

Risk Management in Practice

Lecture Title:
Incident Investigation and Root Cause Analysis

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**Undergraduate Diploma in
Occupational Health and Safety**

Welcome and Objectives

Summary:

Introduces methods for investigating incidents and identifying root causes to prevent recurrence.

Learning Objectives:

Conduct incident investigations systematically.

Apply root cause analysis techniques.

Recommend corrective actions based on findings.



Why is it significant within the context of Risk Management in Practice?

1. Uncovers Root Causes:

Goes beyond symptoms to identify systemic failures.

2. Prevents Recurrence:

Enables long-term corrective actions, not quick fixes.

3. Improves Risk Controls:

Feeds insights back into hazard identification and control measures.

4. Ensures Compliance:

Meets legal/regulatory requirements and demonstrates due diligence.

5. Promotes Learning Culture:

Turns incidents into opportunities for improvement.

6. Supports Communication:

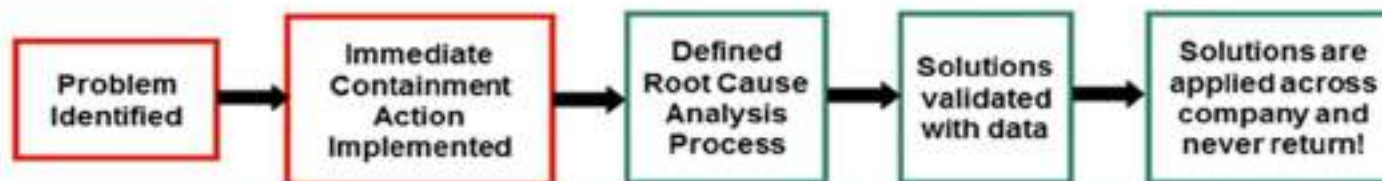
Provides clear, evidence-based information for stakeholders.



USUAL APPROACH



PREFERRED APPROACH



Key definitions (1): Incident vs. Accident vs. Near Miss

1. Incident

An unplanned, undesired event that hinders completion of a task and may cause injury, illness, or property damage or some combination of all three in varying degrees from minor to catastrophic.

Examples: A forklift knocks over a pallet of goods, causing disruption but no injuries. Or A power outage stops production for two hours—no harm to people, but operations are affected

2. Accident

Definition is often similar to incident but supports the mind-set that it could not have been prevented. Any unplanned event that results in injury or ill-health

Examples: A worker falls from a ladder and breaks a leg. Or A machine operator gets a hand caught in moving parts, resulting in an amputation or damage or loss to property or the environment.



Key definitions (1): Incident vs. Accident vs. Near Miss

3. Near Miss

- A near miss, "near hit", "close call", or "nearly a collision" is an unplanned event that has the potential to cause, but does not actually result in human injury, environmental or equipment damage, or an interruption to normal operation
- *Examples: A wrench falls from a scaffold and lands next to a worker—could have caused serious injury. Or A chemical container leaks, but the spill is noticed and cleaned before anyone is exposed.*





Key takeaways

1. **Incident** = Any unplanned event (with or without harm).
2. **Accident** = Incident **with** harm (injury, illness, damage).
3. **Near Miss** = Incident **without** harm, but potential was there.

Key definitions (2): Immediate Cause vs. Root Cause vs. Contributing Factors

Immediate Cause

1. **Definition:** The direct (what happened), observable reason for the incident or accident — usually related to unsafe acts or conditions.
2. **Example:** A worker slipped because there was oil on the floor.



Key definitions (2): Immediate Cause vs. Root Cause vs. Contributing Factors

Root Cause

1. **Definition:** The underlying systemic reason why the immediate cause existed. It often relates to organizational failures, policies, or management systems.
2. **Example:** Oil was on the floor because there is no preventive maintenance program or spill response procedure in place.



Key definitions (2): Immediate Cause vs. Root Cause vs. Contributing Factors

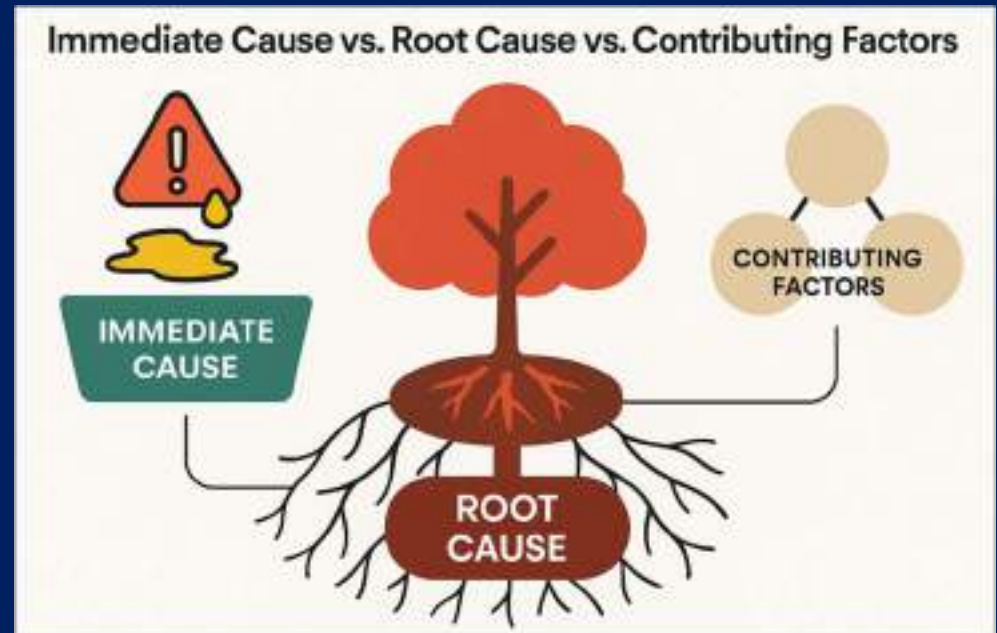
Contributing Factors

1. **Definition:** Additional conditions or circumstances that made the incident more likely or severe but were not the primary cause.
2. **Example:** Poor lighting and lack of warning signage contributed to the worker not noticing the oil spill



Think of it like layers:

- 1. Immediate Cause**
What happened?
- 2. Contributing Factors**
What else played a role?
- 3. Root Cause**
Why did the system allow this to happen?



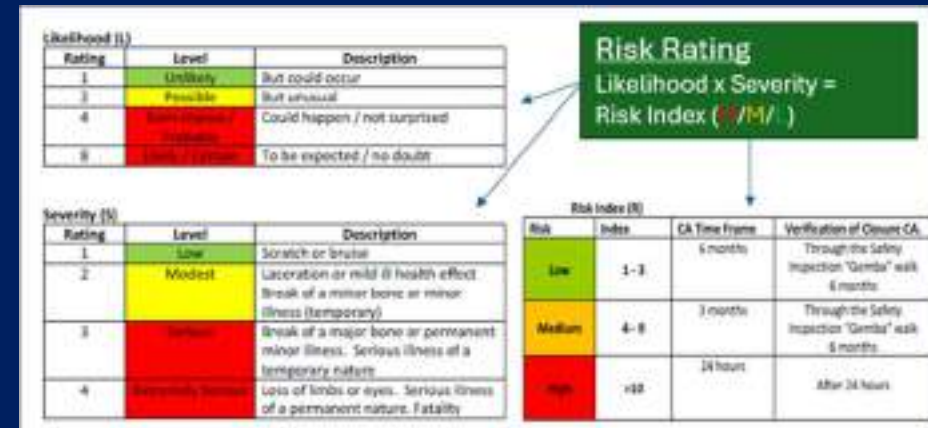
Introduction to Root Cause Analysis

1. Root Cause Analysis is a systematic approach used to identify the fundamental reasons behind accidents and incidents.
2. It goes beyond the surface-level causes and explores the deeper contributing factors that lead to the event.
3. By understanding the root causes, organizations can implement effective preventive measures to AVOID similar incidents in the future.



Triggers for Root Cause Investigation in SMS

1. Overall risk index is classified as HIGH
2. First Aids
3. Near Miss
4. Accidents (incl: the below)
 - a) Damage to company client assets
 - b) Medical Treatments
 - c) Days Away or Restricted or Transferred



Investigation Process Overview

1. Initial Response and Scene Security

Secure the incident scene to prevent further harm and preserve crucial evidence for investigation.

2. Data Collection Methods

Gather detailed information through interviews, photographs, documents, and physical evidence for analysis.

3. Root Cause Analysis Tools

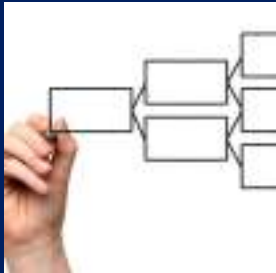
Use techniques like 5 Whys and Fishbone diagrams to identify systemic causes behind the incident.

4. Corrective Actions and Reporting

Develop SMART corrective actions following hierarchy of controls and ensure thorough reporting and monitoring.



Effective vs Ineffective Application



Focus on Systemic Issues

Effective 5 Whys analysis identifies root causes within organizational systems instead of blaming individuals.



Negative Impact of Blame

Ineffective analysis stops at faulting individuals, creating a blame culture and preventing real solutions.



Keys to Effective Application

Successful application requires critical thinking, teamwork, and dedication to uncovering true root causes.



Legal Framework in Malta: Incident Investigation and Root Cause Analysis

Incident Investigation
and Root Cause Analysis



Chapter 646 Overview

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Occupational Health & Safety

Comprehensive Safety Legislation

Chapter 646 replaces previous laws to provide a modern framework aligned with EU directives for occupational safety.

Preventive Safety Approach

The Act emphasizes risk identification, hazard control, and continuous improvement to prevent workplace incidents.

Inclusive Coverage of Workers

The law covers employees, contractors, trainees, self-employed, and volunteers to protect diverse workers.

Consultation and Participation

Employers must involve workers in safety planning to foster a proactive safety culture and effective incident analysis.



Chapter 646 Overview

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1. Legal Duties under Chapter 646 (Work Places (Health, Safety & Welfare Regs): 646.03

○ Principle of Prevention (Article 12)

Employers must:

- **Avoid risks**, identify hazards, and take all necessary measures to reduce danger.
- Investigate **any accident, dangerous occurrence, or near miss** to determine causes and prevent recurrence.

This investigation is not optional—it is a **legal obligation**

2. Notification Requirements

- **Fatal accidents**: Immediate notification to OHSA.
- **Serious injuries or incapacity >3 consecutive days**: Report within 7 working days.
- Maintain written records of **investigations and corrective actions**.



Chapter 646 Overview

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3. Health & Safety Policy

Employers must prepare a policy that includes procedures for incident reporting and investigation.

Communicate this policy to all workers, contractors, and external parties. Health and Safety Reporting Officer (HSRO)
For certain industries, employers may be required to appoint an HSRO. HSRO duties include investigating reports, preparing documentation, and liaising with OHSA.



Employer Duties and Notification Rules

Employer Safety Responsibilities

Employers must conduct risk assessments, implement safety measures, and maintain a documented health and safety policy.

Notification Requirements

Fatalities require immediate reporting to OHSA, while serious injuries must be reported within ten working days.

Accident Investigation

Employers must investigate accidents and near misses, identify root causes, and apply corrective actions.

Compliance Consequences

Non-compliance with Chapter 646 can result in fines and criminal penalties, emphasizing legal accountability.



<https://www.ohsa.mt/eforms/accident>



The screenshot displays the OHSA (Occupational Health and Safety Authority) website. The header includes the OHSA logo, navigation links (Organisation, Legal & Policy, News & Events, Careers, Contact Us), and a search bar. The main content area is titled 'Accident at the Workplace' and provides information on reporting accidents. A left sidebar contains a 'Navigation' menu with links to various eForms.

OHSA
Occupational Health and Safety Authority

Organisation Legal & Policy News & Events Careers Contact Us Search

Navigation

- Construction eForms
- Tower Crane Certification
- Workplace Lift Certification
- Accident at the Workplace
- Removal of Asbestos
- The use of Group 2, 3, or 4

Accident at the Workplace

An employer shall notify OHSA regarding accidents which result in the death of or major injury to any person or the serious injury of an employee at work as required by S.L. 646.03 (Work Places (Health, Safety and Welfare) Regulations).

Where the notifiable accident results in the death or a major injury to a person, the employer shall - (i) notify forthwith OHSA by the quickest practicable means; and (ii) within 7 days from the date of the accident send a written notice of the accident to OHSA.

Fill in the **online form** to submit to the OHSA.

21
N.A.S.B.
www.21Academy.education

e-form

Accident Notification Form

Form should reach OHSA (email: phsa@ohsa.mb) within seven (7) days after the accident in terms of LN 52/1986 Article 22.2(b)

Employer's Name

ID Card No.

Company Name

Company Registration No. (MCSA Reg. No.)

Postal Address

Type of Industry

Email

Telephone

Date of Accident

No. of Persons involved

Place / Address of Accident

Days out of Work (working days)

Person filing the Accident Notification

Name and Surname

Position within the Company

Signature

Details of Injured Person(s)

Name and Surname:

ID Card No. Gender ☒ M ☐ F

Address:

Age:

Job Title:

Name and Surname:

ID Card No. Gender ☒ M ☐ F

Address:

Age:

Job Title:

Name and Surname:

ID Card No. Gender ☒ M ☐ F

Address:

Type of Accident

☐ Use of Hand Tools ☐ Hit by a moving, flying or falling object

☐ Fall on Same Level ☐ Injured while handling, lifting or carrying

☐ Fall on Lower Level ☐ Injured while using means of transport

☐ Inhalation of fumes/gases ☐ Physically injured after being assaulted by human or animal

☐ Burn ☐ Use of chemicals

☐ Electrocuted ☐ Drinking against object

Other specify:

Type of Injury

☐ Fracture ☐ Laceration with wound

☐ Sprain ☐ Burn

☐ Strain ☐ Chemical Burn

☐ Contusion ☐ Amputation

Other specify:

Part of Body Injured

☐ Hand(s) ☐ Back

☐ Leg(s) ☐ Face

☐ Head ☐ Eyeball

☐ Forearm(s) ☐ Feet (Feet)

Other specify:

ohsa@ohsa.mt

Incident Investigation Requirements

Legal Requirement for Investigation

Incident investigations are mandatory by law to reveal causes of workplace accidents and dangerous events.

Focus on Systemic Failures

Investigations emphasize systemic issues over blame, promoting a culture of learning and safety improvements.

Importance of Documentation

Detailed records of investigations and outcomes are essential for compliance and future risk management.

Collaboration in Investigations

Effective investigations involve cooperation between management and workers for comprehensive analysis.



Root Cause Analysis and Legal Compliance

Importance of RCA in Legal Compliance

RCA is essential to meet legal obligations by identifying systemic weaknesses beyond immediate causes of incidents.

Common RCA Methodologies

Techniques like the '5 Whys,' and Fishbone Diagram, help uncover fundamental issues in complex problems.

Continuous Improvement and Feedback

RCA findings inform risk assessments and safety policy updates, promoting continuous organizational improvement.

Benefits Beyond Compliance

Incorporating RCA enhances operational efficiency and fosters a culture of accountability and learning.



Blame Culture Pitfall

Focusing on blaming individuals reduces reporting and transparency, weakening incident investigation effectiveness.

Superficial Analysis

Stopping investigations at human error prevents understanding of systemic factors, leading to ineffective fixes.

Documentation and Follow-up

Poor documentation and lack of follow-up hinder corrective actions and weaken safety improvement efforts.

Fostering Learning Culture

Encouraging learning, thorough analysis, clear records, and leadership commitment improves investigation success.

Challenges in Incident Investigation



Common Methodologies of Root Cause Analysis (RCA)

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1. Fishbone Diagram – Ishikawa

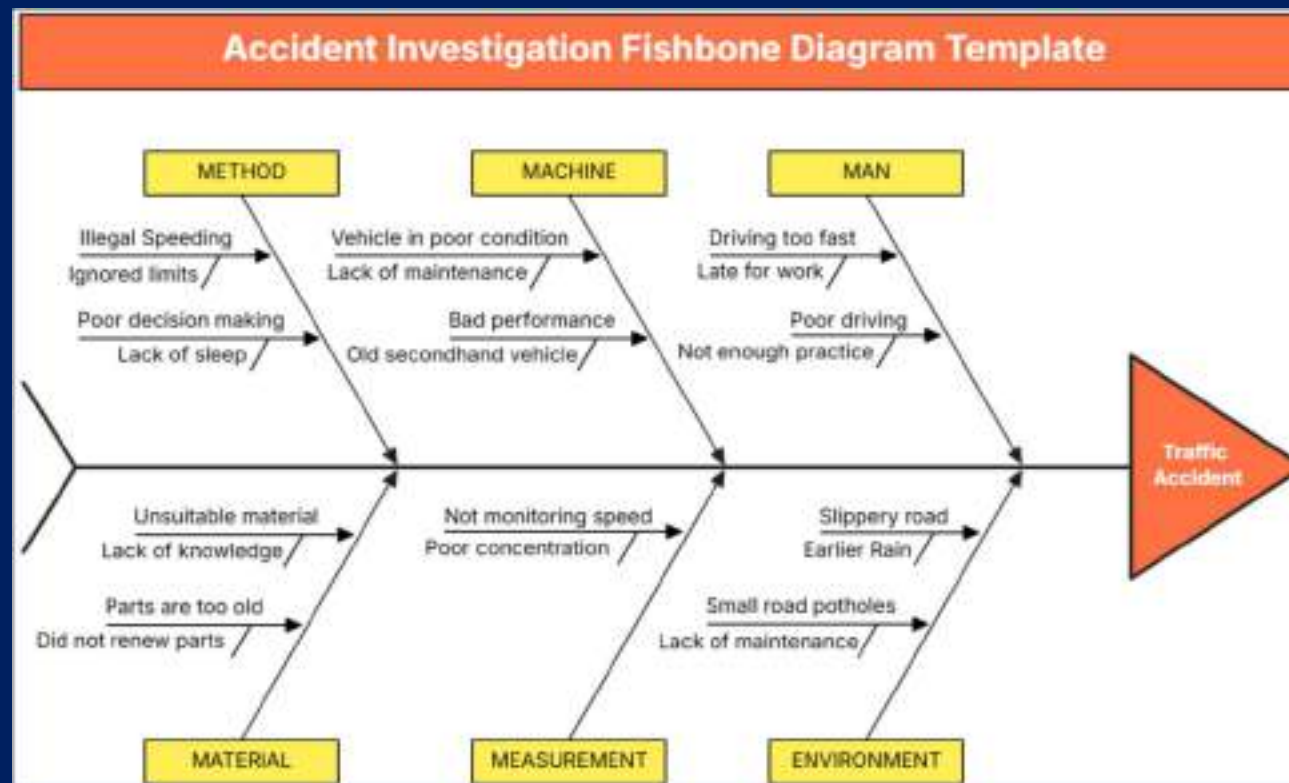
The Fishbone Diagram, also known as the Ishikawa Diagram, categorizes potential causes into branches resembling a fishbone. This method helps identify factors contributing to the incident, such as equipment, procedures, people, and environment

2. 5 Whys Technique

The 5 Whys Technique involves repeatedly asking “why” to uncover the underlying cause of a problem. By asking “why” multiple times, investigators can trace the issue back to its origin.



How to use the Fishbone Tool for Root Cause Analysis



Steps to use Fishbone for RCA

1. Define the Problem Clearly

- Write the incident or issue at the **head of the fish** (right side).
- Example: *"Frequent machine breakdowns"*.

2. Draw the Fishbone Structure

- A horizontal line (the spine) leading to the problem statement.
- Diagonal lines (bones) branching off for major cause categories.

3. Identify Main Cause Categories

- Common categories:

People (training, behavior), **Process** (procedures, workflow), **Equipment** (tools, machines)
Materials (quality, availability), **Environment** (physical conditions), **Management** (policies, leadership)



Steps to use Fishbone for RCA

4. Brainstorm Possible Causes

- Under each category, list contributing factors.
- Example for *Equipment*: “Poor maintenance schedule,” “Old machinery.”

5. Ask “Why?” Multiple Times

- Drill down each factor using **5 Whys** to uncover deeper causes.
- Example: *Why poor maintenance?* → *No preventive maintenance plan*
→ *Lack of resources.*



Steps to use Fishbone for RCA

6. Analyze and Prioritize

- Identify which causes are most likely contributing to the problem.
- Use data (incident reports, observations) to validate.

7. Develop Corrective Actions

- Address root causes, not just symptoms.
- Example: Implement preventive maintenance program, train staff.



5 Why's Root Cause Analysis

1. Focuses on Root Cause, Not Symptoms

Accidents often have underlying systemic issues rather than just surface-level mistakes. By repeatedly asking “Why?” (usually five times), you dig deeper beyond the immediate cause to uncover the fundamental problem.

2. Easy to Apply

It doesn't require complex tools or software. Anyone involved in the investigation can use it, making it practical for workplaces of all sizes.

3. Encourages Critical Thinking

It forces investigators to think logically and sequentially about cause-and-effect relationships, reducing assumptions and guesswork.

4. Prevents Recurrence

By addressing the root cause rather than just the symptoms, corrective actions are more effective, reducing the likelihood of similar accidents happening again.

5. Cost-Effective

Compared to more sophisticated methods like FMEA, the 5 Whys is quick and inexpensive, yet still powerful for many scenarios.



Why 1: Why did the worker slip?

→ Because the floor was wet.

Why 2: Why was the floor wet?

→ Because a pipe was leaking.

Why 3: Why was the pipe leaking?

→ Because it had not been inspected or maintained.

Why 4: Why was it not inspected or maintained?

→ Because there is no preventive maintenance schedule.

Why 5: Why is there no preventive maintenance schedule?

→ Because the company lacks a formal maintenance policy and resource allocation.

Root Cause: Lack of a structured maintenance policy and preventive maintenance program.

Corrective Action: Develop and implement a maintenance policy, schedule inspections, allocate resources.



Why 1: Why did the worker slip?

→ Because they were careless.

Why 2: Why were they careless?

→ Because they weren't paying attention.

Why 3: Why weren't they paying attention?

→ Because they were distracted.

Why 4: Why were they distracted?

→ Because they were thinking about lunch.

Why 5: Why were they thinking about lunch?

→ Because they were hungry.

Root Cause: Worker was hungry.

Corrective Action: Tell workers to focus more and eat before work



Key Differences

Good 5 Whys:

- Focuses on **systemic issues** (policy, process, resources).
- Leads to **preventive measures** that improve safety culture.

Bad 5 Whys:

- Blames the worker (human error bias).
- Ignores organizational factors.
- Results in **weak corrective actions** that don't prevent recurrence.



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INCIDENT REPORT FORM

Section 1

(Section 1 must be completed by manager/supervisor on duty) **Local Reference No.:**

Date of Incident:	Time of Incident:
Department/Contractor:	Location of Incident:

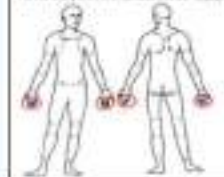
INCIDENT TYPE

☐ Near Miss / Dangerous Occurrence ☐ Lost Work Day Case ☐ Damage to Company/Client Assets	☐ First Aid Case ☐ Restricted Work Case ☐ Damage to the Environment	☐ Medical Treatment Case ☐ Fatality ☐ Fire Incident
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INCIDENT INFORMATION

Involved Person(s):	Yes ☐ No ☐
Number of injured persons:	
How is the associate doing?	
Superior(s):	Sex: ☐ Male ☐ Female
Job title:	

Part of body affected (circle on that body):



Nature of injury (check all that apply):

- ☐ Abrasions, lacerations
- ☐ Amputation
- ☐ Burns, heat
- ☐ Bruise
- ☐ Contusion (bruise)
- ☐ Contusion (to the head)
- ☐ Crushing injury
- ☐ Cut, laceration, puncture
- ☐ Debris
- ☐ Electric shock
- ☐ Foreign body
- ☐ Fracture
- ☐ Head injury
- ☐ Hearing loss
- ☐ Infection
- ☐ Irritation
- ☐ Other: _____

ENVIRONMENTAL

Affected environment	Yes ☐ No ☐	Nature of incident	
Land ☐		Chemical spill	☐
Water ☐		Uncontrolled air emission	☐
Air ☐		Water contamination	☐
		Soil contamination	☐
		Flooding	☐
		Fire explosion	☐
		Management of waste	☐
		Other: _____	☐

DESCRIPTION OF WHAT HAPPENED

(attach diagram, photographs and any witness statements if applicable)

List of tools / machinery / chemicals being used

Certificate

First aid administered and by whom? (title)

Emergency Services Notification

Were any emergency services alerted? Yes ☐ No ☐

Position of associate contacting emergency services:

Which emergency services were contacted?

Authority Notification

Do the local authorities need to be informed? Yes ☐ No ☐

Which local authorities were contacted?

Section 2

ACCIDENT INVESTIGATION

(Section 2 to be completed by I/Os and/or function head/Superior according to level of incident)

Events of conditions that contributed to the incident

People	Machinery / Equipment
Method (Environment / Working Area)	Management

Photo Evidence

WHAT ARE THE FINDINGS OF YOUR INVESTIGATION?

5-why's Root Cause Analysis

Define the problem / findings		
1	Why?	
2	Why?	
3	Why?	
4	Why?	
5	Why?	

Root cause



Root Cause(s):

Corrective Actions:

Action	Responsible Person	Target Date	Status

Who completed and reviewed this form?

Written by:	Title:
Department:	Desk:
Names of investigation team members:	
Reviewed by (SITE LEAD OR EHS Manager):	Title:
	Date:

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Can accident occur on your site? ☐ YES ☐ NO
(If yes, proceed to the incident action for all sites)

Standard Action for all sites	Responsible Person	Target Date	Status
Explore the possibility of the accident happening on your site and ensure that necessary actions throughout to prevent similar accident www.21academy.com	EHS Team		

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Failed Incident Investigations & Root Cause Analysis



Case 1: Repeated Slips in Office

Incident: Employee slipped on wet floor.

Investigation Failure: Focused only on employee carelessness.

Missed Root Cause: No wet weather cleaning protocol.

Outcome: Similar slips continued during rainy days.



Case 2: Machine Injury in Manufacturing

Incident: Worker's hand injured by rotating part.

Investigation Failure: Blamed worker for not paying attention.

Missed Root Cause: Missing machine guard and poor maintenance.

Outcome: Another injury occurred within 3 months.



Case 3: Chemical Spill in Lab

Incident: Acid spill during transfer.

Investigation Failure: Concluded human error.

Missed Root Cause: No SOP or training for chemical handling.

Outcome: Multiple spills over the next year.



Case 4: Construction Fall

Incident: Worker fell from scaffolding.

Investigation Failure: Reported as worker ignored PPE.

Missed Root Cause: No fall arrest system available on site.

Outcome: Fatal fall occurred later.



Case 5: Electrical Shock

Incident: Technician shocked during repair.

Investigation Failure: Blamed technician for not checking power.

Missed Root Cause: No lockout/tagout procedure in company policy.

Outcome: Another shock incident happened.



Why do investigations often stop at blaming individuals?

1. **Ease and Speed:** It's quicker to attribute fault to human error than to analyze systemic issues.
2. **Culture of Blame:** Organizations may lack a “just culture” and default to punitive measures.
3. **Lack of Training:** Investigators may not be skilled in root cause analysis techniques.
4. **Pressure to Close Cases:** Management may prioritize fast closure over thorough analysis.



How can organizations ensure systemic issues are addressed?

1. **Adopt Structured RCA Methods:** Use tools like 5 Whys, Fishbone Diagram
2. **Focus on Processes, Not People:** Shift mindset from “who failed” to “what failed.”
3. **Management Commitment:** Leadership must support deeper investigations and allocate resources.
4. **Integrate Findings into Safety Management System:** Update SOPs, training, and controls based on RCA results.



What tools improve root cause analysis quality?

1. **5 Whys Technique:** Simple but effective for drilling down causes.
2. **Fishbone Diagram:** Visual tool for categorizing causes (People, Process, Equipment, Environment, Materials, Technology, Policies & Procedures).
3. **Failure Mode and Effects Analysis (FMEA):** Predicts potential failures and impacts.
4. **Data Analysis Tools:** Trend analysis from incident reports and near misses.



How can safety culture prevent shallow investigations?

1. **Promote a Just Culture:** Encourage reporting without fear of punishment.
2. **Leadership Engagement:** Leaders model commitment to learning, not blaming.
3. **Training and Awareness:** Educate staff on systemic thinking and RCA importance.
4. **Continuous Improvement Mindset:** Treat incidents as opportunities for learning, not blame.



Summary

Why Incident Investigation is Needed

1. **Legal and Regulatory Compliance:** Required under occupational health and safety laws (e.g., EU directives, Malta OHSA regulations).
2. **Prevent Recurrence:** Identifies what went wrong to stop similar incidents from happening again.
3. **Improve Safety Systems:** Highlights weaknesses in procedures, training, or equipment.
4. **Data for Risk Management:** Provides evidence for updating risk assessments and control measures.
5. **Protect Reputation and Reduce Costs:** Avoids litigation, fines, and productivity losses.



Summary

Importance of Root Cause Analysis

- **Goes Beyond Symptoms:** Finds underlying reasons, not just immediate causes (e.g., why PPE wasn't worn vs why injury occurred).
- **Systemic Improvements:** Addresses organizational failures (training gaps, poor supervision, inadequate design).
- **Supports Continuous Improvement:** Feeds into PDCA cycle and strengthens safety culture.
- **Prevents Multiple Failures:** One root cause can lead to many incidents—fixing it reduces overall risk.
- **Demonstrates Due Diligence:** Shows commitment to proactive safety management.



1. What is the difference between an incident and an accident?
2. Why do we investigate incidents?
3. What is the first step after an incident occurs?
4. What is the reporting deadline for major injuries?



5. What is considered a “notifiable accident”
6. Name one key element of evidence collection
7. Why is interviewing witnesses important?
8. What is a common mistake during investigations?



9. Why secure the scene before investigation?
10. What is the purpose of the “5 Whys” technique?
11. Name one category in a Fishbone Diagram.
12. What is the difference between immediate and root cause?



Summary and Continuous Improvement



Incident Investigation Importance

Effective investigations prevent recurrence and improve workplace safety by identifying root causes.

Understanding Incident Types

Distinguishing incidents, accidents, and near misses helps target the right preventive actions.

Continuous Monitoring and Improvement

Ongoing follow-up on corrective actions ensures sustained safety improvements over time.

Fostering Safety Culture

A learning culture and proactive approach reduce risks and strengthen organizational safety.

Next: Lecture 8: Risk Management in High-Risk Industries

Summary:

Examines risk management practices in industries such as construction, health care and pharmaceutical industries

Learning Objectives:

- Identify Unique risk in high-risk Industries
- Apply industry-specific risk controls
- Evaluate effectiveness of safety programs

