Construction Hazards and Risks Control

Lecture Title: – Enhancing Construction Safety Through Effective Data Management

Lecturer: Katia Fenech

Date: 18th December 2024

Undergraduate Diploma in Occupational Health and Safety

5 Whys

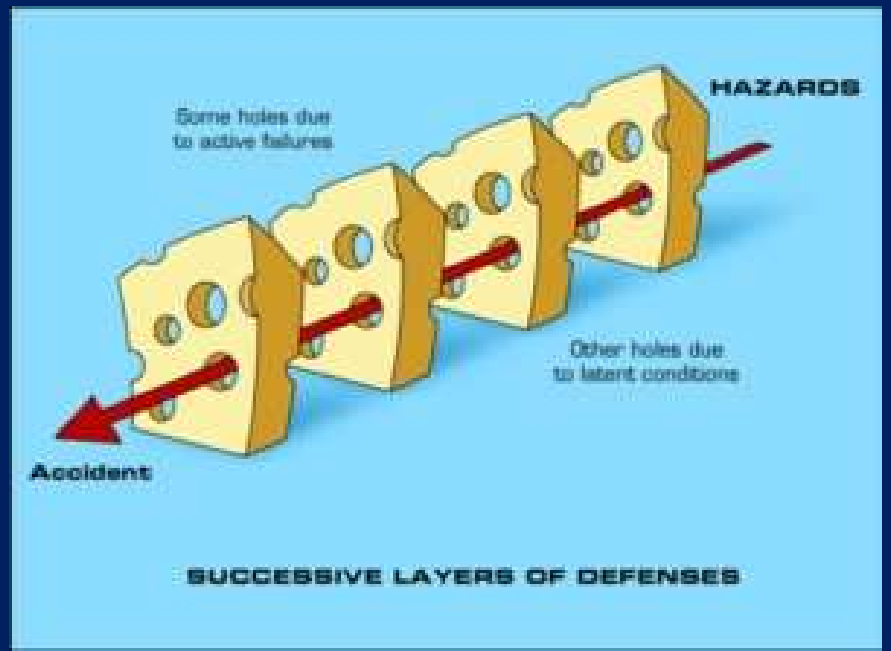
Using the 5 whys strategy, analyse these incidents

At a busy construction site, a forklift operator collided with a pedestrian worker while reversing. The worker suffered multiple fractures and internal injuries. The forklift operator was unaware of the pedestrian's presence in the area and had limited visibility due to construction materials blocking his view.

A worker on a construction site fell 4 meters while working on a steel structure using a temporary ladder. The ladder slipped from its position, causing the worker to fall and suffer spinal injuries and broken ribs.

Swiss Cheese Model

- The Swiss Cheese model is a framework for understanding how incidents or errors occur within complex systems and how they can be prevented. This model would be used to identify and address the holes in each layer of defence and try to make them, as small as possible and as infrequent as possible.



A worker falls from a damaged scaffolding hatch while performing tasks at a construction site.

- Layers of Defence (Swiss Cheese Model):

1. Safety Training
    1. Hole: Incomplete training on the proper use of scaffolding.
    2. Consequence: Workers may not recognize the importance of closing the scaffolding hatch.
2. Scaffolding Inspection
    1. Hole: Failure to conduct regular inspections of the scaffolding setup.
    2. Consequence: The scaffolding may be unstable or improperly assembled, increasing the risk of collapse.

3. Lack of reporting
    1. Hole: Lack of reporting and information to employees.
    2. Consequence: Workers may choose not to report any defects.
4. Site Supervision
    1. Hole: Inadequate supervision and oversight by site managers.
    2. Consequence: Workers may engage in unsafe practices, believing they are not being monitored.
5. Emergency Response Plan
    1. Hole: Unclear or unpractised emergency response protocols for falls.
    2. Consequence: Delays in providing first aid or summoning medical help if an injury occurs.

- Incident Pathway
- In this scenario, the alignment of holes across these layers leads to a fall incident:
- A worker, having received inadequate training on scaffolding safety, climbs a poorly inspected scaffold.
- They do not report defects due to the lack of reporting culture, exacerbated by a lack of supervisory enforcement.
- When the worker falls, an unclear emergency response plan delays rescue efforts, worsening the injury.

- The Swiss Cheese Model illustrates how multiple failures across different safety layers can culminate in an incident. By identifying and addressing the holes in each layer—such as improving training, conducting regular inspections, enforcing PPE usage, enhancing supervision, and clarifying emergency procedures.

Swiss Cheese Model Analysis

- Using the Swiss Cheese Model, analyse the incident by identifying failures at different layers of defence

At a busy construction site, a forklift operator collided with a pedestrian worker while reversing. The worker suffered multiple fractures and internal injuries. The forklift operator was unaware of the pedestrian's presence in the area and had limited visibility due to construction materials blocking his view.

Initial findings

- No clear separation between vehicle and pedestrian routes.
- Hazards identified in previous risk assessments were not addressed.
- No spotters or traffic marshals were assigned to guide forklift. operations.
- The pedestrian worker was not wearing mandatory high-visibility clothing.

A worker on a construction site fell 4 meters while working on a steel structure using a temporary ladder. The ladder slipped from its position, causing the worker to fall and suffer spinal injuries and broken ribs.

Initial findings

- The worker was performing routine maintenance on a steel frame
- A portable ladder was being used instead of scaffolding or a mobile elevated work platform (MEWP)
- The ladder was not secured at the top or bottom
- Site supervisors were not present during the task.
- The worker has not received training on ladder safety.

Group 1

Organizational Level

- Were traffic management plans and risk assessments properly implemented?
- Were there policies to ensure safe vehicle-pedestrian separation?

Procedures and Supervision

- Why was no spotter or traffic marshal present?
- Were supervisors monitoring adherence to safety procedures?

Training and Awareness

- Did workers receive training on vehicle-pedestrian interaction hazards?
- Was PPE compliance enforced?

Environmental Factors

- How did the poor site layout and blocked visibility contribute to the incident?

Human Factors

- Why did the pedestrian enter the forklift's work zone?
- Why did the forklift operator proceed with reversing despite poor visibility?

Group 2

Organizational Level

Were work-at-height policies and plans implemented?

Did the company provide appropriate access equipment?

Procedures and Risk Management

Why was the ladder not secured or stabilized?

Was a proper risk assessment conducted before the task?

Supervision

Why were site supervisors not present to enforce safety measures?

Were daily toolbox talks or safety briefings held?

Training

Did the worker receive sufficient training on ladder safety and fall prevention?

Was the importance of using PPE emphasized?

Human Factors

Why did the worker proceed with an unsecured ladder?

Was there pressure to complete the task quickly?

21 ACADEMY

Undergraduate Diploma in Occupational Health and Safety

Collect Incident Data

- The first step is to gather precise and relevant information about every incident that takes place on your construction site. This includes details such as:
- Date
- Time
- Location/area
- Type
- Severity
- Impact of the incident,
- Names and roles of those involved
- The equipment and materials used
- Any contributing environmental or human factors.

- Use methods like incident reports, interviews, surveys, inspections, photographs, and videos to collect this data. Ensure the information is securely stored and organised in an accessible format, such as a database, spreadsheet, or cloud-based system.

Organise Incident Data

- The next step is to organize the incident data into meaningful categories to better understand the nature and extent of the problem.
- For instance, incidents can be classified by type (e.g., falls, slips, fires, electrical shocks)
- Severity (First Aid, Medical, Lost Time Injury)
- Location (specific site areas or zones)
- Cause (human error, equipment failure, design flaw).
- To visualize and analyse the data effectively, consider using tools such as charts, graphs, tables, or matrices.

Analysing the Data

- The third step involves analysing the incident data to uncover root causes, identify trends and patterns, and assess the effectiveness of current controls and measures.
- Various techniques can be used for this analysis, including the 5 Whys method, fishbone method. These tools help delve into the underlying factors and conditions that contributed to the incidents, enabling you to prioritize the most significant and recurring issues

- Key performance indicators such as incident rate, severity rate, and lost time rate can be used to evaluate your performance and benchmark it against industry standards or best practices.

Reporting Data

- The fourth step is to share the incident data with relevant stakeholders, such as management or clients. Reporting this data is essential for communicating the results of your analysis, demonstrating compliance with legal and contractual obligations.

Implement incident data

- The next step is to act on the recommendations and insights gained from your incident data analysis. This involves implementing specific measures to eliminate or mitigate the risks and hazards that led to the incidents, as well as enhancing your safety culture and overall performance.
- Tools like action plans, checklists, and schedules can help assign responsibilities, set deadlines, and track progress.
- Additionally, methods such as training, feedback, and incentives can be used to engage and motivate workers and stakeholders. It’s important to monitor and evaluate the effectiveness of these actions and make adjustments as necessary.

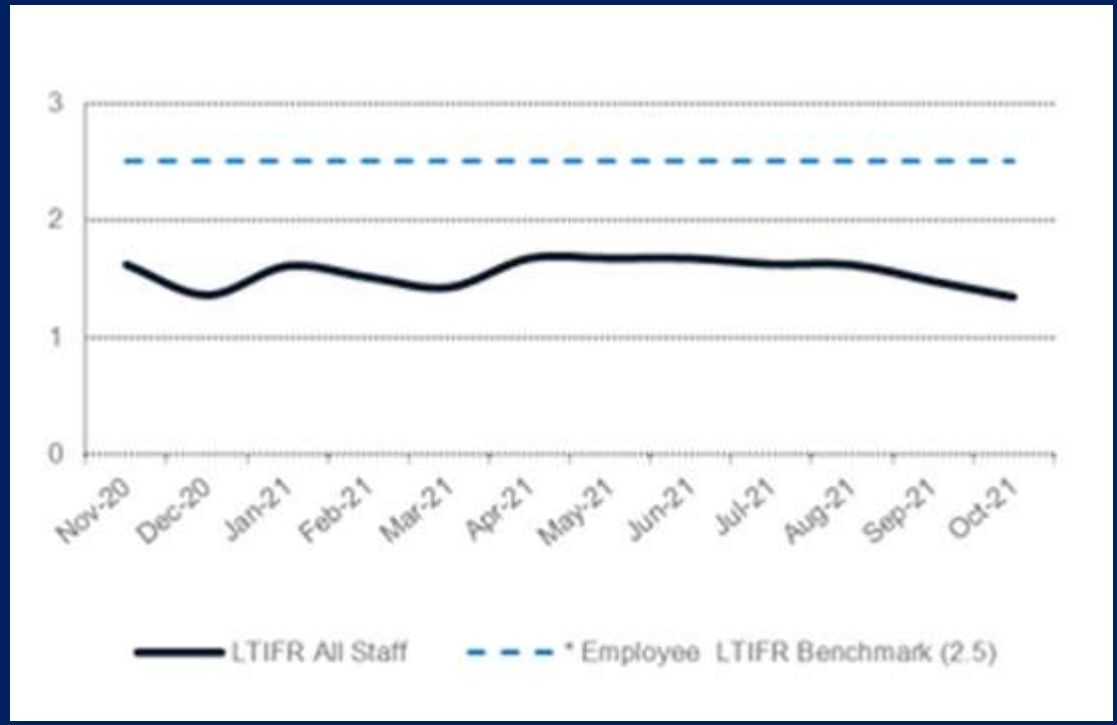
Review incident data

- The final step is to regularly review and update the incident data to ensure your analysis and actions remain current and effective.
- This involves verifying and updating the data, identifying new or emerging incidents, monitoring changes and trends, and evaluating outcomes and benefits.
- Tools like audits and reviews can be used to gather feedback and additional data.
- Sharing insights through methods such as lessons learned, best practices, or case studies can also help reinforce success and promote continuous improvement.
- Remember to celebrate and acknowledge achievements while identifying and addressing any gaps or challenges that arise.

Lost Time Injuries Frequency Rate - LTIFR

- ([Number of lost time injuries in the reporting period] x 1,000,000) / (Total hours worked in the reporting period). Example your company's LTIFR is 2.4, which means there were 2.4 lost time injuries for every one million man-hours worked.
- Number of lost time injuries – H&S
- Total hours worked for the reporting period - HR

LTIFR Graph Example



Lost time injury frequency rates (LTIFR) | dataswa

- Swiss Cheese Model – Aviation Safety | aviationfile-Gateway to Aviation World Swiss Cheese Model

21 ACADEMY

Undergraduate Diploma in Occupational Health and Safety