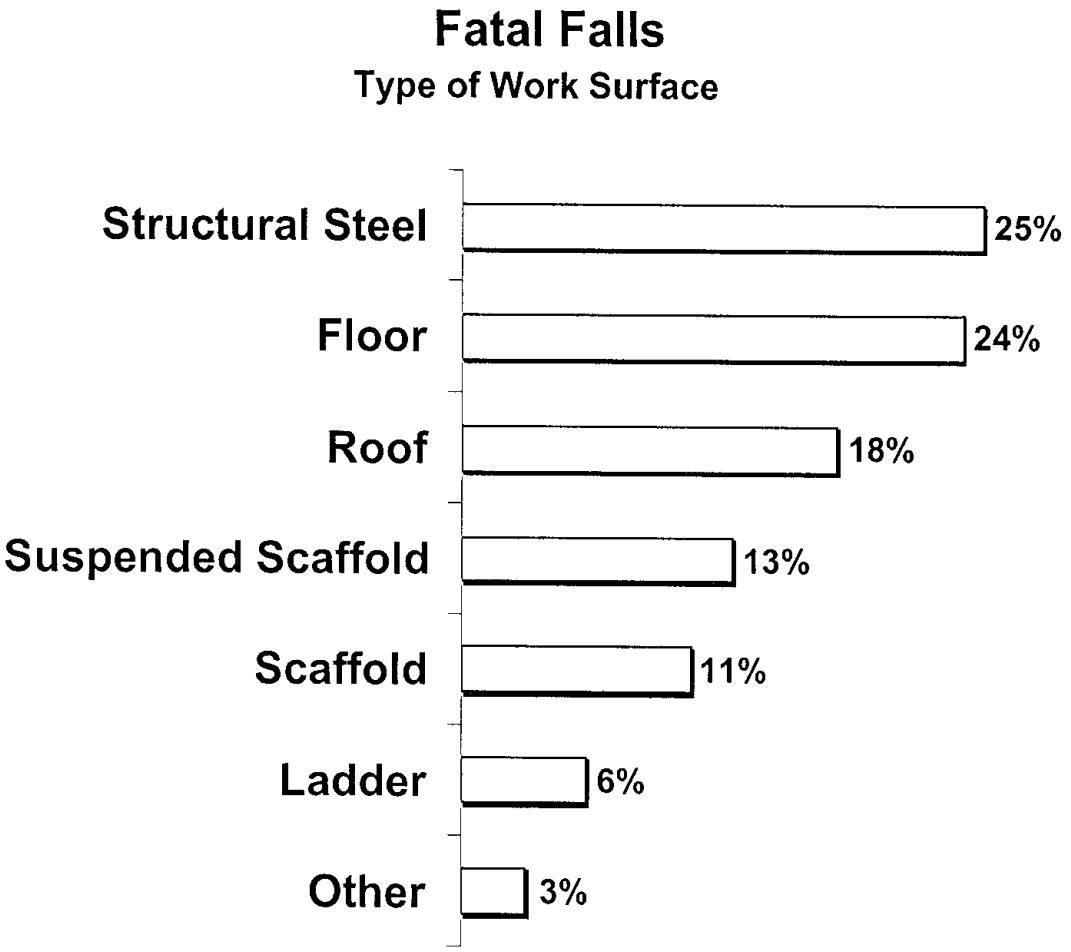

Fatal Falls
Type of Work Surface
Structural Steel
25%
Floor
24%
Roof
18%
Suspended Scaffold
13%
Scaffold
11%
Ladder
6%
Other
3%

Figure 3

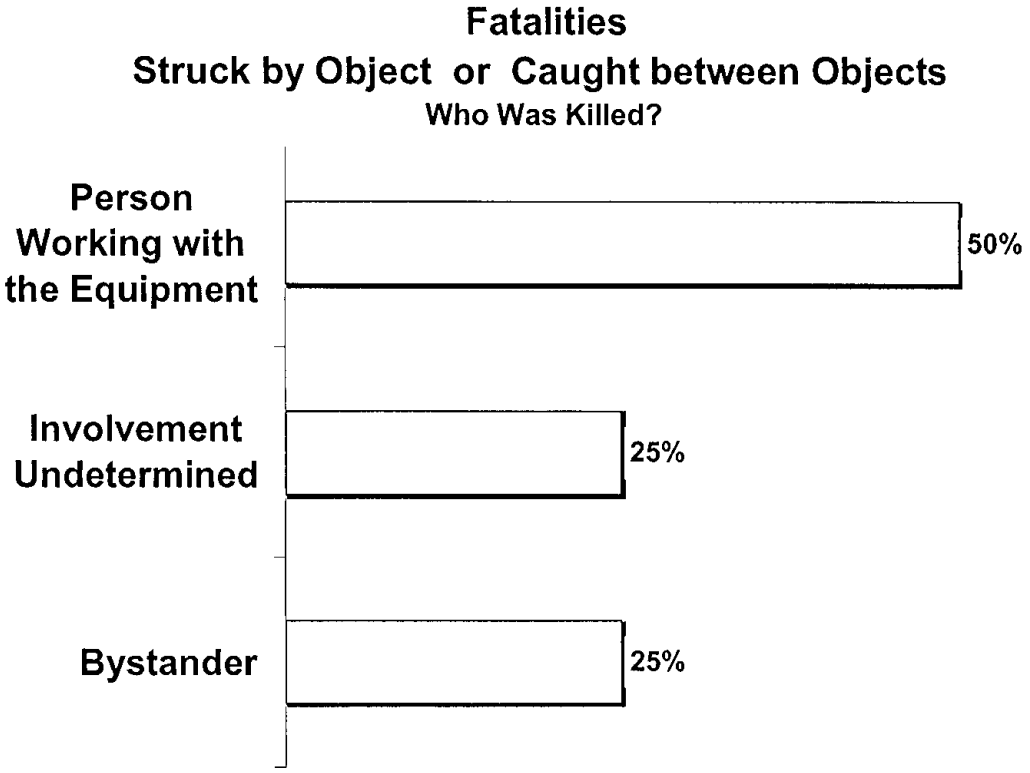

Fatalities
Struck by Object or Caught between Objects
Who Was Killed?
Person Working with the Equipment
50%
Involvement Undetermined
25%
Bystander
25%

Figure 4

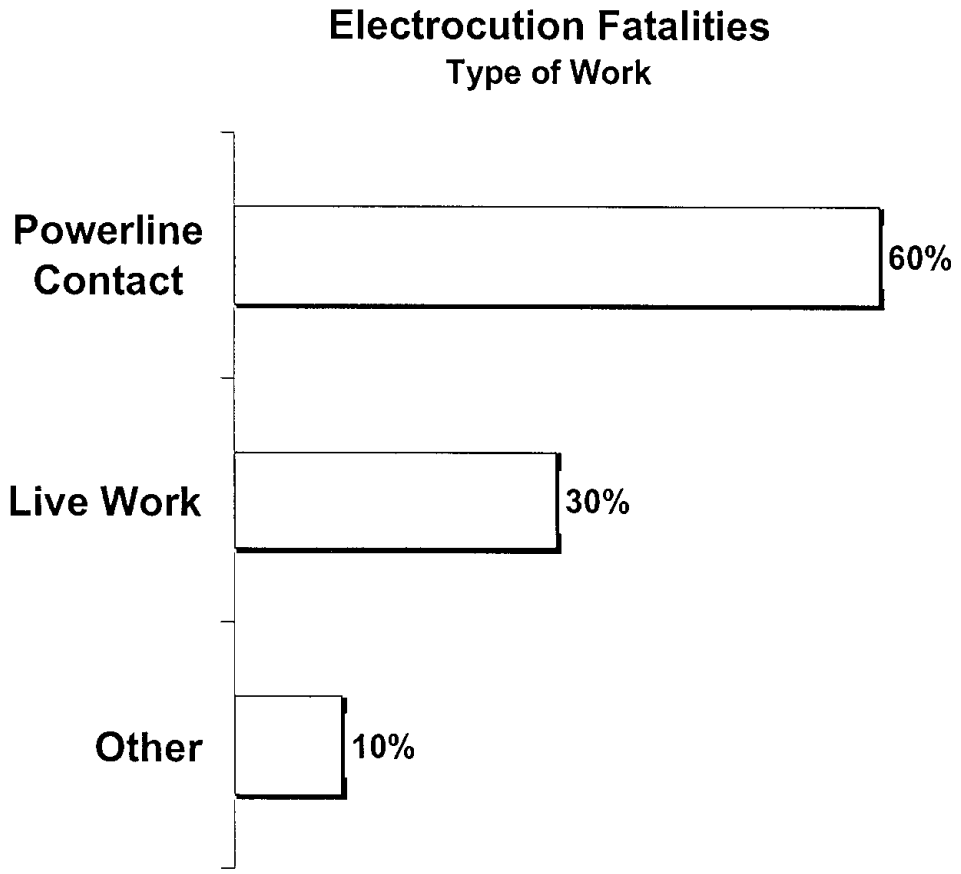

Electrocution Fatalities
Type of Work
Powerline Contact
60%
Live Work
30%
Other
10%

Figure 5

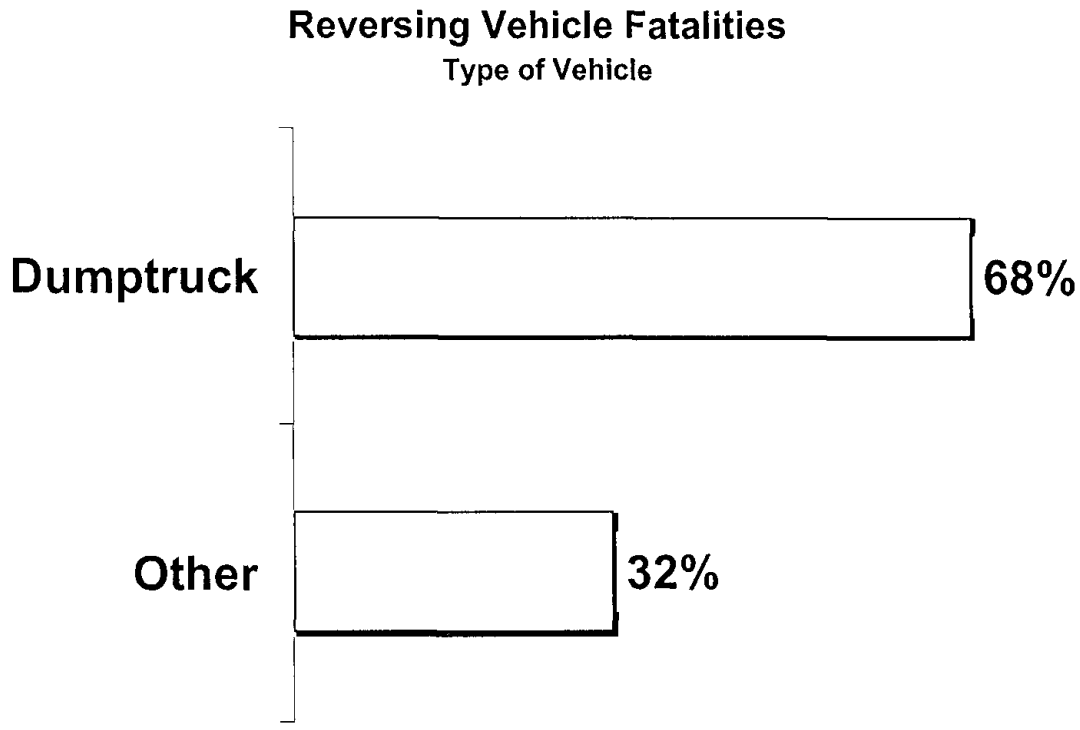
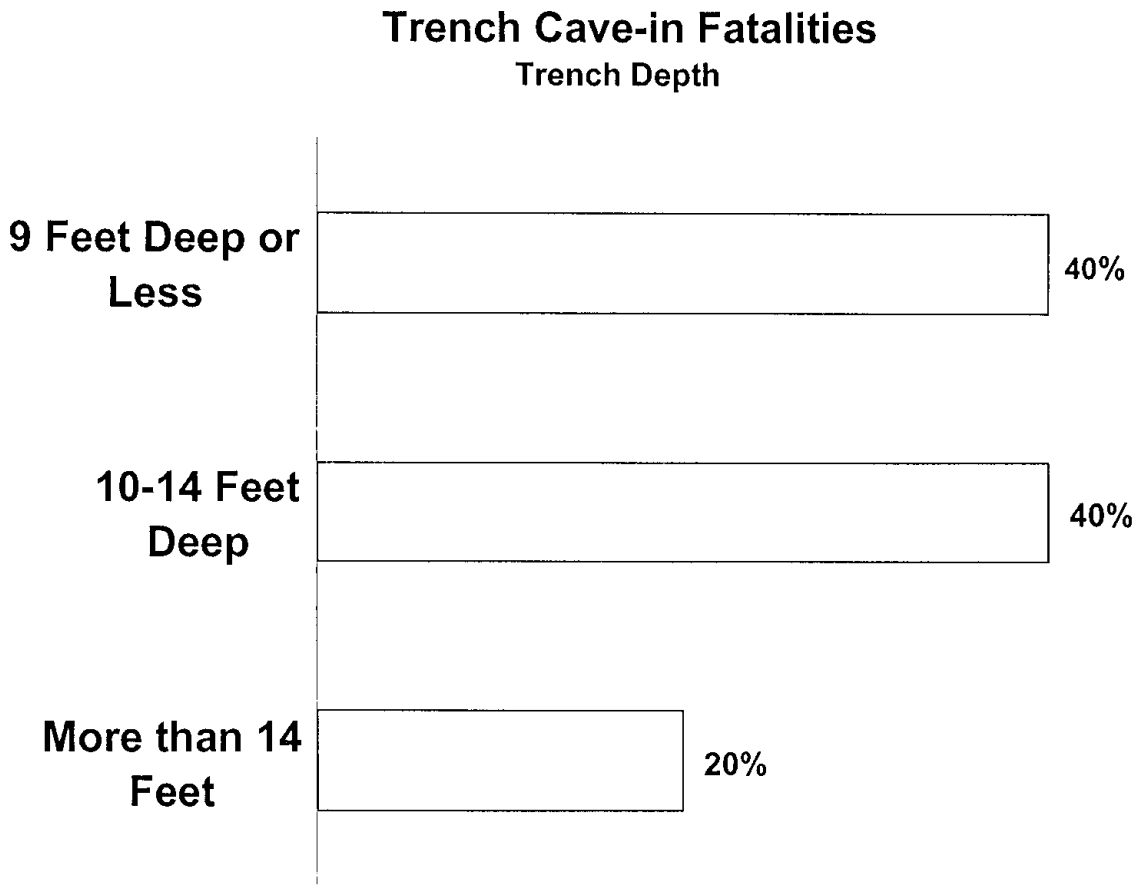

Reversing Vehicle Fatalities
Type of Vehicle
Dumptruck
68%
Other
32%

Figure 6


Trench Cave-in Fatalities
Trench Depth
9 Feet Deep or Less
40%
10-14 Feet Deep
40%
More than 14 Feet
20%