

Risk Management in Practice

Lecture Title:
Risk Assessment Methodologies

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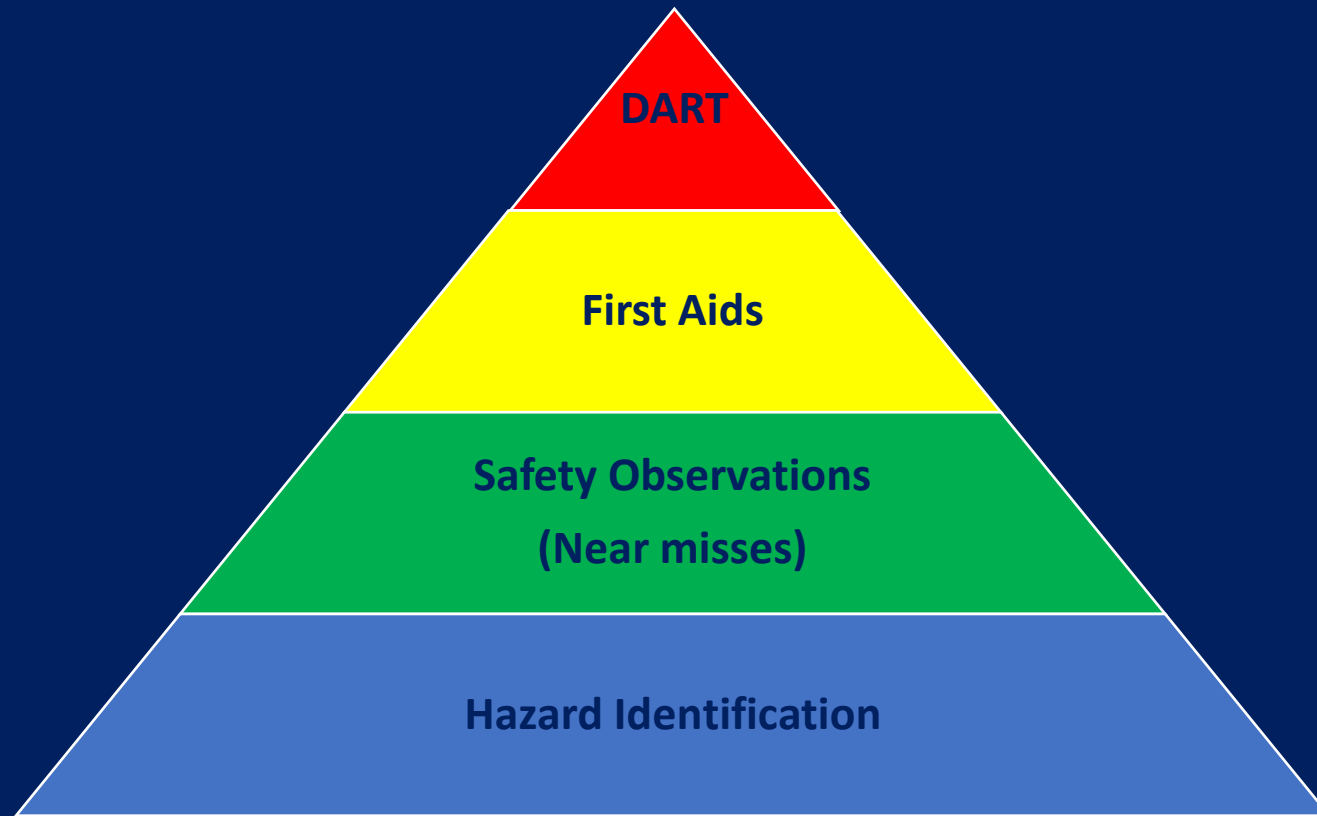
**Undergraduate Diploma in
Occupational Health and Safety**

Welcome and Objectives

- Learning Objectives.
- Understand the concept of risk and its relevance in OHS.
- Recognize the key components of a risk management framework.
- Appreciate the role of legislation, standards and organizational culture in managing risk.
- Begin to identify common workplace hazards and assess associated risks.



Safety Triangle



Hazard Identification Risk Program

Gemba Walks

(Weekly safety process walks performed by Safety Specialists)

Weekly EHS Inspection walks

(performed by departments)

Compliance EHS Audit

(performed by an external accredited company)

EHS Internal Audits

(performed by an external accredited company)

Certification Surveillance Audits

(performed by certification body ISO 14001 & ISO 45001)

**Facility Risk Assessments
Task Based Risk Assessments
Machine Risk Assessments**

The 3 Major Risk Program

Safety Observation Improvement Report

Learning Objectives

Types of Risk Assessments

Learn to differentiate various types of risk assessments used in occupational safety and health.

Application Methodologies

Apply appropriate risk assessment methodologies tailored to specific workplace scenarios.



What is a Risk Assessment

Definition of Risk Assessment

Risk assessment systematically identifies hazards and evaluates their potential risks to safety and health.

Purpose of Risk Assessment

Its purpose is to prevent incidents, ensure legal compliance, and promote a safe working environment.

Legal and Organizational Relevance

Risk assessments are mandated by occupational health and safety laws and are vital for safety management systems.



SUBSIDIARY LEGISLATION 646.11

GENERAL PROVISIONS FOR HEALTH AND SAFETY

AT WORK PLACES REGULATIONS

Summary of key requirements:

- Hazard identification & persons who may be harmed
- Risk assessments for non-eliminable risks
- Factors to consider in the RA:
 - Characteristics of the work
 - Extent of the risk - likeliness and severity
 - Principles of prevention - elimination? reducing risk? substitution?
 - Choice of control measure
 - RA must be reviewed periodically OR when circumstances change/new hazards are introduced
- Communication: results of RA to be brought to the attention of all those affected
- Additional measures when risk is not adequately controlled



Importance of Risk Assessment



Preventing Workplace Incidents

Risk assessment helps identify and mitigate hazards to prevent accidents and injuries at work.

Ensuring Legal Compliance

Conducting risk assessments ensures compliance with health and safety legislation, avoiding penalties.

Fostering Safety Culture

A strong safety culture boosts employee morale and productivity through commitment to well-being.

Types of Risk Assessment

Qualitative Risk Assessment

Qualitative assessments use experience-based judgment to categorize risks as low, medium, or high quickly.

Quantitative Risk Assessment

Quantitative assessments use numerical data for detailed probability and severity calculations of risks.

Application Contexts

Qualitative methods are simpler while quantitative methods suit complex environments requiring precision.



Qualitative and Quantitative Methods

Qualitative Methods Overview

Qualitative methods use risk matrices and checklists, offering simplicity and ease of use for workplace evaluations.

Advantages and Limitations

Qualitative methods are user-friendly but may suffer from subjectivity and lack of detail in results.

Quantitative Methods Overview

Quantitative methods include risk scoring and probabilistic assessments, providing precise numerical risk insights.

Requirements and Challenges

Quantitative methods need extensive data and expertise to execute but allow for detailed decision-making.



Type	Qualitative Risk Assessment	Quantitative Risk Assessment
Definition	Uses descriptive methods to evaluate risks based on <u>likelihood</u> and <u>severity</u>	Uses numerical data and statistical models to calculate risk <u>probabilities</u> and <u>impacts</u>
Approach	Relies on expert <u>judgement, experience and stakeholder input</u>	Based on <u>historical incident data, exposure levels and failure rates</u>
Tools	Risk <u>matrices, hazard checklists, brainstorming sessions</u>	<u>Fault tree analysis, Monte Carlo simulations</u>
Output	Risk levels like: <u>Low, Medium or High</u>	Numeric values like <u>probability (%)</u> , <u>expected loss (\$)</u> or <u>exposure levels</u>
Use Case	Ideal when data is limited or for initial hazard screening	Best for high-risk environments or regulatory compliance
Example	Assessing the <u>risk of a wet floor causing slips by rating likelihood and impact without numerical data.</u>	Calculating the <u>probability of machinery failure leading to injury based on maintenance records and operational hours.</u>

Type	Qualitative Risk Assessment
Scenario	A warehouse has a narrow corridor where forklifts and pedestrians share space.
Hazard	Collision between forklift and pedestrian
Likelihood	Likely (based on staff feedback and past near misses)
Severity	Major (could result in serious injury)
Risk Rating	High
Control Measures	Install physical barriers Introduce one-way traffic system Provide high-visibility clothing



Type	Quantitative Risk Assessment
Scenario	A chemical plant stores flammable liquids in bulk tanks
Hazard	Fire due to tank exposure
Probability of Failure	0.002 per year (based on historical data)
Exposure level	50 workers within 100m radius
Potential impact	5 million euros in damages and potential fatalities
Control Measures	Install automatic fire suppression Increase inspection frequency Relocate non-essential staff



Side by Side comparison for same scenario

qualitative vs quantitative

Scenario: A warehouse with a narrow corridor where forklifts and pedestrians share space

Aspect	Description (Qualitative)
Hazard	Collision between forklift and pedestrian
Likelihood	Likely – based on feedback and near misses
Severity	Major – could result in serious injury
Risk Rating	High - using risk matrix (likelihood and severity)
Assessment Basis	Subjective judgement, safety walk-throughs and team discussions
Control Measures	Install barriers, mark pedestrian zones, train staff
Outcome	Prioritized hazard for immediate mitigation, but no numerical justification

Aspect	Description (Quantitative)
Hazard	Collision between forklift and pedestrian
Probability of incident	0.03 per month – based on incident logs and traffic density analysis
Exposure level	20 pedestrians per shift in shared corridor
Potential impact	50KEuros per incident – medical costs , downtime and legal liability
Expected annual loss	$50k * 12 * 0.03 = 18k$ per year
Assessment basis	Historical data, operational metrics
Control Measures	Cost – benefit analysis supports investment in automated barriers with sensors
Outcome	Financially justified control supports budget allocation

Best Approach?

My opinion

Qualitative is best for Daily use.

1. **Speed and Simplicity:** You can assess risks quickly using a matrix!
2. **Accessibility:** Everyone from operators to supervisors can understand and contribute.
3. **Flexibility:** Works well across diverse hazards – from manual handling to chemical exposure
4. **Engagement:** Encourages team discussions, safety walks and proactive hazard spotting!
5. **Compliance:** Meet legal requirements for risk identification and control under most regulatory frameworks.



Five steps to Risk Assessment



Identify Hazards

Recognize potential sources of harm in the workplace to prevent accidents and injuries.



Assess Who Is Harmed

Determine who may be affected by the hazards and how they might be harmed.



Evaluate Risks and Precautions

Analyze risk levels and decide on appropriate control measures to reduce harm.



Record and Implement

Document findings clearly and put safety measures into practice to protect workers.



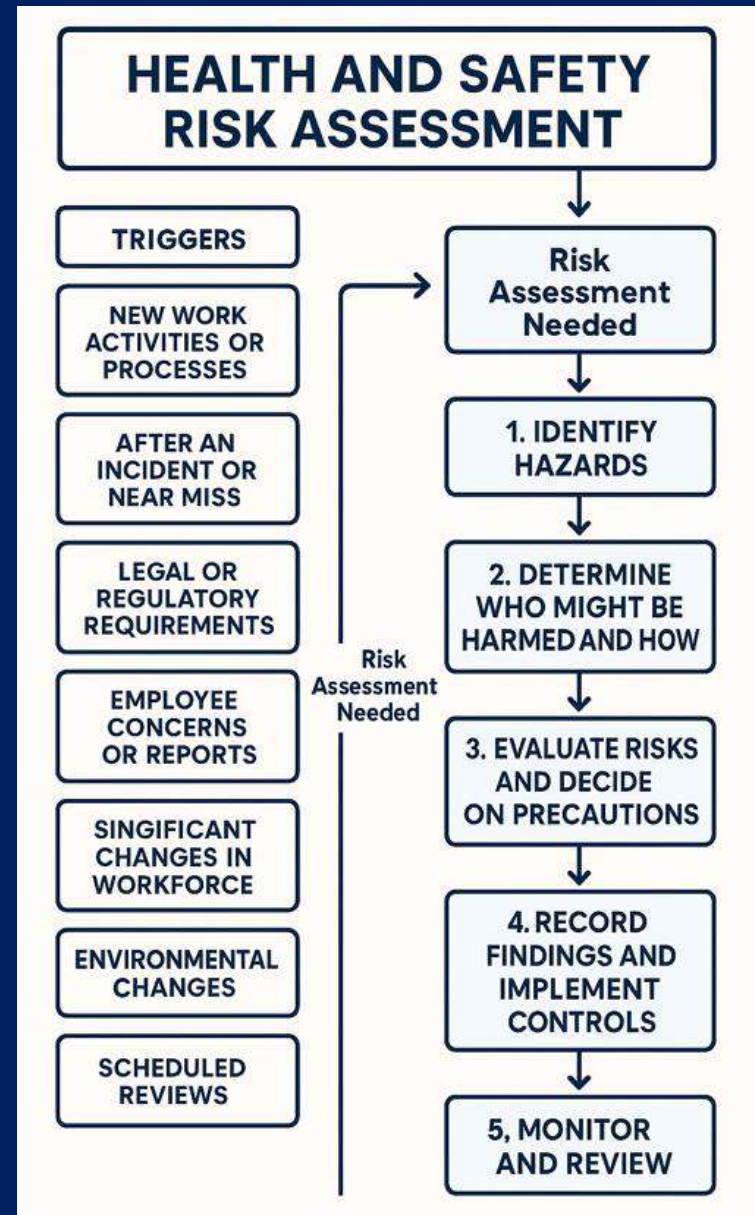
Review and Update

Continuously monitor and improve the risk assessment to ensure ongoing safety.

ACCOUNTABILITY

The Importance of Accountability Process





Type of Risk Assessment	Document Retention	When to Review
Maternity Risk Assessment	Personal Medical Records' File	As required
Task Based Risk Assessment	EH&S Department	Every 3 years or after changes/upgrades in the process
Facility Risk Assessment	EH&S Department	Every 3 years or after changes/upgrades in the process
Machine Risk Assessment	EH&S Department	Every 3 years or after changes/upgrades in the process



Challenges in Risk Assessment

Subjectivity in Evaluations

Subjectivity in risk evaluations can lead to inconsistent and biased assessment results across organizations.

Data Limitations

Limited or incomplete data can hinder the accuracy and reliability of risk assessments.

Organizational Culture Influence

Organizational culture shapes risk perception and can impact transparency and openness in assessments.

Addressing Challenges

Standardized procedures, training, and transparency improve the effectiveness of risk assessments.



Hazard vs Risk

HAZARD

A source or situation with the potential for harm in terms of injury or ill health.



RISK

The likelihood that a person may be harmed or suffer adverse health effects if exposed to a hazard



Risk Rating: Likelihood vs Severity

- A risk matrix helps assess risk levels by combining likelihood and severity:

Likelihood (L)		
Rating	Level	Description
1	Unlikely	But could occur
2	Possible	But unusual
4	Even chance / Probable	Could happen / not surprised
8	Likely / Certain	To be expected / no doubt

Severity (S)		
Rating	Level	Description
1	Low	Scratch or bruise
2	Modest	Laceration or mild ill health effect Break of a minor bone or minor illness (temporary)
3	Serious	Break of a major bone or permanent minor illness. Serious illness of a temporary nature
4	Extremely Serious	Loss of limbs or eyes. Serious illness of a permanent nature. Fatality

- Green: Low Risk
- Yellow: Medium Risk
- Red: High Risk

Risk Index (R)			
Risk	Index	CA Time Frame	Verification of Closure CA.
Low	1 - 3	6 months	Through the Safety Inspection "Gemba" walk 6 months
Medium	4 - 9	3 months	Through the Safety Inspection "Gemba" walk 6 months
High	>10	24 hours	After 24 hours

Machinery Risk Assessment

Chart 3 Machine Risk Assessment Form						CRANE CURRENCY™	
Doc No: TA-EHS-RISK-FORM-0004			Revision: 03		Owner:		
Security Level: S-2 Non-Public, Undesignated					Author:		
RA no.	RA15-01	Facility:		Department:	Print	Process/Room:	Nota Varnish 1 Printing Machine (Line 1)
Rev no.	Rev 4	Date:	02/12/2024	Lead Assessor:	Team Members:		

Machine Risk Assessment form:

This form can be used for machinery risk assessment. The hazards observed will be rated in line with the risk matrix listed in the procedure as per section 8.1.1 and chart 1. The ones rated as high will be tackled primarily.

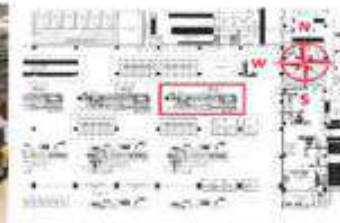


Machinery Risk Assessment

Risk Source ☒ present ☐ not applicable	Description & Safety Hazard	Description of Risk(s) and Impact(s) that include current controls	Significant Risk Potential	Risk Evaluation prior CA				Recommendations to reduce risk	Residual Risk after CA				Preventive action
				L	S	R	Risk level		L	S	R	Risk level	
☒ ERGONOMIC SAFEGUARDING	Guard design, work-area design, guard application, exposure to hot or cold temperature extremes, vibration, lighting, proper tools are available, as appropriate.	<p>The Nota Varnish machine is equipped with guards which do not hinder the operator.</p> <p>The workstation areas are designed in a way that does not create WRULDs for the operator. Reference shall be made to RA 39 –DSE.</p> <p>Temperature was comfortable in the area; no complaints were reported during the time of the risk assessment.</p> <p>Equipment is fixed in place and does not produce vibration motions.</p> <p>The amount of illumination falling on the working plane is suitable for the job.</p> <p>Associates perform different roles whilst machine is in the printing process, as such the need of job rotation is not required.</p>	Work related upper limbs disorders (WRULDs)	1	2	2	Low	No action is to be taken at this point in time as the employer already took into consideration safety aspects as reasonably practicable.	1	1	1	Low	<p>Will be monitored during annual RA reviews, departmental weekly checks, safety inspection tours, H&S audits and following a modification in the equipment.</p> <p>Action by who: Crane Associates</p> <p>Action by when: Throughout the year</p>

Task Based Risk Assessment

Hazard Identification and Risk Evaluation (Task Based)													
Note:		For risk rating refer to tables available in procedure section E.1.2 and chart 3											
RA no:				Revision no:									
Assessment:				Risk assessment date:									
Location:				Review date:									
Area:				Assessor:									
Activity:	Nota Variable 1 Printing Process												
Area / Process / Task: Nota Variable 1 Printing Process													
1	2	3	4	5				6	7				8
Task	Hazards Identified	Risks	Existing control	Risk Evaluation prior Corrective Action				Recommendations to reduce / eliminate the risk	Risk Evaluation if recommendation is implemented				Preventive Action recommendation
				Likelihood	Severity	Risk Rating	Risk level		Likelihood	Severity	Risk Rating	Risk level	
Loading of paper onto machine	Cuts from paper being handled	Injury to associates	Paper is brought by palletiser, each pallet contains 20 reams of paper and each ream containing 500 sheets.	3	3	6	Medium	Training must be given to every new printer employed. Responsible Person: Ian Farrugia Target Date: Continuously	3	3	6	Low	Will be inspected following implementation of corrective actions. Also it will be monitored during safety inspection tours, safety audits, departmental weekly checks. Responsible Person: All associates Target Date: Throughout
	WRLDs		Palletiser is maintained by engineering and included in CMMS.										
	Pinch points by the knocking tool		SWL of palletiser is not exceeded										
			Machine renders manually transfer paper reams onto a dedicated knocking table to align them and then load them onto the machine.										
	Manual Handling	A nylon knocking tool is used for this process.											
		Operators are trained and aware on how to handle. Training sessions were given.											
Lack of training	Dedicated lifters are provided to associates in order to reduce as reasonable practicable manual lifting operation.												
	During the time of the risk assessment the loads of paper were loaded on suitable pallets, no issue of falling load was noticed.												
		Ergonomics hazards such as lifting of paper loads, pulling / pushing of paper loads from the machine were observed. Operators working in line were all trained on manual handling.											



Task Based Risk Assessment

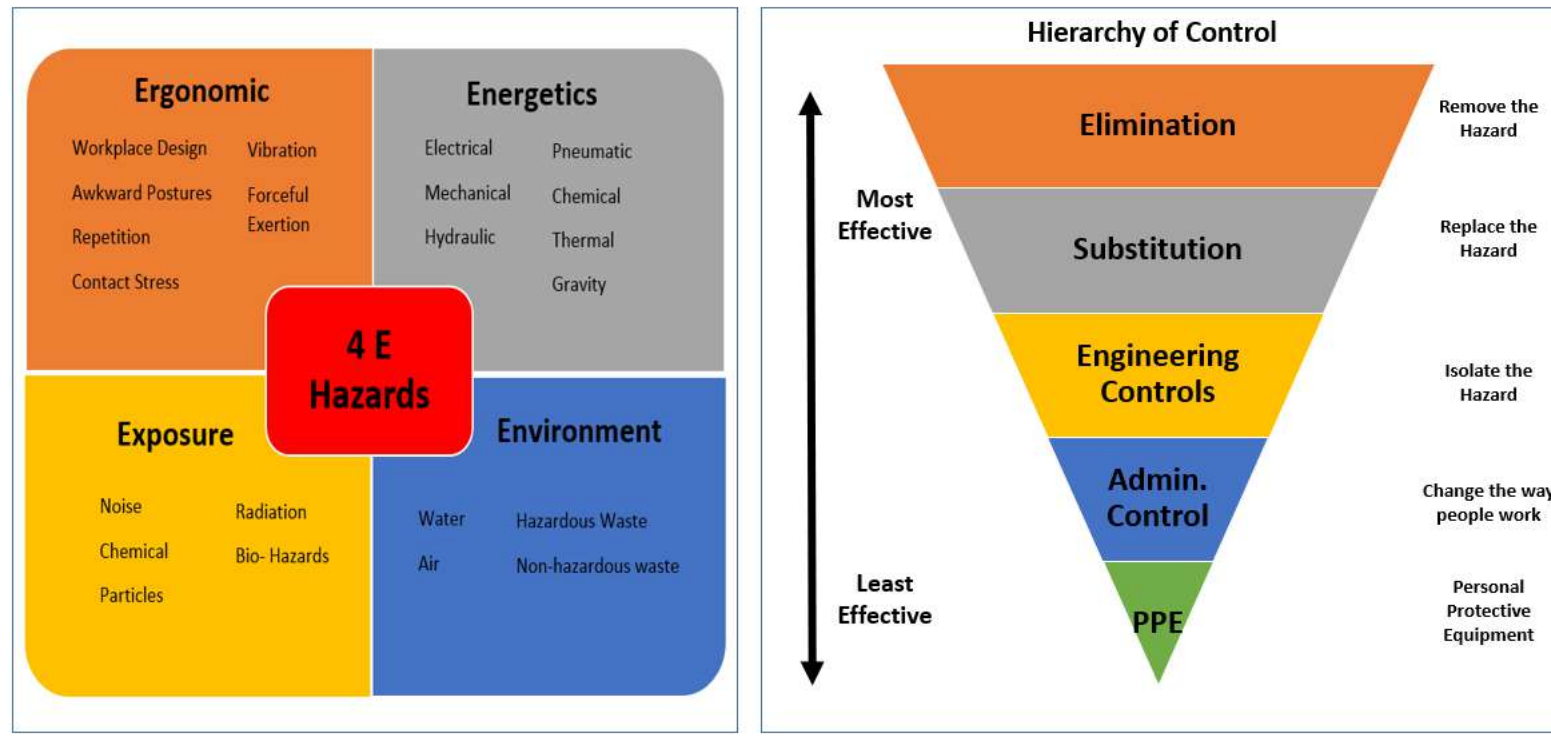
Sample Pick up and examining	Drawing-inn	Injury to associates	Printers should need to pick-up samples from the Nota Varnish machine for inspection purposes whilst machine is in running mode. Samples are only picked when a button from the control panel is pressed. Once button is pressed, operator is allowed to pick up sample.	1	2	2	Low	No actions required at this point in time. Operators must always be aware during this process.	1	2	2	Low	Will be inspected following implementation of corrective actions. Also it will be monitored during safety inspection tours, safety audits, departmental weekly checks. Responsible Person: All associates Target Date: Throughout
Ink refill process 	Slips, trips & falls	Injury to associates	Ink refilling process requires the printer to manually handle the ink bucket and top up the ink containment by a spatula.	2	3	6	Medium	To communicate with relevant associates, not to wear any loose clothing, bracelets or neck hanging accessories while working on machine. To be discussed during review of this RA & toolbox talks. Responsible Person: Ian Farrugia Target Date: 28/02/2024	1	3	3	Low	Will be inspected following implementation of corrective actions. Also it will be monitored during safety inspection tours, safety audits, departmental weekly checks. Responsible Person: All associates Target Date: Throughout
			Associates trained on how to handle ink products. Gloves being worn during the time of the risk assessment.					• Awareness to operators of the rotating & mechanical moving parts. • To make aware the associates about such risk. • Female operators must pull-up their hair using a pull band or a helmet. • And must not wear jewelry such as: watches, rings, bracelets etc. Responsible Person: Ian Farrugia Target Date: 28/02/2024					
	Entanglement with rotating ink roller		MSDS for all inks and chemicals used available during the time of the risk assessment.					To enhance safety awareness to all associates involved with the machine about drawing-inn hazards. Will be given during risk assessment training. Responsible Person: Ian Farrugia Target Date: 28/02/2024					
			Administrative controls in place to keep operator aware of the hazards present.					To make use of safety glasses and gloves while cleaning of roller process. Responsible Person: Print Operators Target Date: Continuously					
	Splashes of ink into eyes and or skin contact		Roller speed is very slow so risk of getting drawn-in is minimum.										
Varnish Refill Process	Manual Handling	WRULDs	Varnish is topped up by the operator on an average of 8 to 10 times every 12 hours.	2	4	8	Medium	Operators to maintain good body posture during this task as varnish tanks are heavy, to reduce risk of back injuries. Responsible Person: Print Operators Target Date: Continuously	1	3	3	Low	Will be inspected following implementation of corrective actions. Also it will be monitored during safety inspection tours, safety audits, departmental weekly checks. Responsible Person: All associates Target Date: Throughout
	Chemical Splashes	Injury to associates	Varnish tanks weigh approximately 23kg each.										
	Slips, trips & falls		Associates trained on how to handle ink products. Gloves and safety glasses being worn during the time of the risk assessment.										
			MSDS for all inks and chemicals used available during the time of the risk assessment.										
	Flying particles		Printers should need to clean the machine sensors by an air gun.										Will be inspected following

Facility Risk Assessment

Chart 5 Facility Risk Assessment										CRANE CURRENCY™			
Doc No: MTA-EHS-RISK-FORM-0006				Revision: 03		Owner:		Date Released: 17 Dec 2019					
Security Level: S-2 Non-Public, Undesignated				Author:									
Risk Source ☒ present ☐ not applicable	Description & Safety Hazard	Description of Risk(s) and Impact(s) that include current controls	Significant Risk Potential	Risk Evaluation prior CA				Recommendations to reduce risk.	Residual Risk after CA				Preventive action
				L	S	R	Risk level		L	S	R	Risk level	
☒ Evacuation 	Escape doors are available at the facility clearly identified from inside and as well open outwards. Are evacuation doors made up of fire resistant material of suitable & sufficient fire rating? Evacuation drills are conducted in line with legal notice L.N.44 of 2002 (S.L.424.15)? Are emergency doors and escapes caters for wheel chairs? Are escape routes and signs are properly lit?	Various fire escape doors available at block A and clearly identified. Yes all fire doors on site are fire proof, specifications can be found at the engineering department. Yes, emergency drill are being done according to the legal notice, for verification check drill reports. Yes, there various emergency doors that cater for wheelchair, signage is in place. Yes, luminous signs available around block A facility. Various emergency exit door luminous signage was switched off during the time of the inspection.	Installation of signage required for wheelchair escape routes.	1	2	2	Low	No actions to be taken at this point in time.	1	2	2	Low	Will be monitored during annual RA reviews, departmental weekly checks, safety inspection tours, H&S audits. Action by who: Crane Associates Action by when: Throughout the year

4 E (Ergonomic, Energetics, Exposure, Environment)

4 E Hazards & Control



Example of RA

4 E (Ergonomic, Energetics, Exposure, Environment)

4E Risk Assessment Form											
Department:						☐ INITIAL ASSESSMENT		☐ UPDATED ASSESSMENT		(choose one)	
Area:						Date:					
Supervisor:						Assessment Participants:					
Assessment Prompted by an Incident?				☐ NO ☐ YES (choose one)							
Is the Task Being Assessed Routine?				☐ NO ☐ YES (choose one)							
Task Description						Current Control Measures		ENGINEERING: ADMIN: PPE:			
Frequency of Exposure 0 - No Exposure (exposure never occurs) 1 - Low (occurs < 1x per month) 2 - Medium (occurs weekly to monthly) 4 - High (occurs daily to weekly)			Probability of Injury (% chance) 1 - Not likely to occur (0-10%) 2 - Possible, somewhat unlikely (10-50%) 6 - Possible and could occur (50-90%) 10 - Likely to occur (>90%)			Severity of Impact 0 - No injury (near miss) No environ. impact (near miss) 1 - Minor injury (first aid) Minor environ. impact (contained spill or release) 2 - Moderate injury (medical) Moderate environ. impact (limited to site premises) 3 - Serious injury (lost time) Serious environ. impact (beyond the site premises) 4 - Severe injury (disability) Severe environ. impact (fines, forced shut down)					
Risk		Initial Assessment				Updated Assessment (w/ corrective actions)					
		F	P	S	Risk Rating	F	P	S	Risk Rating		
Ergonomic - (Lighting, movement, material handling, tools)											
Workplace design					0	●				0	●
Repetition					0	●				0	●
Contact Stress					0	●				0	●
Forceful Exertion					0	●				0	●
Awkward Position					0	●				0	●
Vibration					0	●				0	●
Energetic - (Bump/cold by, Cut by, Caught In/On/Between; Pinch Points, Slips/Falls, Striking Against, Struck by or load movement of object)											
Moving Parts					0	●				0	●
Electrical					0	●				0	●

HAZOP (Hazard & Operability Study)



HAZOP Overview

HAZOP is a systematic technique to identify hazards and operability issues in complex systems.



Primary Purpose

HAZOP proactively detects deviations that may cause unsafe conditions or equipment failure.



Application and Benefits

HAZOP supports risk assessment across sectors and helps foster a preventive safety culture. (mainly in complex systems where safety is critical!)

Step-by-Step Methodology

Define Study Scope

Identify the specific process, system, or task to be analyzed for risk assessment.

Breakdown into Nodes

Divide the process into manageable sections or nodes for detailed examination.

Apply Guide Words

Use guide words like 'No', 'More', and 'Less' to identify possible deviations from normal operation.

Evaluate and Document

Explore causes, assess safeguards, recommend controls, and document findings comprehensively.



Example Scenario and Benefits

HAZOP in Chemical Mixing

HAZOP identifies deviations like excess chemical addition caused by equipment failure or human error in labs.

Existing Safeguards

Automated dosing systems and PPE help prevent hazards during chemical processes in laboratories.

Recommended Improvements

Interlock systems and improved training enhance safety by reducing human error and equipment faults.

Benefits of HAZOP

HAZOP promotes hazard identification, team analysis, regulatory compliance, and preventive safety culture.



Communication

2) Executive summary:

The risk assessments conducted for the Nota Varnish equipment and printing process with the participation of the Print Manager, printer operators and technical staff did not reveal high risk issues. Some observations that require medium attention were observed and shall be addressed through the health and safety CAPA process with the support of the area owner.

3) Main findings of the inspection:

RA 15-01: Nota Varnish 1 Machinery

- Mechanical rotating parts are exposed in certain areas (Feeder area) and could cause injury to personnel.
- The Nota Varnish has belts and pulleys which part of them are covered and others are not.

RA 15-02: Printing Process.

- Ergonomics hazards such as lifting of paper loads, pulling / pushing of paper loads from the machine were observed.
- During the time of inspection associates highlighted that there is a risk of pile falling on associates during change over. There is a possibility that chain can break and result in a serious injury.
- During the time of the risk assessment observation for improvement was noted, this repetitive task in handling heavy varnish tanks is posing a risk for associates which can be eliminated easily by installation of a pump. Pump installed by the engineering department but is not being used as it is not strong enough.

5) Recommendations:

Recommendations for improvement are listed in the recommendations section in respective risk assessment reports.

- RA 15-01 Nota Varnish machinery equipment.
- RA 15-02 task involved in the printing process.

6) General control measures:

8) Summary of Personal Protective Equipment needed according to task (as per Directive 96/58/EC):



- Safety Shoes – S3SRC



- Gloves- Conforms with EN374, EN407 & EN388 (Cut Resistant)



- Eye protection – Conforms with EN166

7) List of Chemicals used during this process:

- UV NC PEL
- Metal Polish
- WD-40

RA REGISTER

RA REGISTER										
		First assessed		Revision 1						
Ref	Activity / Area	First assessed	Participants	Planned Review date	Review Date (As per SOP)	Actual Review Date	By Whom	Completed actions %	Comments	Planned R date
RA 30-03	BPS 1 + NOTA PACK BPS 2 + NOTA PACK	11/Sep/2018	DC, SC, OC, CV	11/Sep/2019	11/Sep/2020	3/Apr/2020	JF, SC, DM, DE	100%	Actions Closed	3/Apr/2020
RA 30-04	BPS 3	2/Jul/2019	AB, SC	2/Jul/2020	2/Jul/2021	6/Apr/2020	JF, SC, DM, DE	100%	Actions Closed	6/Apr/2020
RA 30-05	BPS ACTIVITIES	27/Sep/2018	DC, SC	27/Sep/2019	27/Sep/2020	6/Apr/2020	JF, SC, DE	100%	Actions Closed	6/Apr/2020
RA 31-01	STOCK BOX ROOM FACILITY	7/Apr/2020	JF, RM, NV	7/Apr/2021	7/Apr/2022	13/May/2021	JF, RM, NV	100%	Actions Closed	13/May/2021
RA 31-02	COUNTING EQUIPMENT	7/Apr/2020	JF, RM, NV	7/Apr/2021	7/Apr/2022	13/May/2021	JF, RM, NV	100%	Actions Closed	13/May/2021
RA 31-03	DRYING OVEN	8/Apr/2020	JF, RM, NV	8/Apr/2021	8/Apr/2022	13/May/2021	JF, RM, NV	100%	Actions Closed	13/May/2021
RA 31-04	STOCK BOX ACTIVITIES	8/Apr/2020	JF, RM, NV	8/Apr/2021	8/Apr/2022	14/May/2021	JF, RM, NV	100%	Actions	14/May/2021

Other Methodologies

- Bowtie Analysis

Bowtie Analysis visually maps risk scenarios along with controls to understand risk pathways effectively.

- Failure Modes and Effects Analysis

FMEA identifies potential failure points and their impacts to prioritize risk mitigation measures.

Hazard and Operability Study

- HAZOP systematically examines processes to detect deviations and hazards enhancing process



FMEA (Failure Mode and Effects Analysis)

How to Apply FMEA in Health & Safety Context

Step 1: Define the Scope

Choose a process, task, or system (e.g., chemical handling, machine operation).

Step 2: Break Down the Process

List each step or component.

Step 3: Identify Failure Modes

What could go wrong at each step?

Step 4: Assess Risks

Rate **Severity**, **Occurrence**, and **Detection** (typically on a scale of 1–10).

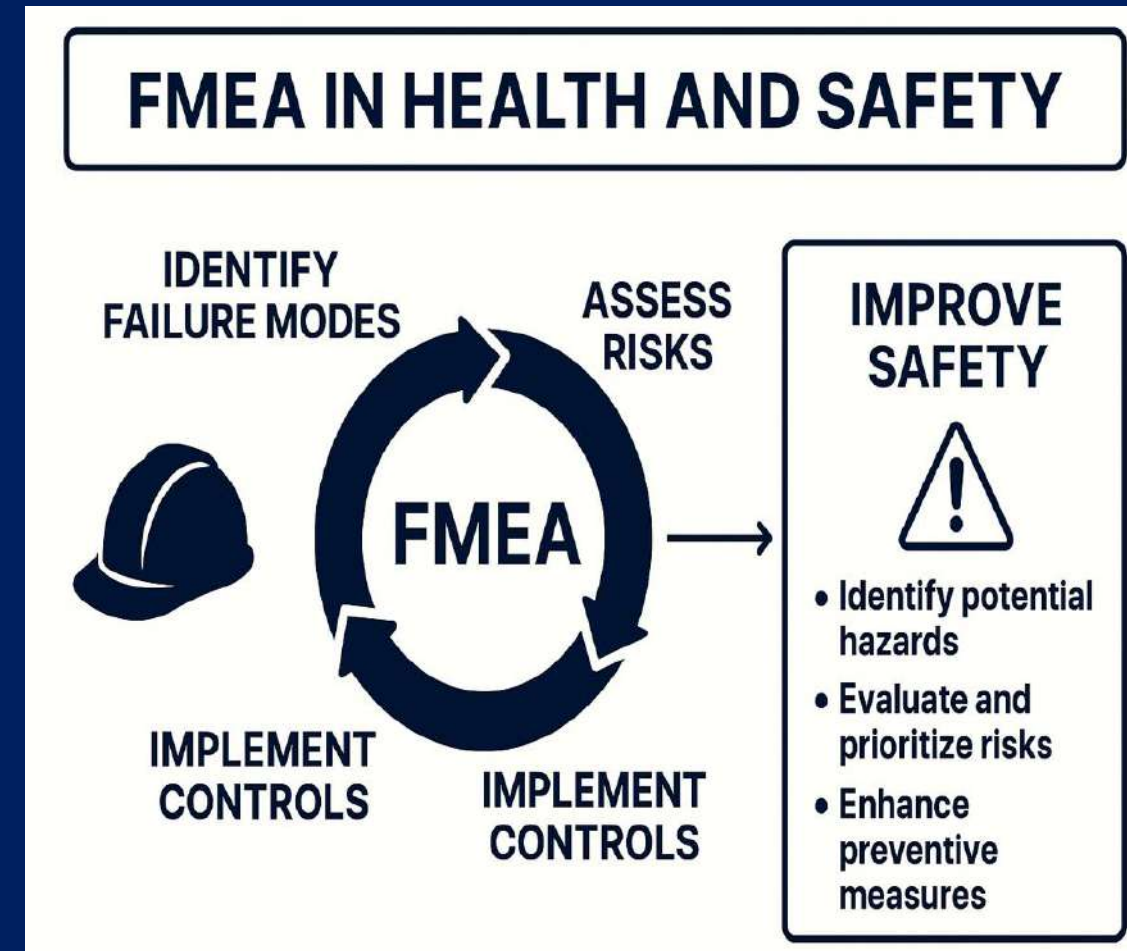
Calculate **RPN (Risk Priority Number)** = **Severity** × **Occurrence** × **Detection**

Step 5: Prioritize and Control

- Focus on high RPNs.
- Apply controls using the **Hierarchy of Controls**.

Step 6: Review and Update

- After changes, incidents, or periodically.



“Imagine you're the safety officer at a chemical plant, a hospital, and a construction site.

Would you use the same risk assessment method in all three?

Why or why not?”



1. Chemical Plant

Recommended Method: *HAZOP or Quantitative Risk Assessment (QRA)*

Why:

- High-risk environment with hazardous substances.
- Need for detailed analysis of process deviations.
- Regulatory requirements often demand quantitative data.

2. Hospital

Recommended Method: **RAMS** or Job Safety Analysis (JSA) or Qualitative Risk Assessment

Why:

- Human-centered tasks (e.g., patient handling, medication).
- Risks often involve ergonomics, infection control, and human error.
- Qualitative methods allow for flexible, scenario-based assessments.

3. Construction Site

Recommended Method: Task-Based Risk Assessment or JSA or RAMS

Why:

- Dynamic and changing work environment.
- Frequent use of machinery, working at heights, confined spaces.
- JSA helps break down tasks and identify hazards step-by-step.



Interpreting Risk Assessment Outcomes

Understanding Assessment Results

Comprehending risk assessment outcomes is essential for identifying potential hazards and their impacts effectively.

Communicating Findings

Clear communication of risk findings to stakeholders ensures informed decision-making and collaborative risk management.

Linking to Control Measures

Connecting assessment results to appropriate control actions helps mitigate risks and enhance safety effectively.



Summary of Key Points

Types and Methods of Risk Assessment

Various types and methods of risk assessments help identify hazards and evaluate their impact in workplaces.

Application in Workplaces

Risk assessments are applied in diverse workplace scenarios to prevent incidents and ensure safety.

Importance of Interpretation

Interpreting risk assessment outcomes effectively is crucial for compliance and fostering a safety culture.

Frameworks and Case Studies

Key frameworks and case studies demonstrate practical implementation of risk assessment strategies.



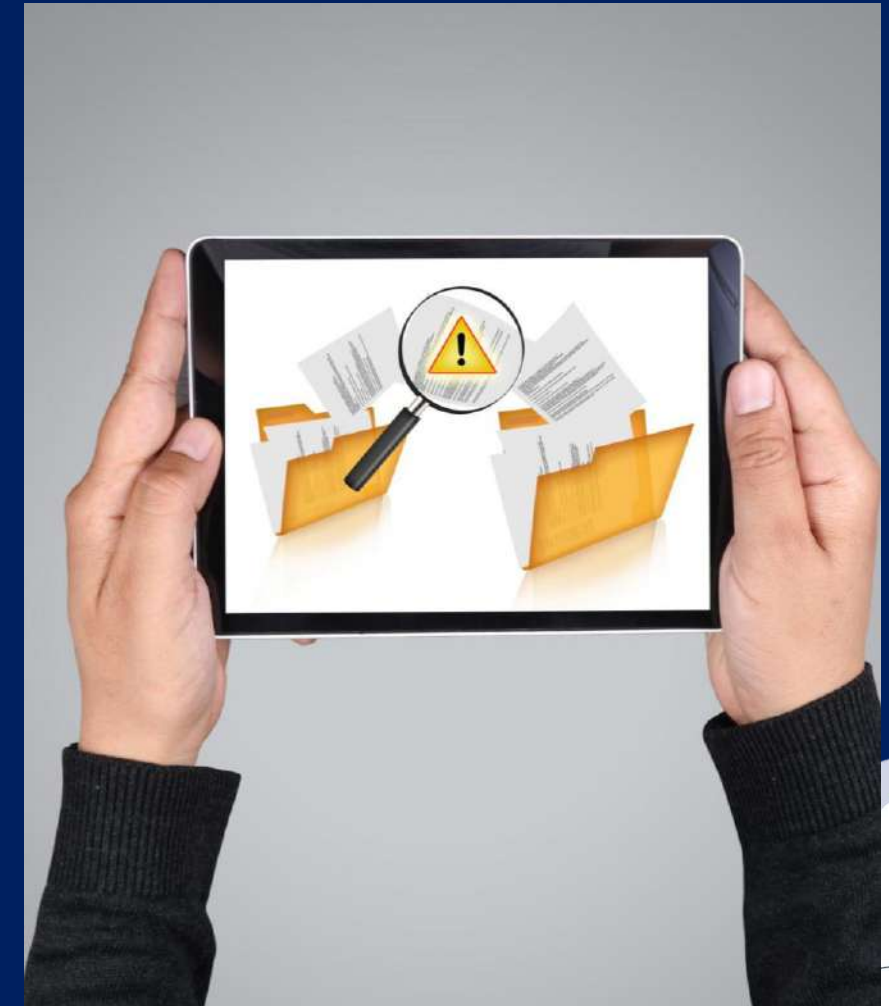
Suggested Reading

HSE Risk Assessment

The HSE Five Steps to Risk Assessment guide explains systematic approaches to identifying and managing workplace risks effectively.

ILO OSH Guidelines

ILO Guidelines on Occupational Safety and Health Management Systems support the creation of structured and effective safety strategies.



Next: Lecture 3: Hazard Identification Techniques

Systematic approaches to identifying hazards in the workplace using tools like checklists, inspections, and job safety analysis.

Learning Objectives:

- Identify various types of workplace hazards.
- Use structured techniques for hazard identification.
- Document and communicate identified hazards effectively.

