Risk Assessment Evaluation and Control

Lecture Title: COMPILATION OF RISK ASSESSMENT

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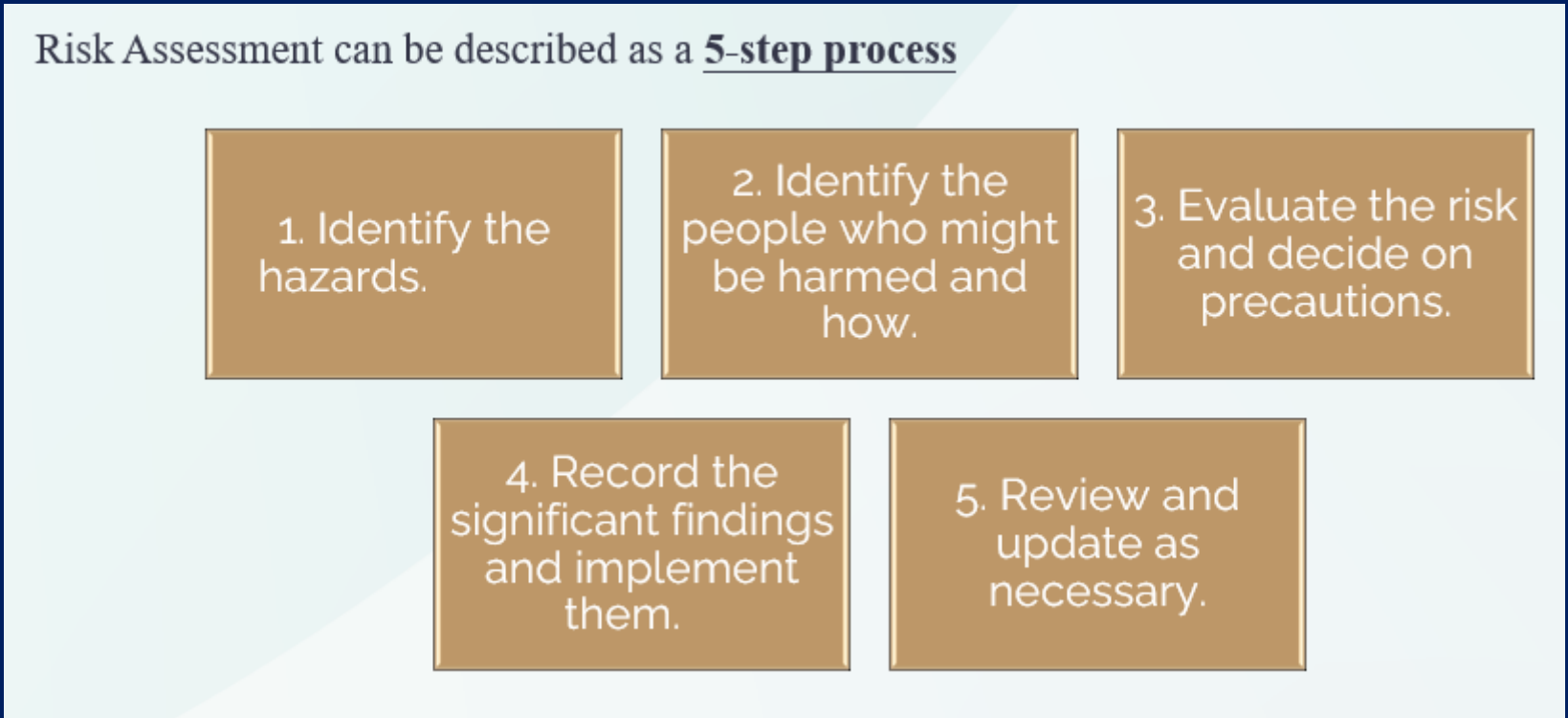
Date: 29th October 2025

Undergraduate Diploma in Occupational Health and Safety

Lecture Aim

- Understanding ALARP
- Understanding the 3 types of Risk Assessment i.e. Qualitative, Semi-Quantitative
- Understanding one Qualitative / Semi-Quantitative RA method.

Risk Assessment – 5 Steps Process



Aim: To remove the risk or reduce it to a level that is As Low As Reasonably Practicable (ALARP).

As Low as Reasonably Practicable (ALARP)

What does the term
"as low as reasonably practicable" (ALARP) mean?

Class Discussion

As Low as Reasonably Practicable (ALARP)

What does ALARP mean?

- Legislation requires employers to reduce **risks as low as reasonably practicable** (ALARP).
- Balances risk reduction against the time, cost, and difficulty of implementing control measures.
- Ensures safety without demanding disproportionate effort.
- Legal meaning of ‘reasonably practicable’ means.

As Low as Reasonably Practicable (ALARP)

Practical Examples of ALARP

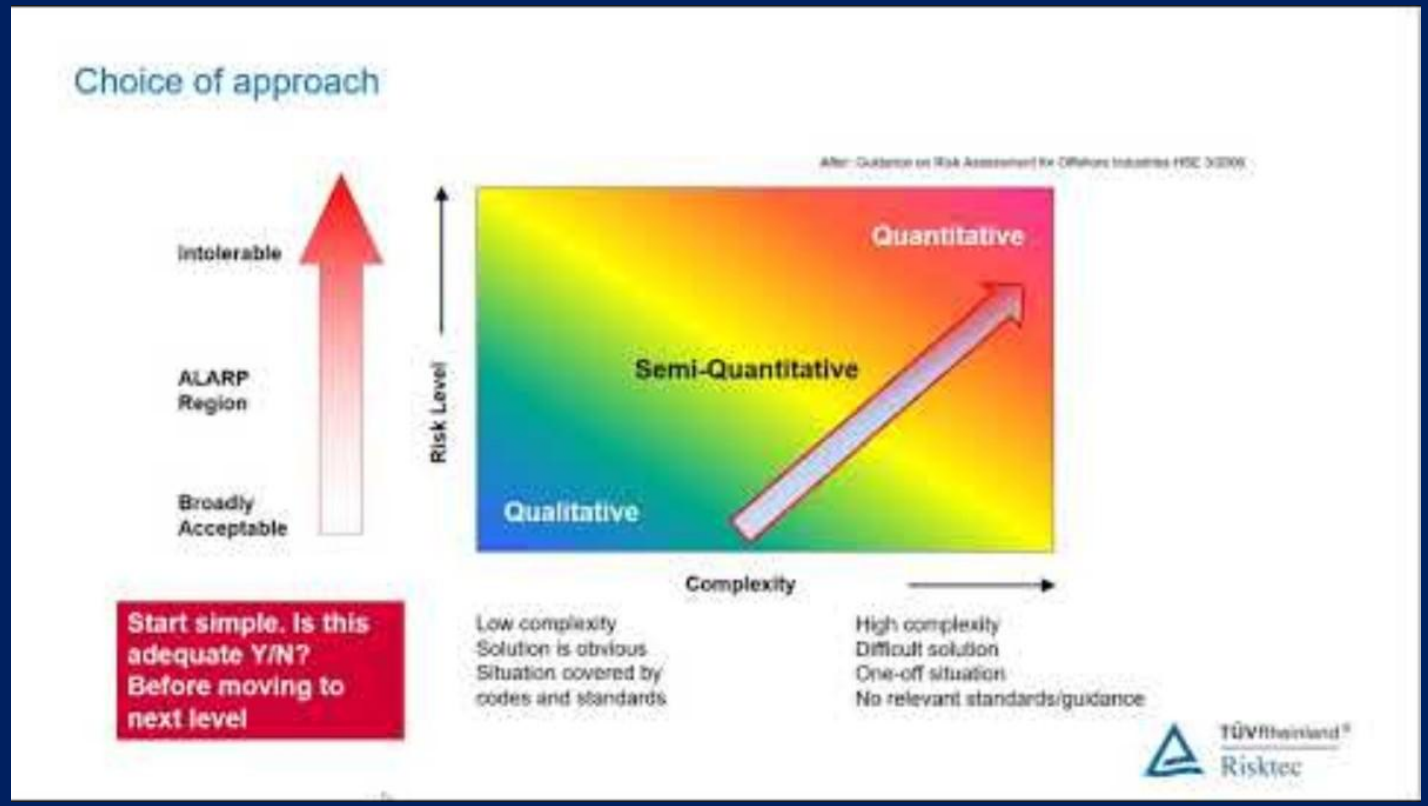
- **Construction Site:** Installing guardrails on scaffolding (low cost, big risk reduction → must be done).
- **Manufacturing:** Using noise-dampening enclosures vs. providing hearing protection (balance between cost and effectiveness).
- **Office Safety:** Ergonomic chairs to reduce back injuries (reasonable cost, prevents long-term health risks).
- **Chemical Handling:** Providing spill kits and training (cost-effective vs. high risk of harm).

As Low as Reasonably Practicable (ALARP)

Common Misunderstandings

- Not about removing *all* risk (impossible).
- Not an excuse for inaction due to minor costs.
- Not a one-time check – ALARP requires continuous review as technology and practices improve.

As Low as Reasonably Practicable (ALARP)



Qualitative, Semi-Quantitative or Quantitative

Risk assessment can be a qualitative, semi-quantitative or quantitative process.

▪Any assessment should begin with a simple qualitative assessment, including consideration of whether any relevant good practice is applicable.

▪ In some cases, it will be appropriate to supplement the qualitative assessment by a more rigorous semi-quantitative or quantitative assessment.

▪ A large number of judgments that we make both as individuals and as decision makers in organizations, are based on qualitative assessments rather than comprehensive mathematical models

Qualitative Risk Assessment

- Where the hazards presented by the undertaking are few or simple, for example in many small businesses, it is appropriate to just carryout a simple qualitative risk assessment.

- Where the hazards and risks are obvious they can be addressed directly, and no complicated processor skills will be required.

- A qualitative risk assessment should be a systematic examination of what in the workplace could cause harm to people, so that decisions can be made as to whether existing precautions or control measures are adequate or whether more needs to be done to prevent harm.

Semi-Quantitative Risk Assessment

- In many intermediate cases where the hazards are neither few and simple, nor numerous and complex, for example if there are some hazards that require specialist knowledge, such as a particular complex process or technique, it may be appropriate to supplement the simple qualitative approach with a semi-quantitative assessment.

- In carrying out semi-quantitative risk assessments, simple qualitative techniques, supplemented by for example measurements to identify the presence of hazards from chemicals or machinery, or the use of simple modeling techniques may be appropriate.

- **A number of different techniques for carrying out semi-quantitative risk assessments exist, including risk matrix approaches.**

Quantitative Risk Assessment

- Where the hazards are numerous and complex, and may involve detailed processes, for example in the case of large chemical process plants or nuclear installations, detailed and sophisticated risk assessments are needed

- Quantitative risk assessment (QRA) involves obtaining a numerical estimate of the risk from a quantitative consideration of event probabilities and consequences.

- In carrying out quantitative risk assessments, special quantitative tools and techniques are used for hazard identification, and to estimate the severity of the consequences and likelihood of realization of the hazards.
- Where such methods and techniques are used it is important that they are carried out by suitably qualified and experienced assessors.

- The results of the QRA will be numerical estimates of the risk, which can be compared to numerical risk criteria at the risk evaluation stage.

Fine-Kinney Method

- **One Qualitative / Semi-Quantitative RA method is:**

Fine-Kinney method(asalsousedbyOIRA,EUAgency)

- **Risk=Severity x Exposure x Probability**
- Severity of injury linked to hazard (often called ‘HazardSeverity’)
- Exposure frequency to the hazard
- Probability of the hazard to occur when exposed
- Numerical method

Fine-Kinney Method

Frequency : reserved for observed data –it's a count of the number of times an event occurs.

Probability: the extent to which something is likely to happen or be the case/the measure of the likelihood that an event will occur.

Severity/Hazard Severity: relative to the Potential Consequences of each hazard.

Fine-Kinney Method

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Fine-Kinney Method

The Fine-Kinney method is a quantitative risk assessment technique that evaluates hazards by assigning numerical values to three factors: Probability (likelihood of the hazard occurring), Exposure (frequency of exposure to the hazard), and Consequence (severity of damage if the hazard occurs).

A risk score is then calculated by multiplying these values (Risk Score = P × E × C), which helps prioritize risks based on their importance and guides in the implementation of control measures.

Fine-Kinney Method

Probability (P)	Description (qualitative)
0.1	Virtually impossible
0.2	Practically impossible
0.5	Plausible, but unlikely
1	Improbable, but possible at boundary conditions
3	Unusual, but possible
6	Possible
10	Predictable

Fine-Kinney Method

APPENDIX A. Risk Evaluation Table According to the Classic Fine-Kinney Method

Order	Hazard	Risk	Probability	Frequency	Severity	Risk Score
1	Breakdown Of Electric Wiring	Financial Damage – Injury - Death	3	2	40	240
2	Fire Hazard	Financial Damage – Injury - Death	3	0,5	100	150
3	Hangar Door	Financial Damage – Injury - Death	1	0,5	40	20
4	Use of Hand Tools and Not Using Personal Protective Equipment	Financial Damage – Injury - Death		3	40	720
5	Using cutting and penetrative tools	Financial Damage – Injury - Death	6	1	40	240
6	Smoking	Sickness – Psychological Effects - Fire	3	1	15	45
7	Stowing	Financial Damage – Injury - Death	1	1	40	40
8	Working with Rotating Parts	Financial Damage – Injury - Death	1	3	40	120
9	Lack of Lightening	Financial Damage – Injury - Death	3	1	40	120
10	Lack of Warning Signals	Financial Damage – Injury - Death	6	2	40	480

Fine-Kinney Method

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7	Stowing	Financial Damage – Injury - Death	1	1	40	40
8	Working with Rotating Parts	Financial Damage – Injury - Death	1	3	40	120
9	Lack of Lightening	Financial Damage – Injury - Death	3	1	40	120
10	Lack of Warning Signals	Financial Damage – Injury - Death	6	2	40	480

Risk Level/Risk Class/Required Action Table

Risk level (R)	Risk class	Required action
< 20	Very low	Acceptable risk: no measure required
20 - 70	Possible	Monitoring
70 - 200	Significant	Measures to be taken
200 - 400	High	Immediate improvement
> 400	Very high	Activity cessation

Table Action Table

Order	Hazard	Classic Fine-Kinney Method	
		Score/ P.N	Action Plan
1	Breakdown Of Electric Wiring	240 / 3	High Risk; Immediate Correction Required, Required To Be Included In Short Term Action Plan
2	Fire Hazard	150 / 4	Substantial Risk; Correction Needed, Should Be Monitored Closely In Action Plan
3	Hangar Door	20 / 8	Risk; Perhaps Acceptable, No Immediate Action
4	Use of Hand Tools and Not Using Personal Protective Equipment	720 / 1	Very High Risk; Consider Discontinuing Operation, Immediate Precautions Needed
5	Using cutting and penetrative tools	240 / 3	High Risk; Immediate Correction Required, Required To Be Included In Short Term Action Plan
6	Smoking	45 / 6	Possible Risk; Attention Indicated, Need To Be Added In Action Plan
7	Stowing	40 / 7	Possible Risk; Attention Indicated, Need To Be Added In Action Plan
8	Working with Rotating Parts	120 / 5	Substantial Risk; Correction Needed, Should Be Monitored Closely In Action Plan
9	Lack of Lightening	120 / 5	Substantial Risk; Correction Needed, Should Be Monitored Closely In Action Plan
10	Lack of Warning Signals	480 / 2	Very High Risk; Consider Discontinuing Operation, Immediate Precautions Needed

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