CHAPTER 5

RISK ASSESSMENT AND RISK MANAGEMENT

1. INTRODUCTION

This chapter will describe what a risk assessment is and how a risk assessment must be conducted. The steps of risk management will also be addressed.

The aim of the **risk assessment** process is to evaluate hazards, then remove that hazard or minimize the level of its **risk** by adding control measures, as necessary. By doing so, **you have** created a safer and healthier workplace.

A risk assessment is a process to identify potential hazards and analyse what could happen if a hazard occurs. A business impact analysis (BIA) is the process for determining the potential impacts resulting from the interruption of time **sensitive** or critical business processes.

2. RISK ASSESSMENTS

Basic principles of workplace risk assessment and control: guidelines for the smaller contractor

Employers have a legal duty as per the OHSA to carry out risk assessments. As an employer, you are required to assess what activities and situations can harm people, how badly they could be harmed, and how likely is it that harm will occur. This allows the significant (important) risks to be identified. The most significant risks are the priorities for action by the employer. The action required is to take reasonable steps to remove or reduce the chance of harm, and in particular, serious harm. You should write down your assessment where there are significant risks.

Basic steps in a risk assessment can be identified as:

The risk assessments are geared to discovering any risks that the employer is not addressing or has not addressed and mitigated in the past. Ideally, the assessment examines all areas and conditions closely to make informed speculations about accidents or ill health that can develop from preventable causes, and it prioritizes these by estimations of likeliness of occurrence and the amount of potential harm.

1. Identifying hazards
2. Assessing the risk of harm

3. Assessing existing control measures, to see if they are adequate
4. Assessing if extra controls are needed
5. Reviewing later on, to see if the controls are working

1. Identifying hazards

Employers have a duty to assess the health and safety risks faced by their workers. Employers must systematically check for possible physical, mental, chemical and biological hazards.

Identify all the significant (important) **hazards** in the job (e.g. falls from height, electricity, asbestos, manual handling). What makes a hazard *particularly* important is if it could kill or lead to serious injury (e.g. falling from an elevated platform or scaffolding), or electricity, are both significant hazards. Lifting a small box is probably not, but lifting a heavy, awkward crate may be a serious hazard.

This is one common classification of hazards:

- Physical: e.g. lifting, awkward postures, slips and trips, noise, dust, machinery, computer equipment, etc.
- Mental: e.g. excess workload, long hours, working with high-need clients, bullying, etc. These are also called 'psychosocial' hazards, affecting mental health and occurring within working relationships.
- Chemical: e.g. asbestos, cleaning fluids, aerosols, etc.
- Biological: including tuberculosis, hepatitis and other infectious diseases faced by healthcare workers, home care staff and other healthcare professionals.

2. Assessing the risk of harm

Identifying who is at risk starts with your organization's own full- and part-time employees. Employers must also assess risks faced by agency and contract staff, visitors, clients and other members of the public on their premises.

Assess how likely it is that workers (contractors, such as other contractors or the public) might be harmed by such a hazard (e.g. would they be working at height all day, every day or just once a month?). You will need to take into account the work situation and the person involved (e.g. a young person may, because of their inexperience, be more at risk than an experienced worker, or a person who cannot read may not know what a safety sign is telling them).

You will also need to consider *how many* workers (and others) may be harmed (e.g. the more people working up ladders or with electricity or dangerous chemicals, the more the risk of harm).

The above assessment gives the **risk** to workers before any health and safety measures (controls) are taken into account (for example, it is likely that you would conclude that the risk of three men

working with electricity is ‘high’, but that the risk of three men working on computers for two hours a day is ‘low’). The three men working up a ladder is the more significant (important) risk and you should deal with important risks first. (Remember: *risk* is linked to the extent of the *hazard* and the *exposure* of people to it).

Identifying who is at risk starts with your organization’s own full- and part-time employees. Employers must also assess risks faced by agency and contract staff, visitors, clients and other members of the public on their premises.

Employers must review work routines in all the different locations and situations where their staff are employed. For example:

- Home care supervisors must take due account of their client's personal safety in the home, and ensure safe working and lifting arrangements for their own home care staff.
- In a supermarket, hazards are found in the repetitive tasks at the checkout, in lifting loads, and in slips and trips from spillages and obstacles in the shop and storerooms. Staff face the risk of violence from customers and intruders, especially in the evenings.
- In call centres, workstation equipment (i.e. desk, screen, keyboard and chair) must be adjusted to suit each employee.

Employers have special duties towards the health and safety of young workers, disabled employees, night workers, shift workers, and pregnant or breastfeeding women.

3. Assessing existing control measures

This means employers must consider how likely it is that each hazard could cause harm. This will determine whether or not your employer should reduce the level of risk. Even after all precautions have been taken, some risk usually remains. Employers must decide for each remaining hazard whether the risk remains high, medium or low.

Look at each significant risk and decide what **controls** are in place to remove or reduce that risk (e.g. having written safety procedures or method statements, only working on ‘dead’ circuits to remove the chance of electrocution, or using personal protective equipment, such as eyewear when drilling, to reduce the risk of eye injury).

Note: you should only use personal protective equipment (PPE) if there is no better way of reducing the risk of harm (e.g. it is better to work three meters up on a firm platform, than three meters up on a shaky stepladder with a safety harness). Remember to **record your risk assessment.**

4. Assessing if extra controls are needed

A risk assessment must be kept under review in order to:

- ensure that agreed safe working practices continue to be applied (e.g. that management's safety instructions are respected by supervisors and line managers); and
- take account of any new working practices, new machinery or more demanding work targets.

When you have taken the existing or planned controls into account, how much risk of harm remains? If the risk is still significant (e.g. if the risk is still 'high'), you must do more to reduce the risk (e.g. doing the work another way, or giving more training, or personal protective

Risk assessments are very **important** as they form an integral part of an occupational health and safety management plan. They help to: Create awareness of hazards and **risk**. Identify who may be at **risk** (e.g., employees, cleaners, visitors, contractors, the public, etc.).

5. Make a record of the findings.

Employers with five or more staff are required to record in writing the main findings of the risk assessment. This record should include details of any hazards noted in the risk assessment, and action taken to reduce or eliminate risk.

This record provides proof that the assessment was carried out, and is used as the basis for a later review of working practices. The risk assessment is a working document. You should be able to read it. It should not be locked away in a cupboard.

How often should a risk assessment take place?

The risk should be assessed "every time there are new machines, substances and procedures, which could lead to new hazards."

An employer should carry out a risk assessment:

- whenever a new job brings in significant new hazards. If there is high staff turnover, then the way new staff do their work should be checked against the risk assessment, and training provided in safe working practices if necessary;
- whenever something happens to alert the employer to the presence of a hazard – for example, an unusual volume of sickness absence, complaints of stress and bullying, or unusually high staff turnover;
- in response to particular changes to the level of risk to individual employees – for example, where an employee returns to work after a period of long-term sickness absence; or

- Where an employee is pregnant or breastfeeding and her work might involve a risk to her or her unborn child's health and safety. (Regulation 16, Management of Health and Safety at Work Regulations 1999).

What are risk assessment tools?

Risk management tools are different procedures and tutorials put together to assist an organization in making informed decisions regarding their risk management procedures. Risk management helps an organization identify, assess, manage and prioritize different risks associated with its overall operation. Once a risk is determined, the risk manager should develop a plan to minimize or reduce the impact of that risk. Each business or organization has specific strategies to manage those risks.

How do you complete a risk assessment?

Risk assessments necessitate undertaking certain basic tasks. The first step identifies hazards, which include anything or situation that may lead to an event that causes harm, such as chemicals or a constantly open drawer. After this, the assessment defines who such hazards can harm. After evaluating the risks, risk assessors generate precautionary measures, and they should also document all actions taken during this process for future reference.

Risk matrix

A risk matrix is a matrix that is used during risk assessment to define the level of risk by considering the category of probability or likelihood against the category of consequence severity. Figure 5.1 is a typical example of safety and health risk matrix.

With reference to the likelihood section the criteria being used is references to the probability of a risk happening with a criterion of how many time the risk may occur.

With the consequence section which is the cross section of the matrix on the left hand side, the criteria being used refers to the impact the risk would have with a typical description of the actual impact. The legend explains the risk ratings from 0 to 25 and the risk priority that is used to determine the risk impact when the matrix is used to do the risk assessment.

This is a simple mechanism to increase visibility of risks and assist management decision making.

Likelihood / Consequence		**Rare** The event may occur in exceptional circumstances.	**Unlikely** The event could occur at some time.	**Moderate** The event will probably occur at some time.	**Likely** The event will occur in most circumstances.	**Certain** The event is expected to occur in all circumstances.
		Less than once a year	At least once a year	At least once in 6 months	At least once per month	At least once per week
	Level	1	2	3	4	5
Negligible No injuries. Low financial loss.	0	0	0	0	0	0
Minor First-aid treatment. Moderate loss.	1	1	2	3	4	5
Serious Medical treatment required. High financial loss. Moderate environment implications. Moderate loss of reputation. Moderate business interruption.	2	2	4	6	8	10
Major Excessive, multiple long term injuries. Major financial loss. High environmental implications. Major loss of reputation. Major business interruption.	3	3	6	9	12	15
Fatality Single death.	4	4	8	12	16	20
Multiple Multiple deaths and serious long term injuries.	5	5	10	15	20	25

Legend

Risk Rating	Risk Priority	Description
0	N	No Risk: The costs to treat the risk are disproportionately high compared to the negligible consequences.
1-3	L	Low Risk: May require consideration in any future changes to the work area or processes, or can be fixed immediately.
4-6	M	Moderate: May require corrective action through planning and budgeting process.
8-12	H	High: Requires immediate corrective action.
15-25	E	Extreme: Requires immediate prohibition of the work, process and immediate corrective action.

Figure 5.1 Example of a risk matrix

Figure 5.2 is an example of a completed risk assessment. In the assessment the main headings that were used for doing the assessment are in which group does the risk fall, number that the group is exposed to, the task that will be performed, what is the hazard that is associated with the task, the type of hazards that can be effected, the frequency of the task, consequences, hazard rating, exposure judgement, controls that must be put into place for the risk associated with the mentioned hazard, likelihood that the event will happen with controls in place, consequence with controls in place and the hazard rating.

Group	Number Exposed	Task	Hazards	Type of Hazard	Frequency of task	Consequence (Outcome of event) without controls	Hazard Rating	Exposure Judgment	Controls	Likelihood (probability or frequency) of event with controls	Consequence (Outcome of event) with controls	Hazard Rating
Small Vehicle Shop	2	Troubleshoot and Replace Alternator or Battery	Fumes, Dust, or Mist Exposure	Health	(4) Weekly	(3) Significant	9	Unacceptable	Training - SOP - JSA - OTJ	(2) Possible	(2) Moderate	4
			Slip or Trip	Safety					PPE			
			Pinch Points	Safety					Special Tool - Serpentine belt wrench			
			Heat Surface or Object	Safety								
			Electrical	Safety								
			Explosion	Safety								
			Uneven Surface	Safety								
			Weather	Health								
			Fire	Safety								
Small Vehicle Shop	2	Repair Brakes	Fumes, Dust, or Mist Exposure	Health	(5) Daily	(1) Minor	2	Acceptable	Training – SOP – JSA - OTJ	(2) Possible	(1) Minor	2
			Slip or Trip	Safety					Engineering Controls - LOTOTO,			
			Struck By	Safety					Communication - Rework meeting			
			Pinch Points	Safety					Work Order			
			Falling Objects	Safety					Workplace Hazard Examination			
			Inexperienced Personnel	Safety					Special tool / equipment			
			Stored Energy	Safety								
Small Vehicle Shop	2	Vehicle Service A/C Repair	Fumes, Dust, or Mist Exposure	Health	(2) Quarterly	(2) Moderate	4	Uncertain	Training – SOP – JSA -OTJ	(2) Possible	(1) Minor	2
			Slip or Trip	Safety					Engineering Controls - LOTOTO,			
			Struck By	Safety					Communication - Rework meeting			
			Pinch Points	Safety					Work Order			
			Inexperienced Personnel	Safety					Workplace Hazard Examination			
			Fatigue	Safety					Special tool / equipment			
			Heat Surface or Object	Safety								
			Stored Energy	Safety								

Figure 5.2 Completed risk assessment

4. THE RISK MANAGEMENT PROCESS

Risk Management is "the systematic application of management policies, procedures and practices to the tasks of establishing the context, identifying, analysing, assessing, treating, monitoring and communicating to reduce and minimize risks".

How do you do risk management?

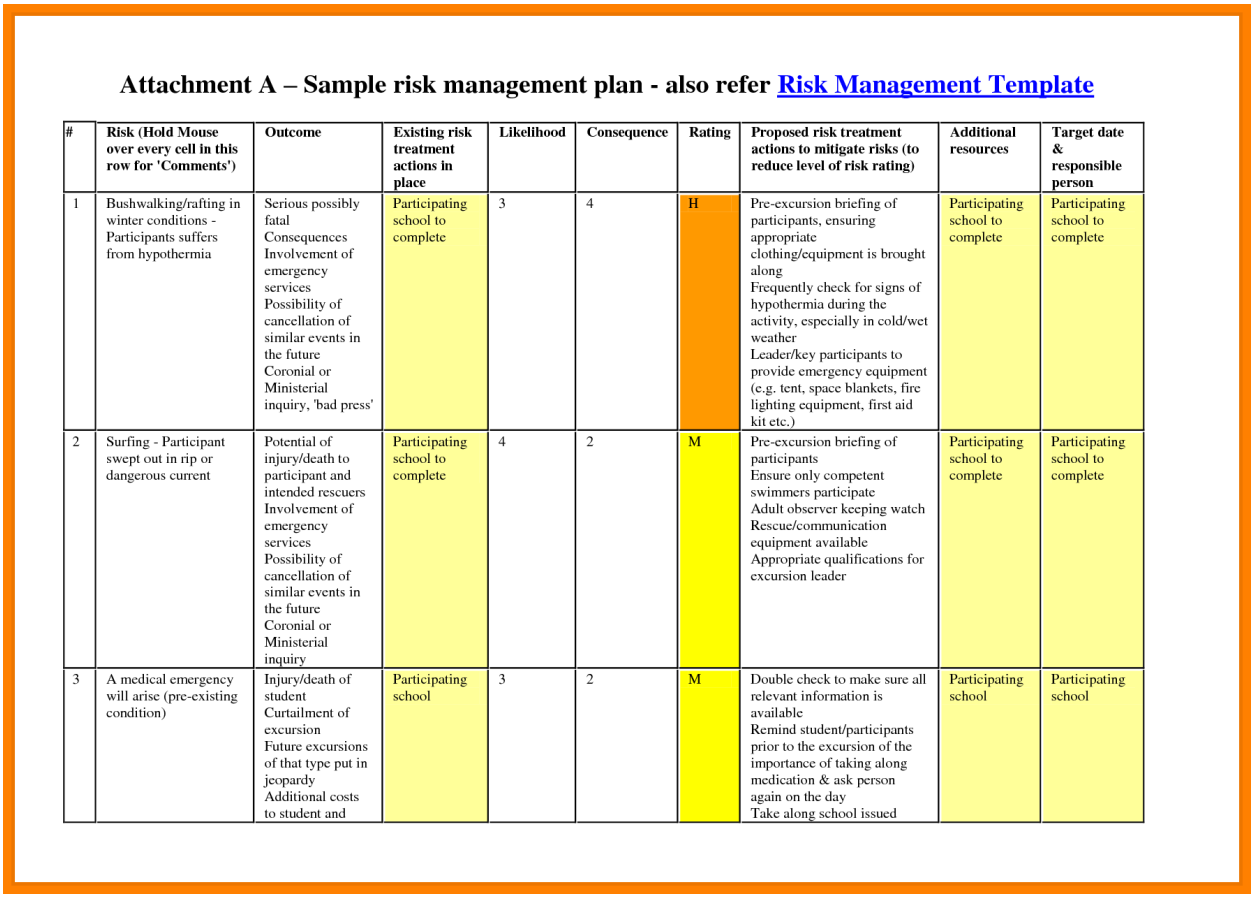
Steps

1. Understand how Risk Management works. ...
2. Define your project. ...
3. Get input from others. ...
4. Identify the consequences of each risk. ...
5. Eliminate irrelevant issues. ...
6. List all identified risk elements. ...
7. Assign probability. ...
8. Assign impact.

A **risk management** information **system** (RMIS) is an information **system** that assists in consolidating property values, claims, policy, and exposure information and providing the tracking and **management** reporting capabilities to enable the user to monitor and control the overall cost of **risk management**.

A **risk management plan** is a document that a project manager prepares to foresee **risks**, estimate impacts, and define responses to issues. It also contains a **risk** assessment matrix. A **risk** is "an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives."

Figure 5.3 shows a typical example of a risk management plan.



Attachment A – Sample risk management plan - also refer Risk Management Template

#	Risk (Hold Mouse over every cell in this row for 'Comments')	Outcome	Existing risk treatment actions in place	Likelihood	Consequence	Rating	Proposed risk treatment actions to mitigate risks (to reduce level of risk rating)	Additional resources	Target date & responsible person
1	Bushwalking/rafting in winter conditions - Participants suffers from hypothermia	Serious possibly fatal Consequences Involvement of emergency services Possibility of cancellation of similar events in the future Coronial or Ministerial inquiry, 'bad press'	Participating school to complete	3	4	H	Pre-excursion briefing of participants, ensuring appropriate clothing/equipment is brought along Frequently check for signs of hypothermia during the activity, especially in cold/wet weather Leader/key participants to provide emergency equipment (e.g. tent, space blankets, fire lighting equipment, first aid kit etc.)	Participating school to complete	Participating school to complete
2	Surfing - Participant swept out in rip or dangerous current	Potential of injury/death to participant and intended rescuers Involvement of emergency services Possibility of cancellation of similar events in the future Coronial or Ministerial inquiry	Participating school to complete	4	2	M	Pre-excursion briefing of participants Ensure only competent swimmers participate Adult observer keeping watch Rescue/communication equipment available Appropriate qualifications for excursion leader	Participating school to complete	Participating school to complete
3	A medical emergency will arise (pre-existing condition)	Injury/death of student Curtailment of excursion Future excursions of that type put in jeopardy Additional costs to student and	Participating school	3	2	M	Double check to make sure all relevant information is available Remind student/participants prior to the excursion of the importance of taking along medication & ask person again on the day Take along school issued	Participating school	Participating school

Figure 5.3 Risk management plan

A **risk management strategy** provides a structured and coherent approach to identifying, assessing and **managing risk**. It builds in a process for regularly updating and reviewing the assessment based on new developments or actions taken. Figure 3 is a typical example of a risk strategy.

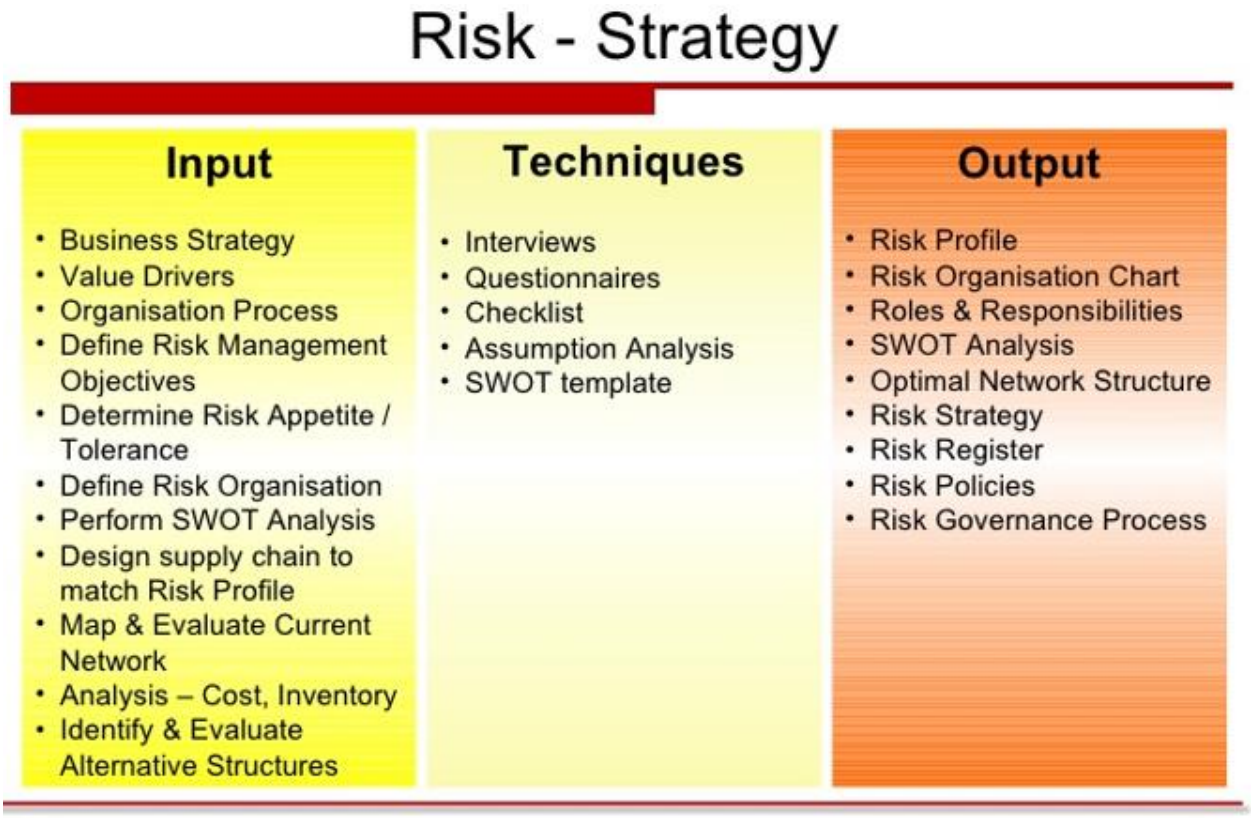


Figure 5.4 Risk Strategy

Risk mitigation planning is the process of developing options and actions to enhance opportunities and reduce threats to project objectives. Risk mitigation implementation is the process of executing **risk mitigation** actions.

How do you deal with risk?

The following steps are typically being followed to deal with an identified risk:

1. Accept The Risk. Accepting the risk means that while you have identified it and logged it in your risk management software, you take no action ...
2. Avoid The Risk. You can also change your plans completely to avoid the risk ...
3. Transfer The Risk ...
4. Mitigate The Risk ...
5. Exploit The Risk

By applying a **mitigation plan**, we reduce the probability of impact of the identified risk. By identifying the contingency plan, we do not change the probability or impact of the current risk, but we plan to control the impact as risk event looks like occurring. This works as a fall back plan for the high exposure risks.

NOTES

1. http://www.medwise.ie
2. http://www.medindia.net
3. http://www.opensourcevegan.com
4. http://www.responsetrainingservices.com/sites
5. http://www.worksafemt.com/safety/safety-important/the-importance-of-safety

REFERENCES

1. Brauer Roger L., Safety and Health for Engineers, 3rd Edition. 2016
2. H.W Heinrich, Industrial Accident Prevention, 4th ed., McGraw-Hill, New York, 1959.
3. ILO / WHO 1950
4. OHSA No. 85 of 1993 and Regulations, Revised 16th Edition, 2016

Chapter review questions:

1. How do you create a safer and healthier workplace? Refer to hazards and risks.
2. Define a risk assessment as used in the petrochemical industry
3. Employers have a legal duty to carry out risk assessments. Where in the OHSA will you find this duty stipulated?
4. What are the basic steps in risk assessment?
5. Employers have a duty to assess the health and safety risks faced by their workers. What must be systematically checked?
6. Name the common classification of hazards as found in the workplace
7. Name for typical hazards that could be found on a chemical plant
8. What makes a hazard *particularly* important?
9. Employers must assess risks faced by whom?
10. Employers have special duties towards the health and safety of which type of workers?
11. Assessing existing control measures, what do employers need to consider with reference to the hazards?
12. What must be looked at to decide what **controls** are in place to remove or reduce that risk?
13. Give three examples to support the answer in question 12
14. When should you only use personal protective equipment (PPE)?
15. What must you do with the risk assessment after it was conducted?
16. A risk assessment must be kept under review in order to do what?
17. When should a risk be assessed?
18. When should an employer carry out a risk assessment?
19. Name three risk management tools
20. Once a risk is determined, who should develop a plan to minimize or reduce the impact of that risk?
21. How would you conduct a risk assessment?
22. What is a risk matrix?
23. With reference to the risk matrix, under the consequence section of the matrix, what are the consequences that must be used to evaluate the risk?
24. With reference to the risk matrix, under the likelihood section of the matrix, what are the likelihood items that must be used to evaluate the risk?
25. Name the five (5) risk priorities and the description of each of these priorities
26. Define risk management
27. What is a risk management strategy?
28. What is Risk mitigation planning?
29. Name the steps that are typically being followed to deal with an identified risk
30. What is a mitigation plan?
31. What is risk mitigation?