

Incident Investigation



“Those that do not learn from
their mistakes, are bound to
repeat them”

Bear in Mind..

The most important things in an accident are:

- ❑ When an accident happens, the most important thing is taking care of the victim or victims.
- ❑ To investigate the causes of the accident.
- ❑ Every employees, including employers, need help and advice to identify the causes of accidents.

Bear in Mind..

Accidents also cause great economic losses

- ❑ Lost efficiency due to break-up of crew.
- ❑ Damage to tools and equipment.
- ❑ Damage from accident due to fire, chemicals, spills, crashes, etc.
- ❑ Loss of customers because products and services are not provided.
- ❑ Training costs for replacement worker.

Course Aim & Objective

Upon completion of this course, delegate shall be able to;

- ❑ Understand the primary reasons, benefits, and employer responsibilities to conducting an accident investigation
- ❑ State the steps for an effective investigation
- ❑ Investigate, Analysis & Report incident

Understanding the terms

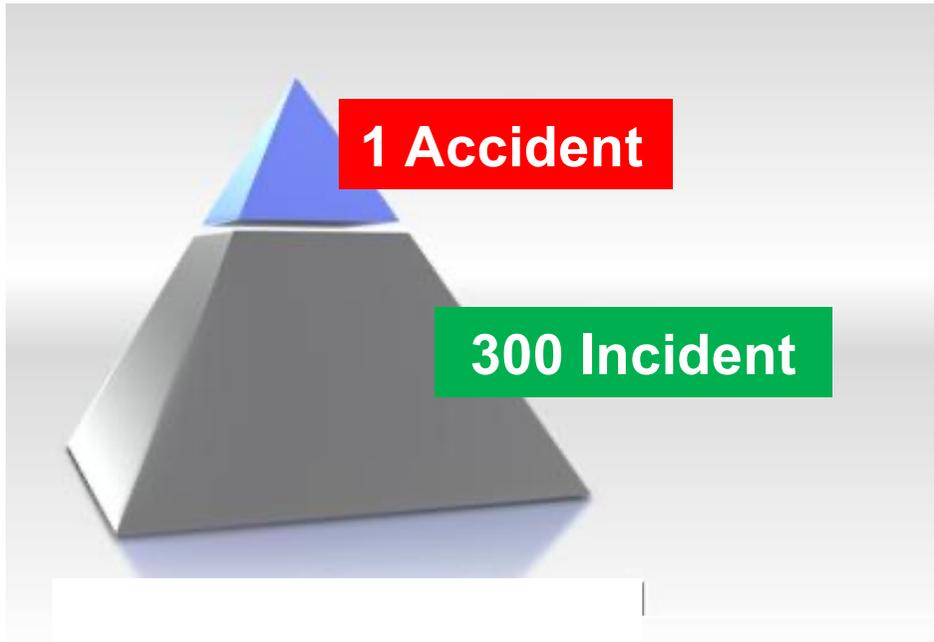
- What is an accident?
 - *an unplanned undesirable event that interrupts a planned activity and that results in injury/illness or property damage*
- What is an incident?
 - *is an unplanned, undesired event that adversely affects completion of a task.*
- What is an “Accident/Incident Investigation”?

What is an Accident Investigation?

- An accident investigation is the analysis and account of an accident based on information gathered by a thorough and conscientious examination of all factors involved.



What is the pyramid saying?



For each accident,

- 300 incidents occurred, or
- you lost 300 chances to prevent the accident!

If we are going to prevent accidents, we have to investigate the accidents and the incidents!

Investigation Concepts

- Why do we investigate accidents?
 - Prevent future incidents
 - To identify and correct/eliminate unsafe conditions, acts or procedures
 - Reduce costs and down time
 - Regulatory requirements
 - Process claims



Five basic principles of effective accident investigation

- ❑ accidents are generally rooted in management system flaws or failures
- ❑ all accidents (or at least their outcomes) are preventable
- ❑ investigations must be aimed at identifying root causes
- ❑ proper investigative techniques
- ❑ investigative training

Who should do the investigation?

- Expert in accident causation
- Experienced in investigative techniques
- Fully knowledgeable of:-
 - work processes
 - procedures
 - persons and industrial relations environment
- Unbiased/impartial

Accident Causation

- Are accidents caused by:
 Unsafe Acts or
 Unsafe
 Conditions?



Accident Causation

● Unsafe Conditions

- Poorly maintained machinery or equipment.
- Defective or missing personal protective equipment.
- Unguarded machinery or equipment.
- Missing or inadequate warnings or safety and health signs.
- Lack of housekeeping.



Accident Causation

● Unsafe Acts

- ❑ Conduct work operations without prior training
- ❑ Block or remove safety devices.
- ❑ Clean, lubricate, or repair equipment while its in operation.
- ❑ Working without protection in hazardous places.



Accident Causation

- Must remember 3 basic facts:
 1. Accidents are caused.
 2. Accidents can be prevented by eliminating the causes.
 3. Unless the causes are eliminated, the same accidents will happen again.

Accident Causation – cont.

Most accidents have at four or five root causes or factors that contribute. Often there are more.

- ❖ Your task is to identify as many as possible



Accident Causation – cont.

3 questions to ask, when considering the contributing factors of an accident.

1. What can management do to prevent the incident from recurring?
2. What can the supervisor do to prevent recurrence?
3. What can the worker do?

Regulatory Requirements

- OH&S Regulation 3.3 (e)
- Local OHSA Regulation
- You must remember these are the minimum standards



Informing the Authority

Every employer shall inform the board of authority immediately of the occurrence of any accident which:

- (a) resulted in serious injury to or the death of a worker, or
- (b) involved a major structural failure or collapse of an installation, scaffold, crane, hoist, temporary construction support system, or
- (c) involved the major release of a hazardous substance, or
- (d) was an incident required by regulation to be reported.



Informing the Authority

As a general guideline, a report would be expected when:

- 1) The incident resulted in an injury which required immediate medical attention beyond the level of service provided by a first aid attendant, or injuries to several workers which require first aid.
- 2) The incident resulted in a situation of continuing danger to workers.

Preservation of evidence

Except as otherwise directed by a safety officer, a person must not disturb the scene of an accident that is reportable except as far as necessary to:

- attend to persons injured or killed
- prevent further injuries of death or
- protect property that is endangered

Accidents to be investigated

Every employer shall initiate immediately an investigation into the cause of every accident which:

- (a) is required to be reported or
- (b) resulted in injury requiring medical treatment, or
- (c) did not involve injury or involved only minor injury not requiring medical attention but had a potential for causing serious injury.

Investigators' Qualifications

- ❑ Investigations shall be carried out by persons knowledgeable about the type of work involved.
- ❑ If they are reasonably available, with the participation of the employer or their representative and a worker representative*

**joint committee member or worker H&S rep.*

Intent of an investigation

- An incident investigation shall, as far as possible,
 - determine the cause or causes of the incident,
 - identify any unsafe conditions, acts or procedures which contributed in any manner to the incident and
 - recommend corrective action to prevent similar incidents.

Availability of witnesses

The employer must:

- make every reasonable effort to be available for interview by the person conducting the investigation, or by an officer of the board, all witnesses to the incident and any other persons whose presence might be required for a proper investigation of the incident.
- Record the names, addresses and telephone numbers of witnesses and other persons with information

Incident investigation reports

The employer shall ensure that an incident investigation report is prepared containing:

- (a) the place, date and time of the incident
- (b) the names and job titles of persons injured
- (c) the names of witnesses
- (d) a brief description of the incident

Incident investigation reports

- e) a statement of the sequence of events which preceded the incident,
- f) identification of any unsafe conditions, acts or procedures which contributed in any manner to the incident,
- g) recommended corrective actions to prevent similar incidents,
- h) the names of the persons who investigated the incident.

Distribution of reports

Copies of incident investigation reports shall be forwarded without undue delay to the company OH&S Committee and to the local government HSE Department.

Follow-up action and report

- Every employer shall initiate corrective action without undue delay to prevent recurrence of similar incidents
- Prepare a report of the action taken to the Joint Health & Safety Committee, or where there is no such committee, shall post the report for reference by workers.

Investigation Concepts

- Understand that an accident/incident cannot be investigated unless it is known that one has occurred.
- What are some reasons why accident/incidents are not reported and how would you ensure that they are reported?

What to Investigate

- Serious and Major accidents
 - usually investigated automatically.
- Minor and Near-Miss
 - indicators that point to a condition or practice that, if allowed to continue, could cause injury or equipment damage.
- Investigations of serious accidents often reveal earlier incidents of a similar nature that have been dismissed as insignificant.

What to determine

- *Who* was involved/injured? Witnesses
- *Where* did accident happen? exactly
- *When* did accident occur?
- *What* were immediate & basic causes
- *Why* was unsafe act/condition permitted
- *How* can similar accidents be prevented

Investigation Steps

- Reporting
- First aid & medical care
- Advise investigators
- Identify causes
- Report findings
- Implement corrective action
- Evaluate the effectiveness
- Make changes for continuous improvement

Accident Causes - Root Cause Analysis

- Task
- Material/Equipment
- Environment
- Human Factors
- Management (cultural factors)

Begin with the proximate cause and work backwards from there

- Unsafe behavior?
- Equipment failure?
- Unsafe procedure?

Task

- Was a safe work procedure used?
- Had conditions changed to make the normal procedure unsafe?
- Were the appropriate tools and materials available and used?
- Were safety devices working properly?

Material

- Was there an equipment failure?
 - What caused it to fail?
 - Poor design? Poor Maintenance?
- Were hazardous materials involved?
 - Were they clearly identified?
 - Was a less hazardous material possible/available?
- Should PPE has been used?

Environment

- Weather conditions?
- Housekeeping?
- Temperature?
- Lighting?
- Noise?
- Air contaminants?

Human Factors

- Age
- Experience
- Attitude
- Physical condition
- Health status
- Emotional status

Accident Causes-

Management/Organizational

- Had hazards been previously identified?
- Were hazards eliminated or adequately controlled?
- Had procedures been developed to address them?
- Were work procedures available/followed?

Management

- Task Structure
- Work organization
- Workplace design/layout
- Equipment availability
- Policies/procedures
- Training program-new & transferred
- Supervision
- New employee screening program
- Management's example

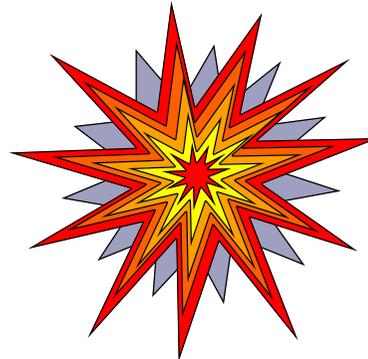
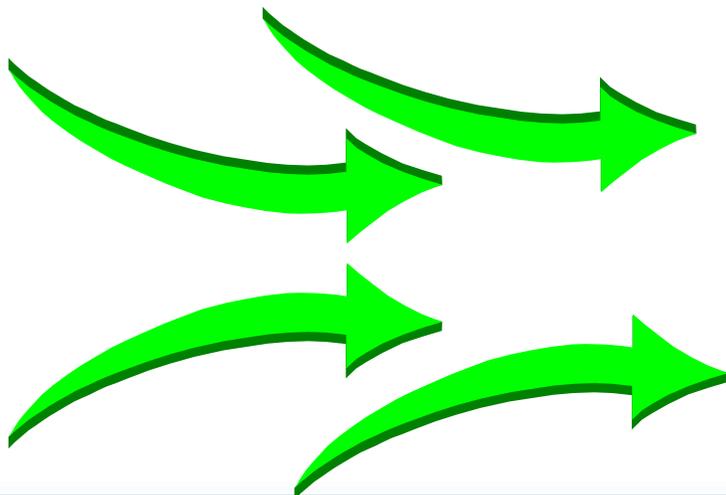
Accident Time Phases

- Look at accident in three time phases.

Events leading up to accident.

The accident.

Immediately afterwards.



Investigate

- ❑ Seal the accident area.
- ❑ Interview witnesses.
- ❑ Draw and take measurements of the accident area.
- ❑ Take samples.

Conducting the investigation

- Remember....
 - Focus on the system and not the individual
 - Focus on cause and not blame
- Investigation team
 - management representative
 - OH&S committee worker representative

Investigation Procedure

- Visit the scene - secure to minimize risk of further injury/damage
- Keep scene as undisturbed as possible
- Make accurate record of scene (photos, drawings, measurements)
- Conduct interviews
- Evaluate evidence, draw conclusions
- Write report with recommendations.
- Follow-up.

Interviewing persons with information

- Who to interview?
 - Injured worker
 - supervisor
 - eye witnesses
 - workers on another shift
 - new or transferred workers to area
 - anyone with information!

Conducting Interviews

- Put the person at ease
 - they may not see the bigger picture and feel personally responsible.
- Reassure each person of the investigation's main purpose.
- Ask person to relate their account (in their own words).
- Listen but do not interrupt.
 - Do not take notes.
 - Do not use a tape recorder.

Interviews – cont.

- Have person relate account again.
 - Take notes.
 - Ask questions.
- Go over notes with person to ensure accuracy.
- Ask for suggestions to prevent recurrence.
- Thank person for their help.

Analyze

- ▶ Say what happened step-by-step.
- ▶ Analyze the events with the 6 key questions:
 - Who?** *Who* saw the crash?
 - What?** *What* happened to the brakes?
 - When?** *When* did the brakes fail?
 - Where?** *Where* were the replacement brakes?
 - Why?** *Why* wasn't the mechanic told?
 - How?** *How* did the crash happen?

Investigation & Analysis

Accidents must be investigated and analyzed from three different points of view:

- 1 . Direct cause of injury
2. Surface causes of accident
3. Root causes of the accident

Direct Cause of Injury

A harmful transfer of energy that produces injury or illness.

- The worker suffered bodily injury when physical energy produces an impact into the body parts.

Surface Causes of Accident

Specific unsafe conditions or unsafe behaviors that result in an accident.

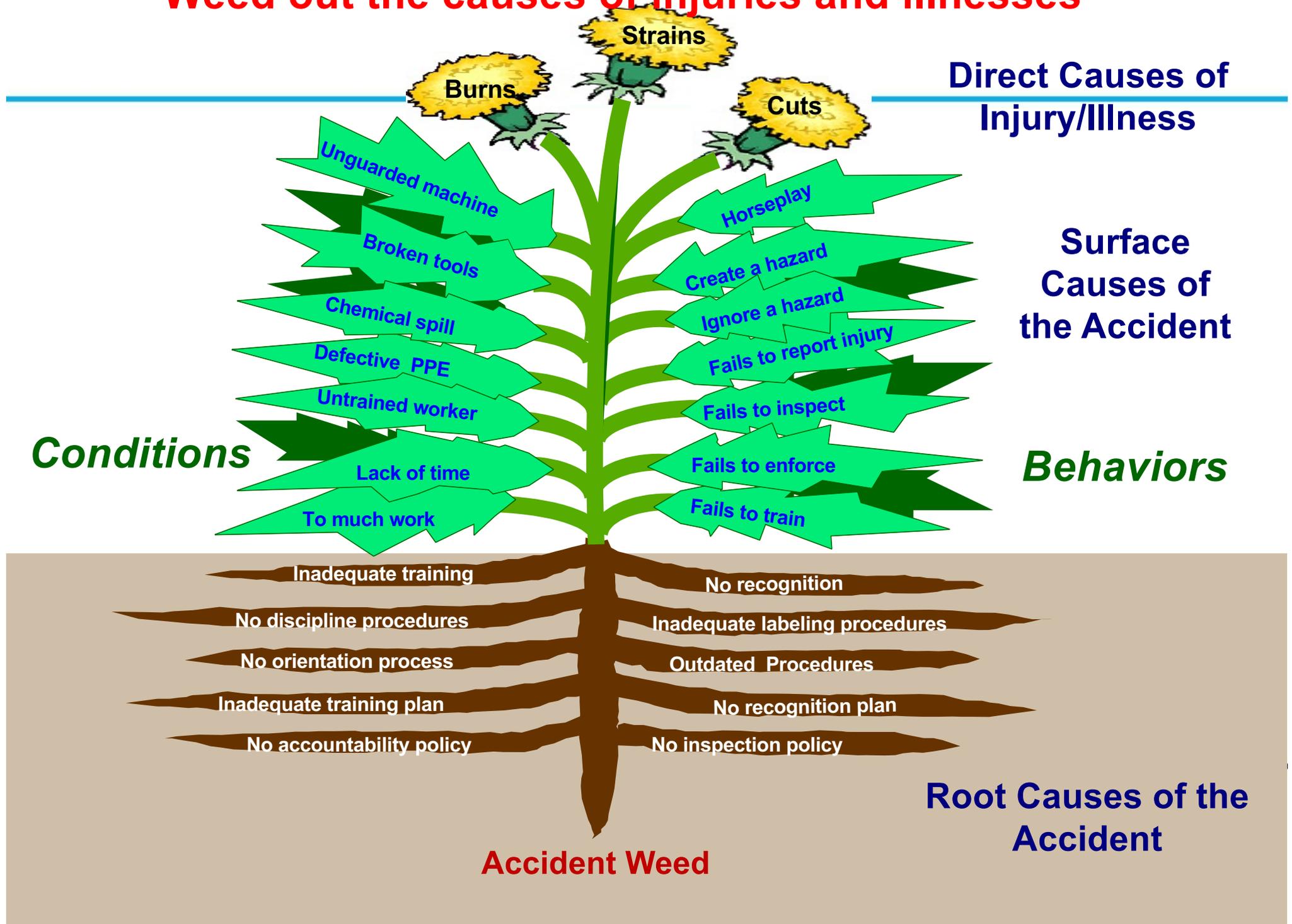
- The physical energy being produced maybe as a result of some failures within the system.

Root Causes of Accident

Common conditions and behaviors that ultimately result in an accident.

- Example: The company did not have a maintenance program for its machine failure.

Weed out the causes of injuries and illnesses

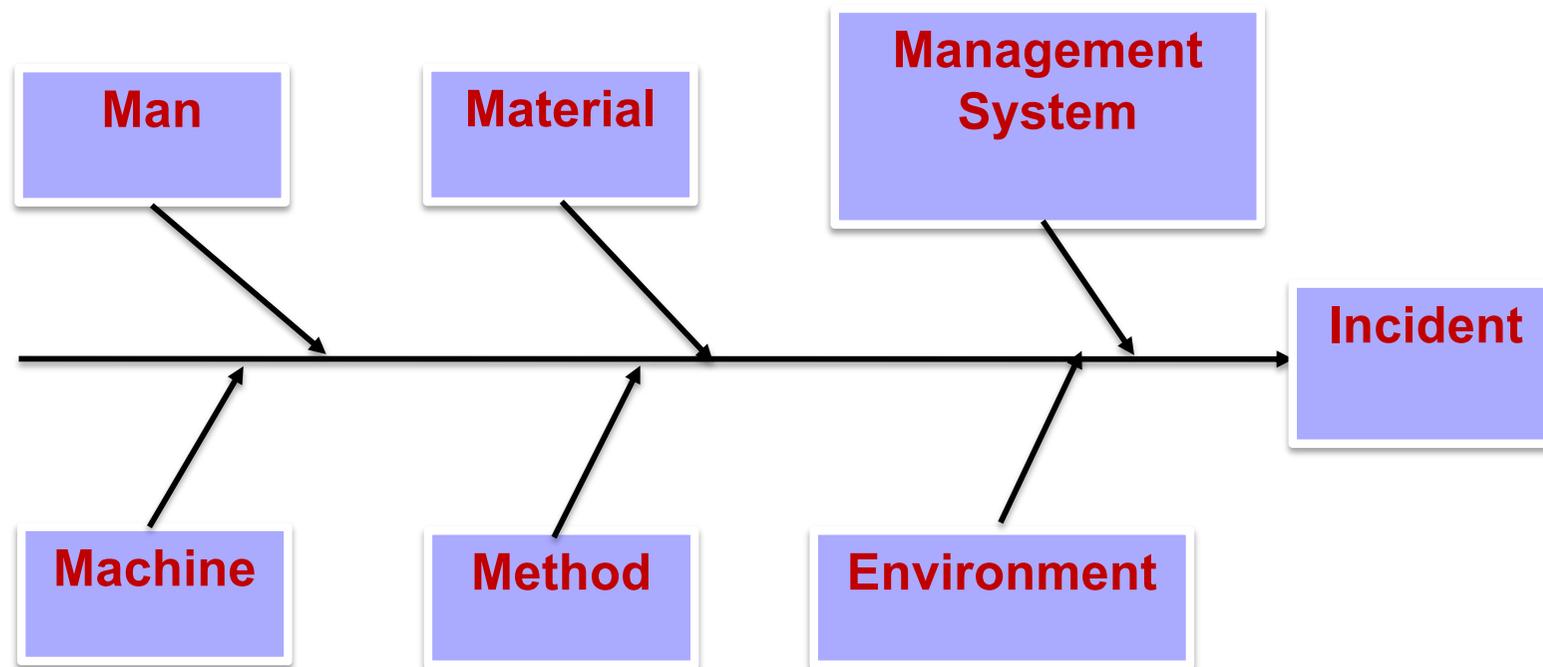


Determine The Root Cause

- ❑ It is important to determine the work element that directly caused the incident.
- ❑ The root cause of an incident can be placed into 6 different categories:
 - Man
 - Material
 - Management system
 - Machine
 - Methods
 - Environment

Determine The Root Cause

Basic Elements of Root Cause:



Determine The Root Cause

<p style="text-align: center;">Materials</p>	<p style="text-align: center;">Machine/Equipment</p>
<ul style="list-style-type: none"> • Defective raw materials • Wrong type of material for job • Not enough raw material 	<ul style="list-style-type: none"> • Incorrect selection of tool or equipment • Poor equipment maintenance or design • Poor equipment or placement • Defective equipment or tool
<p style="text-align: center;">Environment</p>	<p style="text-align: center;">Man</p>
<ul style="list-style-type: none"> • Orderly workplace • Job design or layout of work • Surfaces poorly maintained • Physical demands of the task • Other conditions (noise, lighting, etc) 	<ul style="list-style-type: none"> • No or poor management involvement • Inattention to task • Task hazards not guarded properly • Other (horseplay, intention etc) • Stress demands
<p style="text-align: center;">Methods</p>	<p style="text-align: center;">Management System</p>
<ul style="list-style-type: none"> • No or poor procedures • Practice does not mesh with written procedures • Poor communication 	<ul style="list-style-type: none"> • Training or education lacking • Poor employee involvement • Poor recognition of hazards • Previously identified hazards were not eliminated

Example of Root Cause Elements

Analyze for Remedies

- Identify factors which if modified would eliminate the unsafe behavior
- Example - in this instance it may be discovered that:
 - worker had not been trained in lockout procedures,
 - unsafe behavior not corrected in past as supervisors not adequately trained to correct
 - workload means that if lockout device is not readily available, then it will not be used

Determining Corrective Action

- Review training program-analyze to determine flaws
- Review training for supervisors-look at motivation
- Purchase additional lockout devices and issue one set to each electrician
- GOAL IS TO PREVENT FUTURE INCIDENTS
 - often necessitates making fundamental changes

Common Errors / Pitfalls

- Believing carelessness is a cause of accidents.
- Assuming contradictory information indicates falsehood.
- Conducting interviews as if in a courtroom.
- Looking for only one basic cause.

Investigation Follow Up

- Delegate recommendations for corrective action.
- Publicize the investigation results.
- Copies of reports through usual routings.
- Post action taken as well as any non-action and reasons.
- Confirm that action has corrected the problem.

Investigation Procedure - Summary

- Visit the scene - secure to minimize risk of further injury/damage
- Keep scene as undisturbed as possible
- Make accurate record of scene (photos, drawings, measurements)
- Conduct interviews
- Evaluate evidence, draw conclusions
- Write report with recommendations.
- Follow-up.

Investigation Kit

- camera, film, flash
- tape measure
- clipboard, pad of paper
- straight edge
- pens, pencils
- A.I. forms
- Checklist
- Flashlight

Remember.....

- Focus on cause not blame
- This allows management and supervisors to consider failures in the management system (company's basic operating procedures and management/supervisors attitudes), as the real cause of the accident, rather to simply blame the “defective worker”.
- Murphy's Law - “If it can go wrong, it will”
 - goal is to minimize consequences of mistakes or unsafe acts

Incident Investigation Exercise

Case Study Scenario

- *Joe is operating a conveyor system upon which product is placed after packing and preparing for shipment. His job is to make sure the conveyor is operating and carries enough product so that forklift truck drivers have a continual flow to fill trailers.*
- *He has a back locked in the system and goes to investigate, and finds some shrink wrap has winded around a gear on the conveyor. This causes the pallet to be off center, and a jam occurs. He pushes the pallet of boxes to release the jam (while standing on the edge of the conveyor). The jam is released, and several pallets of product move and impact Joe. He subsequently falls off the conveyor.*

Case Study Scenario

Result:

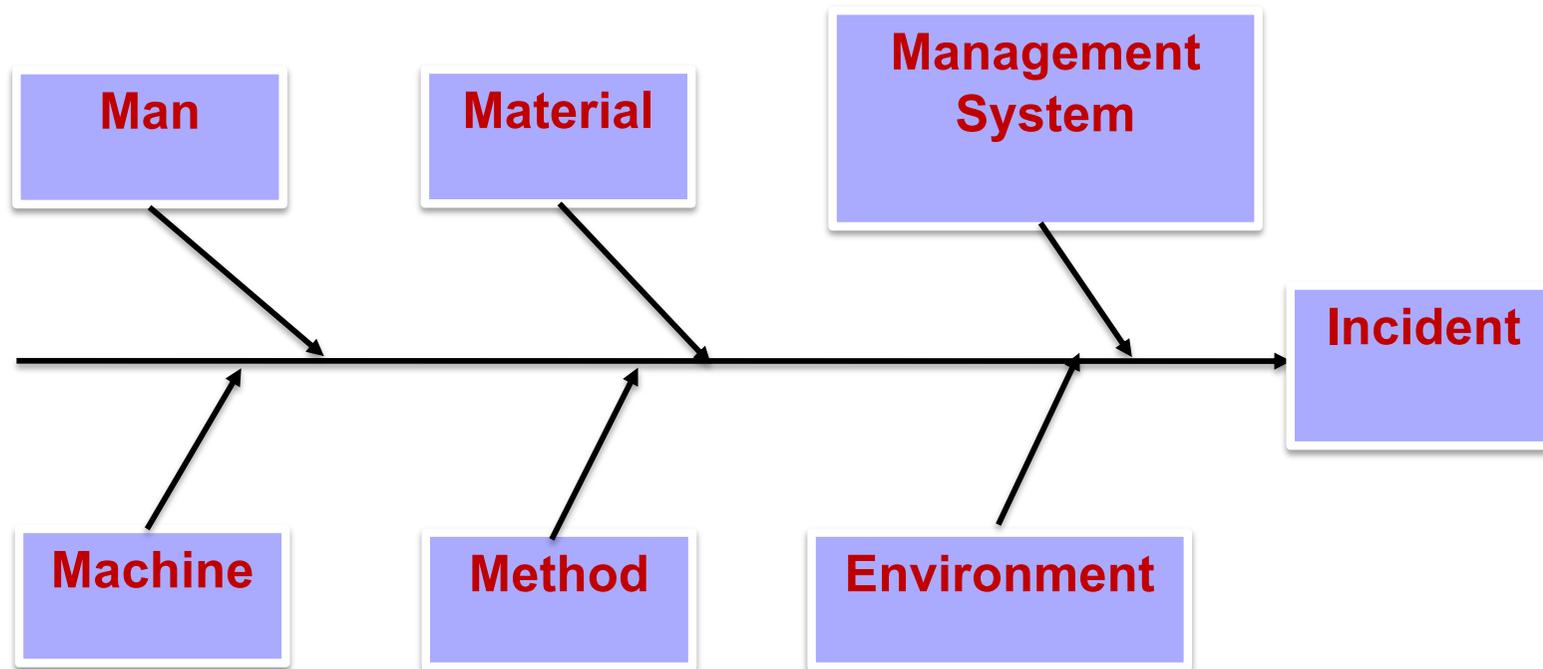
- Joe suffers a contusion on his left temple from an upright post, scrapes his left knee and wrenches his back. He is currently out of work.
- Time 3:00 PM (shift ends at 4:30 PM)
- Temporary employee that works with Joe was not in that day.

Investigation:

- There are three employees who work in the department and were present at the time of the incident:
 - 1: 'He was stressed because several trucks were waiting for product'
 - 2: 'Jams happen a lot there, something always catches, but maintenance cannot seem to find anything'
 - 3: 'I have seen Joe clear jams like that before'
- Joe's supervisor, the warehouse manager: 'Maintenance has made a tool to push jams out so that employees do not have to climb on the conveyor, apparently Joe did not use it.'

Case Study Scenario

Cause Determination:



Case Study Scenario

Final Analysis

Basic Causes:

Indirect Causes (Intermediate Cause);

Direct Causes:

Result:

Root Cause:

Case Study Scenario

Final Analysis

Basic Causes:

Improper Design, Maintenance, Enforcement of Tool Use, Lack of Help;

Indirect Causes (Intermediate Cause);

Climbing on Conveyor; Rushing;

Direct Causes:

Boxes Lurched;

Result:

Fell and was injured;

Root Cause:

Basic – management or Design;

The End & Thank You!