COURSE n° 5: Risk Assessment Tools and Techniques

INTRODUCTION

Risk assessment tools, sometimes called "risk assessment techniques," are procedures or frameworks that can be used in the process of assessing and managing risks.

There are four commonly used risk assessment tools in different businesses. All of them are used often and are easily applicable to different situations. These tools are:

1) Risk matrix,
2) Failure Mode and Effects Analysis (FMEA),
3) Decision Tree,
4) Bowtie Model.

1. RISK MATRIX

A risk matrix is visually represented as a table or a grid. It has categories for impact (along the X axis) and probability (along the Y axis), all following a scale of low to high. It is a tool to categorize and prioritize risks based on their likelihood and severity.

❖ 3×3 Risk Matrix Example

LIKELIHOOD				
	High	Medium risk	High risk	Extreme risk
	Medium	Low risk	Medium risk	High risk
	Low	Insignificant risk	Low risk	Medium risk
		Low	**Medium**	**High**
	IMPACT			

Color-coding is crucial for a risk assessment matrix to represent the combination level of probability and impact of the identified risks. That said, high risks must be in red, moderate risks in yellow, and low risks in green.

❖ Probability

Also called *likelihood*, the Probability (Y-axis) pertains to the extent of how likely it is for the risk to occur. The 3 risk rating levels under this component are as follows:

1. **Low**: risk is **unlikely** to occur ;
2. **Medium**: risk may **occur occasionally** ;
3. **High**: risk is **highly likely** to occur.

❖ Impact

Also called *severity* or *consequences*, the Impact (x-axis) aims to determine the level of effects that the hazard can cause to workplace health and safety.

1. **Low**: minor injuries ;
2. **Medium**: injuries or illnesses that may require medical attention but limited treatment ;
3. **High**: severe injuries or fatality.

❖ Calculating risks using the 3×3 risk matrix

Probability x Impact = Risk Level

❖ Control measures in place

Risk Level 1 – Insignificant Risk, No action is required.

Risk Level 2 – Low Risk, Largely acceptable, subject to reviews periodically or after significant changes etc.

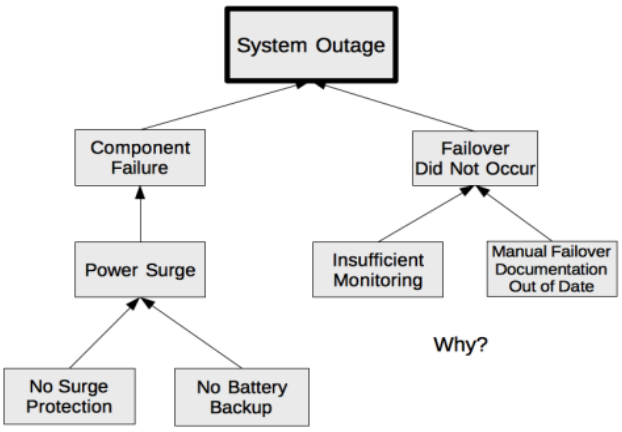
Risk Level 3 or 4 – Medium Risk, Efforts should be made to mitigate the risk. Risk should only be tolerated for the short term, and then only whilst further control measures to mitigate the risk are being planned and introduced, and these within a pre-defined time period. However, the costs of prevention should be carefully measured.

Risk Level 6 – High Risk, Work activities should not be started until the risk has been mitigated. Where the risk involves work in progress, urgent action should be taken.

Risk Level 9 – Extreme Risk, Work should not be started or continued until the risk has been mitigated. If it is not possible to mitigate risk, the work should remain prohibited.

2. TREE OF CAUSES

The Tree of Causes is a problem-solving tool that helps identify the root cause of a problem. It is a visual representation of the causal relationships between the problem and its underlying causes. The tree is structured in a hierarchical manner, with the problem at the top and the causes branching out from it. The tree is useful in identifying the underlying causes of a problem and in developing effective solutions to address them.



3. CAUSE AND EFFECT DIAGRAM

A cause-effect diagram is a visual tool used to logically organize possible causes for a specific problem or effect by graphically displaying them in increasing detail, suggesting causal relationships among theories. A popular type is also referred to as a fishbone or Ishikawa diagram.

Cause and Effect Diagram Examples

A simple cause-effect diagram is shown in Figure 1. The phenomenon to be explained is "Lost control of car." Some of the possible major factors contributing to that lost control are a flat tire, a slippery road, mechanical failures, and driver error. Each of these major categories of causes may, in turn, have multiple causes. A flat tire may come from a nail, a rock, glass, or a blow-out from material failure. The causal relationship can be traced back still more steps in the causal chain if necessary or appropriate. Lost control may arise from a mechanical failure; that failure may be a brake failure, which, in turn, may come either from fluid loss or from worn pads. You can probably think of other factors to add to this diagram.

Cause and Effect Diagram Example: Lost Control of Car