

# INCIDENT INVESTIGATION



## Modules:

- 1) Terminology
- 2) Reporting Near Miss
- 3) Investigation Process
- 4) Causation Models
- 5) Investigation Techniques
- 6) Investigation Reports
- 7) Case Study

# Module-1

# Terminology

# Incident/Accident & Event

- ❖ **Incident - An uncontrolled chain of events that results in /**  
Could have resulted in harm to people, damage to property , environment or reputation.
- ❖ **The following incident types are distinguished:**
- ❖ **Accident: An unforeseen incident that results in harm to**  
People, damage to property or loss to process including fires.
- ❖ **Event: An event is an occurrence or happening which**  
Can be an accident, incident, near miss or equipment failure that can behave actual or potential impact on people, the environment, assets or the company reputation.

# Fatality, LWC & LTI



- ❖ **Fatality - is the death of employee resulting from**  
Work related injury or illnesses regardless of time intervening between the injury and death.
- ❖ **Lost Workday Case (LWC) - is a work related injury**  
Which renders the injured person temporarily unable to perform any regular job or restricted job on any day after the day on which the injury was received.
- ❖ **Lost Time Injury Case (LTI) - is a work related**  
Injury which renders the injured person temporarily/permanently unable to perform any regular job. Fatality and LWC are all considered LTI Case

## ❖ **Restricted Work Case (RWC) - Any work related**

Injury other than a fatality or lost time injury case which results in a person being medically unfit for full performance of the regular job on any day after the occupational injury. Work performed might be:

- A. An assignment to a temporary job.
  - B. Part time work at the regular job.
  - C. Continuation full time in the regular job but unable to perform all the usual duties.
- Often a person is designated for “light duties”.

## Medical Treatment Case (MTC)

- ❖ Any work injury that involves neither lost time nor restricted workdays but which requires treatment by, or under, specific order of a physician or could be considered in the province of a physician.
- ❖ An incident will be a medical treatment case if there are complications requiring follow up medical treatment.



## Examples of Medical Treatment

- ❖ Treatment of infection.
- ❖ Antiseptics during second or subsequent visits to medical personnel.
- ❖ Treatment of second or third degree burns.
- ❖ Use of prescription medications.
- ❖ Soaking therapy (hot or cold) during second or subsequent visits to medical personnel.
- ❖ Cutting away dead skin (surgical debridement).
- ❖ Application of heat therapy during the second or subsequent visits to medical personnel.
- ❖ Positive X-rays diagnosis (query fractures)
- ❖ Admission to a hospital for treatment (more than observation).



## ❖ First Aid Case (FAC) –

- ❖ An injury other than a lost time injury which may result in a partial absence from a shift but doesn't otherwise interface with job performance.
- ❖ Cases which are not sufficiently serious to be reported as Medical Treatment Cases (MTC's) and require minor first aid, e.g. dressing on a minor cut, burns, removal of a splinter, etc. before returning (usually immediately) to work.
- ❖ Such treatment and observation are considered First Aid, even if provided by a physician or registered medical professional personnel.



# Near Miss

## ❖ Nearmiss Case –

❖ Is an incident which potentially could have caused injury or occupational illness and /or damage (loss) to people, assets, the environment or reputation but which did not.

❖ These are incidents which occurred without injury or damage to life or property.



# Occupation Illness

## ❖ Occupational Illnesses Case –

- ❖ Is any abnormal condition or disorder, other than an injury, which is mainly caused by exposure to environmental factors associated with the employment.
- ❖ It includes acute or chronic illnesses or diseases.
- ❖ Work related illnesses shall be determined and certified by the License Physician's & accepted by the HSE Manager.



# Property Damage & MVA

## ❖ **Property Damage –**

Any damage to property of the Client, project property or Partner/Subcontractor resulting from an accident during construction activities.

## ❖ **Motor Vehicle Accident (MVA) -**

An Incident which has involved a vehicle and which has resulted in injury. Illnesses and / or damage (loss) to people, assets, the environment or the company reputation.



# Environmental, Fire & Security Incidents

## ❖ Environmental Incident –

Any work related incident that can harm to environment such as water pollution, oil spill, noise pollution, damage to forest etc.

## ❖ Fire Incident –

Any accidental burning of property or equipment that belongs to the project.

## ❖ Security Related Incident –

Any incident related to threat, robbery kidnapping, sabotage which involves company property or personnel working in the project.



# Module - 2

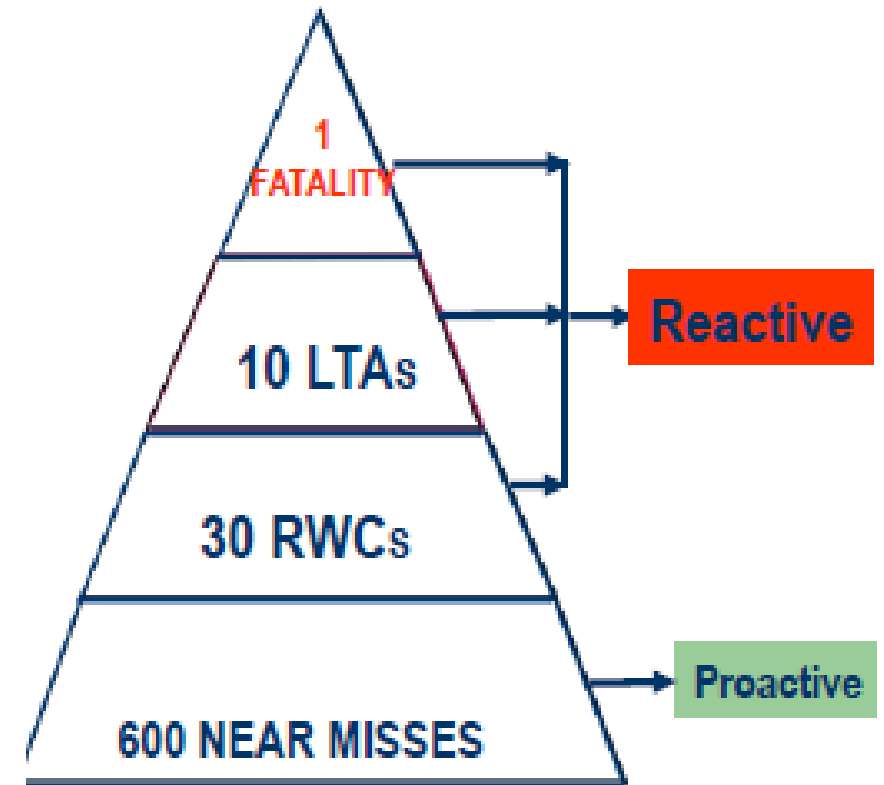
## Reporting Near Miss



# Why is it important to report a Near Miss?

1. In order to prevent major incidents, it is important to identify the hazards in the work areas.

2. Since a near miss is reflective of a possible hazard, recognizing a near miss will help identify the hazard and will offer an opportunity to carryout corrective action before a major incident can occur



# Benefits of Near miss reporting

- ❖ Identify the problem, rectify it, eliminate / control the hazard.
- ❖ Provide wide source of information which can be analysed to identify trends and find areas of operation that require improvement.
- ❖ By getting used to near miss reporting, people will get used to looking out for unsafe acts and conditions.
- ❖ Improve awareness.



# Reporting Near- Miss

## How to enhance Near miss reporting :

- ❖ Giving awards and recognition for quality nearmiss
- ❖ Appreciating the work done by reporting nearmiss
- ❖ Intra-plant, Intra-shiftgroup competition
- ❖ Eliminate Hazard / Implementing suggestion
- ❖ Communicate back the status

# What to do with Near Miss Received

- ❖ Evaluate if the nearmiss is worth investing or just a correction needed
- ❖ Investigate if it meets criteria by forming appropriate team
- ❖ Implement the recommendations
- ❖ Share the status of all nearmiss in a monthly meeting
- ❖ Recognize team involved in best investigation

# Module - 3

## Investigation Process

# Investigation Team

❖ An Incident Investigation Team to be facilitated by the Site HSE Manager will be organized when any one of the following incidents has taken place.

- (1) All LTI cases.
- (2) Near Miss that could result in a Fatality, LTI, serious property damage, serious environmental damage or serious loss of reputation.
- (3) Failure or collapse of facility
- (4) Serious damaged to environment



(5) Property damage that could result in a delay of the project. For all other incidents as investigation report is required, including all learning points. The manpower required is depending on the damage, serious environmental damage, or serious loss of reputation. Investigations should be carried out as soon as possible after the incident, because the quality of evidence can deteriorate rapidly with time.

❖ **In principle, the Investigation Team should consist of the Following:**

1. Area Manager, Responsible for the area where the incident happened.
2. Engineer/Supervisor responsible for the work that was carried out .
3. HSE personnel responsible for the area where the event happened.
4. Partner/Subcontractor Site Manager. (if necessary)
5. Partner/Subcontractor Supervisor and crew leader carrying out the work. (if necessary)
6. Partner/Subcontractor HSE Manager. (if necessary)
7. Witness of the event, if any.
8. Client Representative.

# Investigation Reporting

**The report and investigation procedures are as follows;**

- 1) Determine the scope of the investigation
- 2) Select the investigators and assign specific tasks to each member
- 3) Present a preliminary briefing to the investigating team, including
  - Description of the accident, with damage estimates
  - Normal operating procedures
  - Maps and layout (local and general)
  - Location of the accident site
  - List of witnesses
  - Event that preceded the accident
- 4) Visit the accident site to get updated information
- 5) Inspect the accident site
- 6) Interview each victim and witness

# Investigation Reporting

- 7) Determine what was not normal before the accident, where the abnormality occurred, when it was first noted, and how it occurred
- 8) Analyze the data obtained in step 7
- 9) Determine why the accident occurred, a likely sequence of events and problems causes, and alternative sequences
- 10) Check each sequence against the data from step 7
- 11) Determine the most likely sequence of events and the most probable causes
- 12) Conduct a post-investigation briefing
- 13) Prepare the summary report

## Feedback From Incident

- ❖ The report of incident investigation shall be reviewed in a weekly HSE meeting, and the findings and recurrence prevention measures shall be educated to employees as well as field engineers, supervisors and foremen.
- ❖ All accidents, incidents and dangerous occurrences including the preventive actions, recommendations by the investigation team and lesson learned from them shall be effectively channeled down to all levels of workforce through group meetings.
- ❖ The communication line shall be as follows:
  - Accident/Incident Investigation Team → HSE
  - Committee → Project Managers of Sub-contractors →
  - Construction Managers of Sub-contractors → Site
  - Engineers → Site Supervisors → Workforce.



# Why Incidents must be Reported and Investigated

- ❖ In order to prevent major incidents, it is important to identify the hazards in the work areas.
- ❖ Every incident should be reported and properly investigated to know all the root causes and to prevent recurrence.
- ❖ All lesson learned from every incident should be disseminated to site employees through TBM, HSE Bulletin Boards and any other means of communication

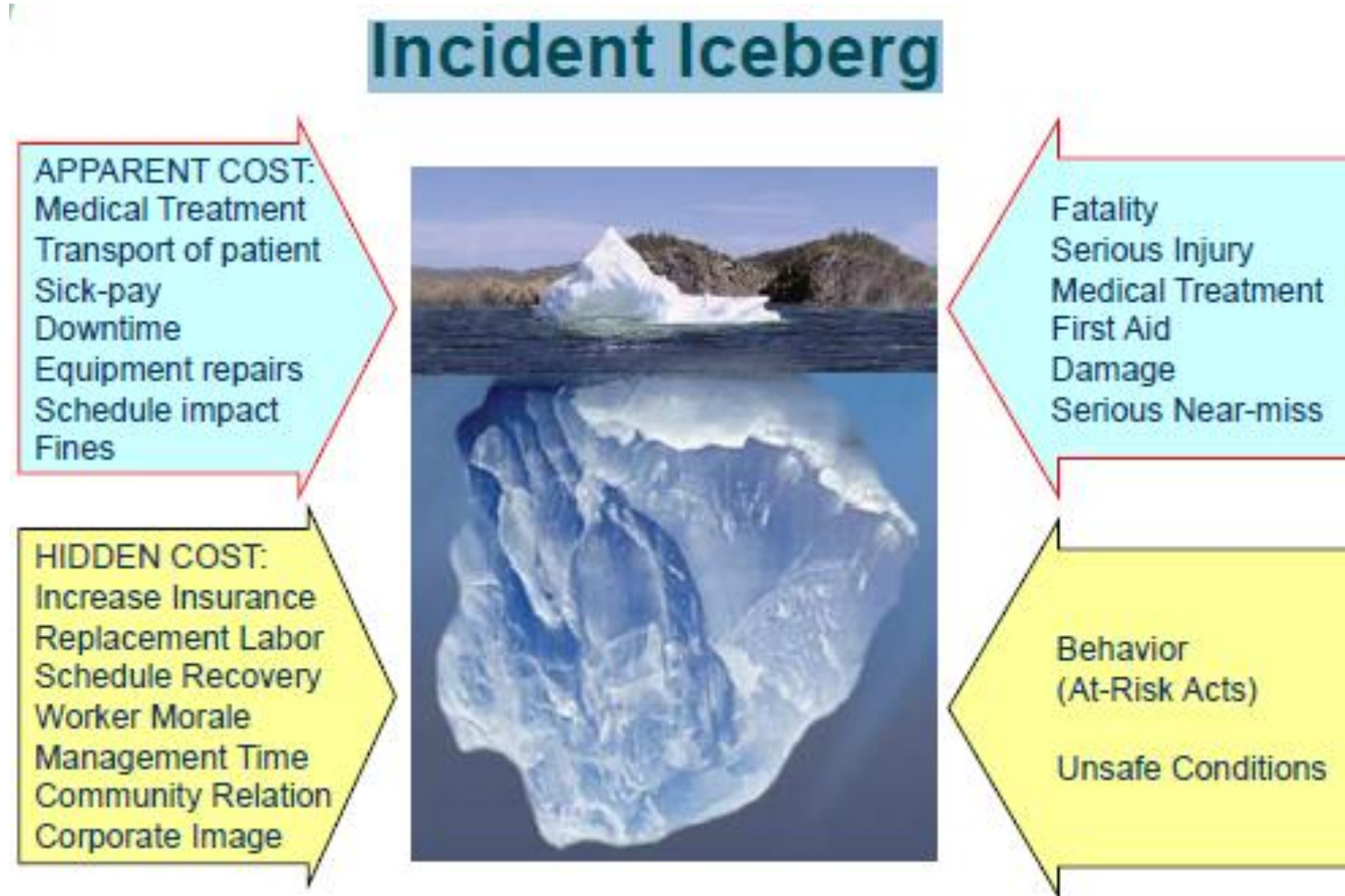
# Module - 4

## Causation Models

# Need to Report & Investigate Incident

- ❖ Establish and record the Facts
- ❖ Facts Facts Facts Facts Facts
- ❖ Identify what really happened and why
- ❖ Immediate, underlying & root causes
- ❖ Minimize the possibility it could happen again
- ❖ Corrective actions & Effective follow-up
- ❖ Identify Incident trends
- ❖ Requires a consistent format / definitions
- ❖ Maintain a record for legal or other purposes
- ❖ Criminal and civil
- ❖ Because it's Good Business!
- ❖ Incident cost money

# Incident Iceberg

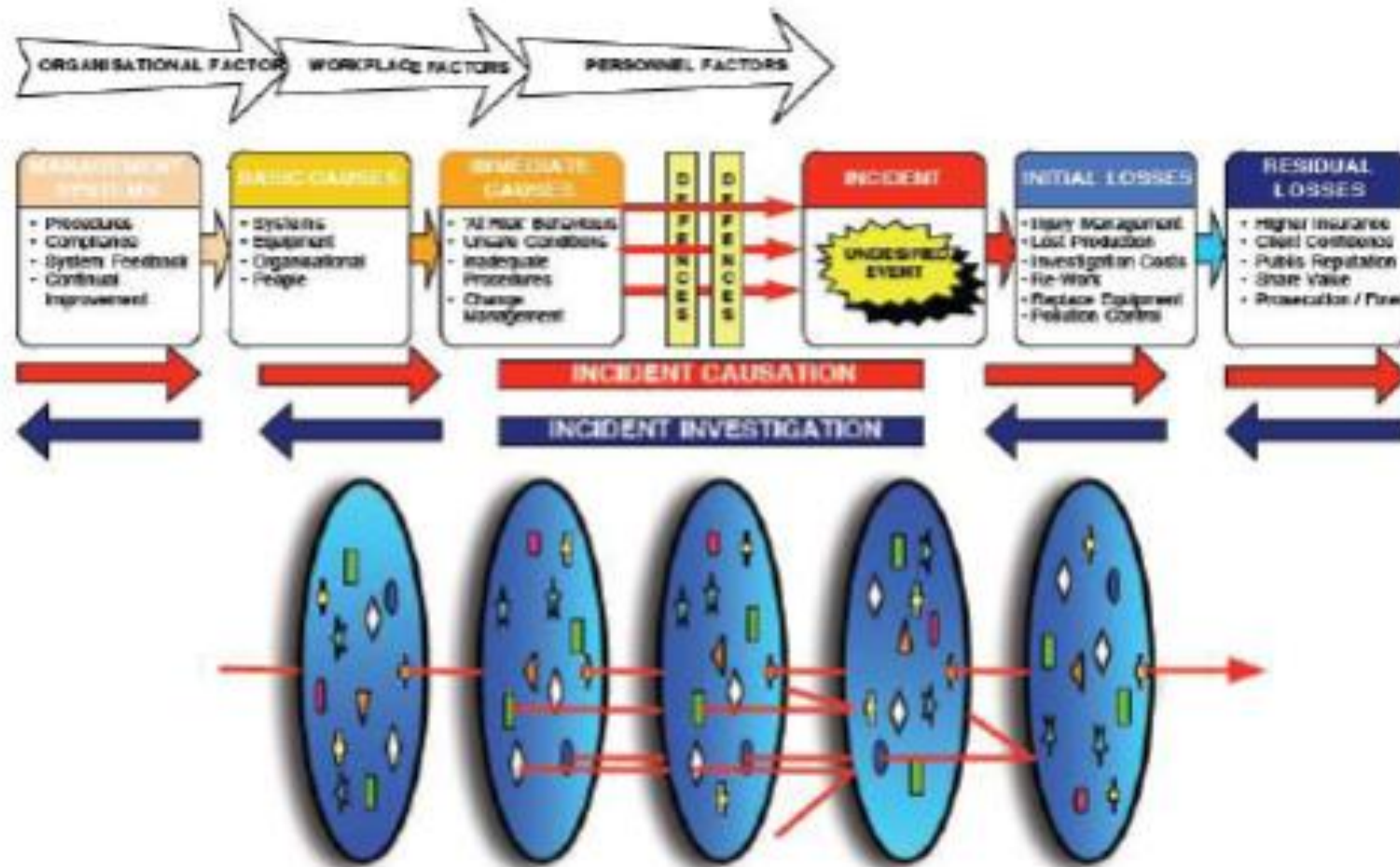


# Why Do Incident Occur

- Incident rarely have just one cause
- Once early concept was Heinrich's Domino Theory:



# Causation Models



# 8 Common Mistake of Incident Investigation

## 1.No Investigation

Incidents not reported & so not investigated

## 2.Wrong type of investigation

Depth of investigation does not match potential (or actual) severity

## 3.Investigation is Too Late

Late investing is not effective as evidences may vanish

## 4. Assumptions become facts

Statement made on the basis of rumors is written, and reported, as facts



## 8 Common Mistake of Incident Investigation, Condt.

### **5. Witness Statement Inaccurate**

Statements is what witness 'thinks' not 'knows' – becomes accepted as 'true'

### **6. Focus is Wrong**

Investigation is about the event & what happened after it, not why it occurred

### **7. Irrelevant Corrective Actions**

Corrective actions not related to root causes – lack of focus

### **8. No / Inadequate Follow-up**

Corrective actions identified but no effective follow-up



# Module - 5

## Investigation Techniques

# Incident Investigation Techniques

## ❖ Different techniques for different incidents:

Logic of Fault Trees

Multi Linear Events sequencing

Events and Causal factor chart

MORT (Management Oversight & Risk tree)

## ❖ Investigations may use specific tools to support them

– e.g.

Tap Root® / Tripod Beta® / SOURCE™

These can be complicated are generally used for the investigation of more serious incidents require formal training and, in some cases, computer software in order to be effective

## ❖ Most incidents can be successfully and correctly investigated using a more basic technique

**I have six faithful serving men  
They taught me all I knew**

**Their names are.....**

**WHAT and WHERE and WHEN  
and WHY and HOW and WHO**

# Immediate Investigation Requirements

- ❖ From the 1st phone call, take notes (contemporaneous evidence)
- ❖ Date, time, people, details Depth of investigation should match incident potential.
- ❖ Any incident which could have resulted in a fatality should be investigated as if it had secure the site.
- ❖ Work in affected area(s) should only re-start if authorized
- ❖ Identify witness for Interview.
- ❖ Get early comments.



# Immediate Investigation Requirements

- ❖ Inspect the site
- ❖ Take photograph &, if possible, find photos prior to incident
- ❖ Secure key documents
- ❖ Maintenance records
- ❖ Certificates
- ❖ Training / Induction / Orientation records
- ❖ Log books
- ❖ Notebooks
- ❖ QC records Etc.
- ❖ Quarantine Key Components

# Investigation Process

- ❖ What happened?
- ❖ Where did it happen?
- ❖ When did it happen?
- ❖ Why did it happen?
- ❖ How did it happen?
- ❖ Who can contribute to the
- ❖ investigation?

# What???

**Facts Facts Facts Facts Facts Fact –**

## **Definitions:-**

- ❖ Something that has actual existence (Miriam Webster)
- ❖ A thing that is indisputably the case (Oxford English)
- ❖ Is defined as something that is true, something that actually exists, or something that can be verified according to an established standard of evaluation.

# What???

- ❖ What was the injured employee's explanation?
- ❖ What were they doing at the time of the accident?
- ❖ What was the position at the time of the accident?
- ❖ What is the exact nature of the injury?
- ❖ What operation was being performed?
- ❖ What materials were being used?
- ❖ What safe-work procedures were provided?



# Where???

## Specifically where?

❖ On the morning of 2nd March, shortly after shift start, a section of the trench wall collapsed, trapping two workers.

**OR**

❖ On the morning of 2nd March 2006, 4 workers were building formwork in a trench at EAP EPC NGL II BRT expansion site, Nigeria. Running north to south, the trench was approximately 20m L x 2m W x 4 m D.

❖ At approximately 07:45 a section of the trench wall (4m back from the south end of the trench) collapsed, trapping two workers.

# Where???

- ❖ Where did the accident occur?
- ❖ Where was the employee positioned?
- ❖ Where were eyewitnesses positioned?
- ❖ Where was the supervisor at the time?
- ❖ Where was first aid initially given?



# When???

- ❖ **Create an accurate ‘timeline’**
- ❖ Went on shift at ‘x’ on ‘y’ date
- ❖ Incident occurred at ‘z’ hours (use 24 hour clock)
- ❖ Assumed / approximate times should be started as such
- ❖ Considering using evidence such as:
  - ❖ Stopped clock
  - ❖ Data logging from process unit
  - ❖ CCTV camera systems
  - ❖ Phone records
  - ❖ Security swipe card systems Etc.



# When???

- ❖ When did the accident occur?
- ❖ When did the employee start his/her shift?
- ❖ When did the employee begin employment?
- ❖ When was job-specific training received?
- ❖ When did the supervisor last visit the job?



## Planning the interview

- ❖ Schedule the witnesses.
- ❖ For major incidents, keep key witness apart.
- ❖ Allow sufficient time for each interview.
- ❖ Develop structured questions in advance.
- ❖ Allow witnesses to have a friend / safety representative to present if they want.
- ❖ They are to be observers not talkers.



# Who???

## Interviews

- ❖ Put the interviewee at ease
- ❖ Choose a quiet location
- ❖ Sit on the same side of the table
- ❖ Reassure interviewee:
- ❖ “This interview is to establish the facts”
- ❖ “I will be asking you describe what you saw, and what you know, in your own words”
- ❖ Allow the interviewee to see your notes
- ❖ Right down what is said, not how you interpret it



# Who???

- ❖ Who was injured?
- ❖ Who was working with him/her?
- ❖ Who else witnessed the accident?
- ❖ Who else was involved in the accident?
- ❖ Who is the employee's immediate supervisor?
- ❖ Who rendered first aid or medical treatment?

## How???

- ❖ How did the accident occur?
- ❖ How many hours had the employee worked?
- ❖ How did the employee get injured (specifically)?
- ❖ How could the injury have been avoided?
- ❖ How could witnesses have prevented it?
- ❖ How could witnesses have better helped?
- ❖ *HOW COULD THE COMPANY HAVE PREVENTED IT?*



# Why???

## Ask WHY 5 times:

- ❖ Why did he fall?
- ❖ He fell through the hole in the grating
- ❖ Why could he fall through a hole in the grating?
- ❖ The grating was removed to pull cables and there was no barrier
- ❖ Why there was no barrier?
- ❖ The crew pulling cables did not put one in place
- ❖ Why did they not put a barrier in place?
- ❖ Waiting for scaffolders to erect a barrier would delay the job
- ❖ Why would it take too long for scaffolders to arrive?
- ❖ It's big site and there are only 3 scaffolders
- ❖ It was a short-notice rush job and there was not enough time to plan the scaffolding

# Interviewing Techniques

- ❑ **Open & Closed questions**
  - ❖ **Open – cannot answered with a ‘Yes or No’**
    - ❖ “What is your job?”
    - ❖ “What time did you arrive?”
    - ❖ “Describe what you saw.”
    - ❖ “What did you do next?”
  - ❖ **Closed – can be answered “Yes or No”**
    - ❖ “So you’re a welder”
    - ❖ “You arrived at 7 o’clock with the others”
    - ❖ Did you see the scaffold collapse?”
  - ❖ **Repeat the answer back**
    - ❖ Make sure you understood the answers
    - ❖ Make sure the interviewee verifies earlier responses

# Module - 6

## Investigation Reports

# Incident Mapping

- ❖ Use whiteboard / walls or windows.
- ❖ Develop timeline of events on 'post-it' notes.
- ❖ One event per 'post it' include witnesses/ date/ time/ location.
- ❖ For complex incidents use a site plot plan to identify key actors, witness location and other critical data Identify which events were critical to the incident occurring



# Incident Mapping

- ❖ **Continue timeline through the event to point recovery:**
- ❖ Fatal incidents
- ❖ Deceased removed from site and authorities permit re-start
- ❖ Injury events
- ❖ Injured person arrives at hospital/ clinic for treatment
- ❖ Pollution events
- ❖ Until pollution controlled and clean-up operations underway
- ❖ Damage only events:
- ❖ Equipment repaired/ process re-start
- ❖ Analyze each of these to identify root causes
- ❖ Anything which is an assumption should be clearly marked as such

# Writing the Report

## Suggested content:

### ❖ Introduction

Set the scene, describe work in progress at time of incident

### ❖ Executive summary

Summarize incident, causes, findings, key recommendations

### ❖ Description of incident

Detailed description of incident, timelines, photos, etc

# Important Consideration for Report

- ❖ Justify each finding
- ❖ Make sure recommendations are realistic
- ❖ Resources required to implement the recommendations
- ❖ What could be the cost?
- ❖ Set realistic deadlines for the recommendations
- ❖ Ensure there reasonable short-term fixes for longer term solutions
- ❖ List trainings required
- ❖ Avoid conflict with regulatory requirements
- ❖ Do you need to share with other members of the organisation

# Go Now and Investigate!!!





# Questions?

# Thank You!