

Risk *topics*

Hazard Detection Control

Introduction

A study of industrial accident statistics reveals that almost six times as many industrial accidents occur as a result of unsafe acts of employees as compared to unsafe physical conditions in the plant, and yet, very little is usually done to understand or control the human element. For example, posters like "Drive Safely" do very little for the success of a safety program. A hazard detection and control program that does not take into account human elements is almost certain to fail.

Definitions

Hazard: An unassessed risk or a potential threat for a loss. An unsafe condition or an unsafe practice (act) which, if not corrected or controlled, has the potential to cause, contribute to, or intensify an unintentioned event (accident).

Accident: An unintended event that has the potential to cause damage to property, injury, illness, or death.

Loss: The bodily injury, death, financial or property damage arising out of an accident.

Unsafe Condition: A physical condition within the environment that has the potential to cause or contribute to an accident.

Unsafe Practice (Act): A knowing or unknowing violation of the standard accepted procedures or practices with the potential to cause or contribute to an accident.

If hazards such as unsafe conditions and/or unsafe practices can be detected, action can be taken to eliminate or modify them. These can help prevent an accident from occurring and, hence, prevent a loss. To do this successfully, one must understand the nature of unsafe conditions and unsafe acts and the reasons for their occurrence. If a hazard cannot be prevented, the strategy would be to control its frequency and severity aspects.

Nature of Unsafe Condition Type Hazards:

Hazards from unsafe conditions can be temporary or permanent. They generally remain in the environment until found either by inspection or by accident. They tend to worsen with elapsed time. An important characteristic of these types of hazards is that once the fundamental cause of their existence is found and acted upon, they do not usually re-occur for an extended period of time. Unsafe condition type hazards can be caused by:

Risk Engineering

Where standard solutions are the exception



- unsafe practices
- previous accidents
- damaged equipment
- normal wear and tear
- poor maintenance
- fabrication and/or design defects
- improper arrangement or layout
- environmental contamination
- by products of an operation

Nature of Unsafe Practice Type Hazards:

Hazards from unsafe work practices aren't always as easily identifiable as those from unsafe conditions. However, they will often result in a larger percentage of accidents. These hazards are often brought about by:

- lack of knowledge or skill
- incentive to commit an unsafe act (deliberate acts)
- existing poor work habits
- habit interference reaction
- mental or physical impairment

Because unsafe practices are usually harder to detect than the unsafe condition type hazards, they are much more difficult to control. They occur intermittently and last a short time. The reasons for their occurrence can vary from individual to individual as well as varying reasons for the same individual. Analysis of unsafe work practices requires an understanding of human nature in order to target a specific solution to each case.

Hazard Detection

A good safety program always starts with hazard detection which consists of a deliberate search and identification of various unsafe conditions and unsafe practices in the work place. It requires a good knowledge of acceptable standards, codes, regulations, and safe work practices. The tools that are most commonly used in hazard detection include:

- physical inspection
- accident investigation
- accident analysis

Physical Inspection:

A physical (or facility) inspection is a program of systematic and planned plant observations for the effective prevention of accidents and efficient management of the people, equipment, machines, and environment. Inspections can be formal or informal and are very suitable for detecting unsafe condition type hazards. A program of regular physical inspections can help a tendency to overlook less obvious unsafe condition-type hazards. A program of regular physical inspections can help one spot developing unsafe conditions before they become dangerous and produce an accident. The main weakness is that physical inspections are not as suitable for detecting hazards from unsafe work practices. They also may not reflect the actual accident experience and may have a tendency to overlook less obvious unsafe condition type hazards.

Accident Investigation:

An accident investigation is basically an objective account, analysis, and evaluation of an accident based on all facts, opinions, statements, and related information. A true accident investigation also includes a recommended corrective

action to prevent a recurrence of the accident. Accident investigations are “postmortem” in nature, because the accident and loss have already occurred. This technique can successfully find the fundamental or basic unsafe practice(s) or condition(s) responsible for creating the specific hazard and the subsequent accident. A word of caution, however, is that investigations are only as good as the ability of the person making them. In addition, there may be a tendency to overlook other unsafe practices or conditions that are not directly involved in causing the specific accident being investigated.

Accident Analysis:

An Accident Analysis is a collective analysis of data obtained from a variety of accident information. If accident reports and investigations, including First Aid records, are included in this analysis, it significantly enhances its effectiveness in detecting unsafe conditions and unsafe practice hazards. Accident/Incident Analysis looks at the total loss experience to highlight the “vital few” accidents that result in significant loss. This provides valuable insight in the loss data that may not be apparent in a single accident. It is most useful in providing a focus for corrective actions when the resources for any remedial action are scarce.

A successful accident analysis requires a good knowledge of various factors involved, but is only as good as the accident data available. Therefore, good accident recordkeeping is essential

Hazard Control

Unsafe conditions associated with normal wear and tear are some of the easiest to correct by instituting a good maintenance program. Hazards caused by defects in tools, equipment, and work place require more in-depth analysis like Proc-

ess/Equipment Hazard Review and Ergonomic Analysis.

Unsafe conditions arising out of environmental contamination may require engineering controls. It is important to note that unsafe practices, like poor work habits, also create unsafe conditions. Once correctly identified, control of unsafe condition hazards is usually a matter of allocating adequate resources for the corrective action.

Unsafe acts committed out of lack of knowledge are usually the most dangerous but probably the easiest to control by providing proper instructions/training, like employee orientation. Unsafe acts committed because of poor/unsafe work habits can be corrected by training and periodically re-training until the unsafe work habits are replaced by the safe ones. Unsafe acts that are committed knowingly or deliberately can be addressed by providing a stronger incentive to choose a safe practice over an unsafe one. These incentives can be positive, i.e., reward, or negative, i.e., punishment. The incentive value of various objects and activities varies with different individuals and situations. They pose a creative challenge to management. A person committing an unsafe act knowingly is generally aware of the danger and sometimes takes a compensating action to protect him or herself. For example, a driver running a red light will often make sure there is no police officer around to issue a ticket.

Employee physicals and other careful job placement measures can help minimize adverse effects of an individual's physical or mental disabilities.

Habit Interference Reaction or Habit Pattern Interference is the unpredictable and uncontrollable action produced when the conscious mind is unable to

select or maintain the correct sequence or action for the task being performed. They help in explaining certain “completely illogical” (unsafe) acts by individuals. Daydreaming, sudden shock, loud noise, emotional or physical stress and panic situations are some of the examples of Habit Pattern Interference. They are most difficult to predict and almost impossible to eliminate completely. It is for this reason that guards, protective safety equipment, and the engineering methods are necessary to protect even the most experienced employee.

Summary

An effective hazard detection and control program must employ all three hazard detection tools discussed earlier: physical inspection; accident investigation; accident analysis well as implementing specific methods to control identified deficiencies. Each method has certain strengths as well as weaknesses. However, they compliment each other in detecting and controlling unsafe conditions and unsafe as practices that can result in loss producing conditions.

References

1. *Accident Prevention Manual for Industrial Operations*. National Safety Council, Chicago, IL.
2. Bird, Frank, E., Jr. and Robert G. Loftus. *Loss Control Management*.

Disclaimer

The information and suggestions contained in Risk Topics have been developed from outside sources. Zurich Services Corporation makes no warranties and accepts no responsibility about the correctness of Risk Topics, any Company responses to inquiries relating to Risk Topics, Risk Topics' application to compliance with specific regulations, laws or other standards, or that the use of the information contained in Risk Topics will provide for the health or safety of the workplace.



ZURICH

Zurich Services Corporation
Risk Engineering
1400 American Lane
Schaumburg, IL 60196

Telephone +1-800-982-5964
Fax +1-847-605-7736