MACHINE SAFETY RISK ASSESSMENT

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CHAPTER 1 ABSTRACT

Machine Safety Risk Assessment, the process of evaluating the risks to safety and health arising from hazards while working in machines, which forms an integral part of the Occupational Safety and Health Management System, whereby all hazards are identified and evaluated taking into consideration existing control measures. The exercise should be carried out by competent persons in the field. The aim is to eliminate or minimise risks at work through tightening of control measures. The risk assessment process may also identify the training needs of employees and contribute towards the building of a preventative safety and health culture. In this endeavour, thecommitment of management, employees and competent persons are important in carrying out a proper risk assessment. Risk Assessment is an important tool in the creation of safe working conditions thereby increasing productivity and employees' morale while reducing injury, sick leaves, and labour turnover. It also aims at cost reduction as accidents and illnesses are costly to the injured/diseased person, the close family, the organisation as well as the State. The objectives of this guideline are to assist employers and employees' representatives to have a better understanding and to put into application a uniform approach of Risk Assessment. Risk assessment is the determination of quantitative or qualitative value of risk related to a concrete situation and a recognized threat

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LIST OF SYMBOLS AND ABBREVIATIONS

S. No		Abbreviations
1	MSDS	Material Safety Data Sheet
2	OEL	Occupational Exposure Limit
3	OSH	Occupational Safety and Health
4	OSHMS	Occupational Safety and Health Management Systems
5	HRN	Hazard Risk Number
6	PPE	Personal Protective Equipment
7	EMF	Electromagnetic Flux
8	FE	Frequency of Exposure
9	MPL	Maximum probable loss
10	NP	Number of Persons
11	IOSH	Institute of Occupational Safety and Health
12	OSH	Occupational Safety and Health
13	EU	European Union

CHAPTER 2 INTRODUCTION

Machine Safety Risk Assessment, the process of evaluating the risks to safety and health arising from hazards while working in machines, which forms an integral part of the Occupational Safety and Health Management System, whereby all hazards are identified and evaluated taking into consideration existing control measures. The exercise should be carried out by competent persons in the field. The aim is to eliminate or minimise risks at work through tightening of control measures. The risk assessment process may also identify the training needs of employees and contribute towards the building of a preventative safety and health culture. In this endeavour, thecommitment of management, employees and competent persons are important in carrying out a proper risk assessment

Risk Assessment is an important tool in the creation of safe working conditions thereby increasing productivity and employees' morale while reducing injury, sick leaves, and labour turnover. It also aims at cost reduction as accidents and illnesses are costly to the injured/diseased person, the close family, the organisation as well as the State.

Risk assessment is the determination of quantitative or qualitative value of risk related to a concrete situation and a recognized threat. The common terms used in risk assessment are elaborated below: Risk: Risk is defined as the combination of chance or frequency or probability of occurrence of an accident and its damage consequences to life and property. So, risk has two parameters:

i. Frequency of occurrence of an accident

ii. ii. Damage consequences to life and property

Machine Safety Risk Assessment is carried out for Safety Critical Machines which comes under operational category of Rotating, Revolving, Tearing, Cutting, Punching, Automatic, Semi-Automatic, Drilling. Any machine which has history of incidentwill be considered as Safety critical machine.

The objectives of this guideline are to assist employers and employees' representatives to have a better understanding and to put into application a uniform approach of Risk Assessment

CHAPTER 3 TERMS AND DEFINITIONS

For this document, the following terms and definitions apply: - Hazard: the inherent potential to cause injury or damage to people's health.

Hazard identification: process of recognising that a hazard exists and defining its characteristics.

Ill health: identifiable, adverse physical or mental condition arising from and/or made worse by a work activity and/ or work-related situation.

Material Safety Data Sheet (MSDS): a form containing data on the properties of a particular substance. It includes information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill handling procedures.

Occupational Exposure Limit (OEL): the human exposure limits to hazardous substances. **Occupational Safety and Health (OSH):** work-related safety and health issues.

Occupational Safety and Health Management Systems (OSHMS): a system, which the organisation sets in place to manage all occupational health and safety issues.

Risk: a combination of the likelihood of an occurrence of a hazardous event and the severity of injury or damage to the health of people caused by this event.

Risk Assessment: The process of evaluating the risks to safety and health arisingfrom hazards at work

HRN: Hazard Risk Number is number rating of hazard based upon calculation of Probability, Frequency, Maximum probable Loss and Number of persons exposed to risk

PPE: Personal Protective Equipment is protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection

CHAPTER 4 LIST OF MACHINES

S. No	Name of the Machine	No. of machines
1	HUMIDITY CHAMBER - ENVIRONMENTAL	10
2	TETEX TEST - C & Tan D	
3	CD TEST BENCH	
4	THERMAL STABILITY -1 & 2	
5	DESTRUCTION TEST SET UP	
6	IEC AGEING	
7	STEP AGEING - 1, 2, 3, 4	
8	WINDING MACHINE (E1)	4
9	WINDING MACHINE (M2 & M3)	
10	WINDING MACHINE (J1, J2, J3, J4, J5)	
11	VACUUM SEALING MACHINE	
12	CORE HEAT TREATMENT	1
13	OVEN	5
14	ARC SPRAYING (TAFA)	8
15	FLAME SPRAY - 1, 2, 3, 4	
16	EC AC TESTING AUTO -1	
17	EC AC TESTING AUTO -2 (JUMBOLINO)	
18	C&TAN DELTA MEASUREMENT SOKEN	
19	RIVETING MACHINE 1 & 2	3
20	LID TESTING MACHINE 5KV (HV)	
21	RESIN FILLING MACHINE 1 (MICAFIL)	2
22	SEAMING MACHINE 1(recon)	
23	SEAMING MACHINE 2(Packmack)	5
24	SEAMING MACHINE 1, 3, 5	
25	SOFT RESIN FILLING 1	
26	RESIN FILLING MACHINE 2 (SCHEUGENPFLUG)	6
27	SEAMING MACHINE 4, 6, 7, 8, 10	
28	CAPACITOR TESTING MACHINE 1 - Koti	2
29	CAPACITOR TESTING MACHINE 2 - Infinity	
30	CD TEST BENCH -1, 2, 3 (QUALITY)	6

31	BDV Setup	
32	VACUUM SEALING MACHINE	
33	CD TEST BENCH -4 AUTO (QUALITY)	
34	BUSBAR CUTTING	4
35	BUSBAR PUNCHING	
36	CRIMPING	
37	DRILLING	
38	VACCUM HEAT TREAMENT 3 - 26	23
39	HIPOT	1
40	HIPOT	1
41	HIPOT	1
42	HIPOT	1
43	HIPOT	1
44	HIPOT	1
45	Thermal Press	1
46	PM2XXX HIPOT	1
47	HIPOT	1
48	HIPOT	1
49	HIPOT	1
50	IMD Laser Marking Machine	1
51	HIPOT	1
52	LASER MARKING	1
53	BRIDGE FINAL FUNCTION STATION	1
54	HIPOT	1
55	RF TEST STATION	1
56	LUG INSERTION 1&2	2
57	TRACEABILITY	1
58	CONTACT BASE ASSEMBLY	1
59	KEYSTONE JACK ASSEMBLY	1
Total No. of Machines		101

Table 4.1 List of machines

The above listed machines are considered as Safety Critical Machines as they come under category of Rotating, Revolving, Tearing, Cutting, Punching, Automatic, Semi-Automatic, Drilling.

CHAPTER 5 TYPES OF HAZARDS

A hazard is any source of potential damage, harm or adverse health effects on something or someone.
Harm – physical injury or damage to health. Hazard – a potential source of harm to a worker.
A common way to classify hazards is by category:

- **Biological** – bacteria, viruses, insects, plants, birds, animals, and humans, etc.,
- **Chemical** – depends on the physical, chemical, and toxic properties of the chemical,
- **Ergonomic** – repetitive movements, improper set up of workstation, poor design of equipment, workstation design, (postural) or workflow, manual handling, repetitive movement. Etc.,
- **Physical** – Slippery floors, objects in walkways, unsafe or misused machinery, excessive noise, poor lighting, fire. radiation, magnetic fields, pressure extremes (high pressure or vacuum), noise, etc.,
- **Psychological** – Shift work, workload, dealing with the public, harassment, discrimination, threat of danger, constant low-level noise, stress. Stress, violence, etc.,
- **Safety** – slipping/tripping hazards, inappropriate machine guarding, equipment malfunctions or breakdowns.

5.1 BIOLOGICAL HAZARD:

Wastes from hospitals and research facilities may contain disease-causing organisms that could infect site personnel. Like chemical hazards, etiologic agents may be dispersed in the environment via water and wind. Other biologic hazards that may be present at a hazardous waste site include poisonous plants, insects, animals, and indigenous pathogens. Protective clothing and respiratory equipment can help reduce the chances of exposure. Thorough washing of any exposed body parts and equipment will help protect against infection.

Types of things you may be exposed to include:

- Blood and other body fluids
- Fungi
- Bacteria and viruses
- Plants
- Insect bites
- Animal and bird droppings

5.2 PHYSICAL HAZARD:

Are factors within the environment that can harm the body without necessarily touching it.
Physical Hazards Include:

- Radiation: including ionising, nonionizing (EMF's, microwaves, radio waves, etc.)
- High exposure to sunlight/ultraviolet rays
- Temperature extremes – hot and cold
- Constant loud noise

5.3 ERGONOMICS HAZARDS:

Occur when the type of work, body positions and working conditions put strain on your body. They are the hardest to spot since you don't always immediately notice the strain on your body or the harm that these hazards pose. Short term exposure may result in "sore muscles" the next day or in the days following exposure, but long-term exposure can result in serious long-term illnesses.
Ergonomic Hazards Include:

- Improperly adjusted workstations and chairs
- Frequent lifting
- Poor posture
- Awkward movements, especially if they are repetitive
- Repeating the same movements over and over
- Having to use too much force, especially if you have to do it frequently

5.4 CHEMICAL HAZARDS:

Are present when a worker is exposed to any chemical preparation in the workplace in any form (solid, liquid or gas). Some are safer than others, but to some workers who are more sensitive to chemicals, even common solutions can cause illness, skin irritation, or breathing problems.
Beware of:

- Liquids like cleaning products, paints, acids, solvents – ESPECIALLY if chemicals are in an unlabelled container!
- Vapours and fumes that come from welding or exposure to solvents

- Gases like acetylene, propane, carbon monoxide and helium
- Flammable materials like gasoline, solvents, and explosive chemicals.
- Pesticides

5.5 SAFETY HAZARDS:

These are the most common and will be present in most workplaces at one time or another. They include unsafe conditions that can cause injury, illness, and death.
Safety Hazards Include:

- Spills on floors or tripping hazards, such as blocked aisles or cords running across the floor
- Working from heights, including ladders, scaffolds, roofs, or any raised work area
- Unguarded machinery and moving machinery parts; guards removed or moving parts that a worker can accidentally touch
- Electrical hazards like frayed cords, missing ground pins, improper wiring
- Confined spaces
- Machinery-related hazards (lockout/tag out, boiler safety, forklifts, etc
- Identify the hazards

CHAPTER 6 PROCEDURE

- Determine who might be harmed and how
- Evaluate the risks and take precautions
- Record your findings
- Review assessment and update if necessary

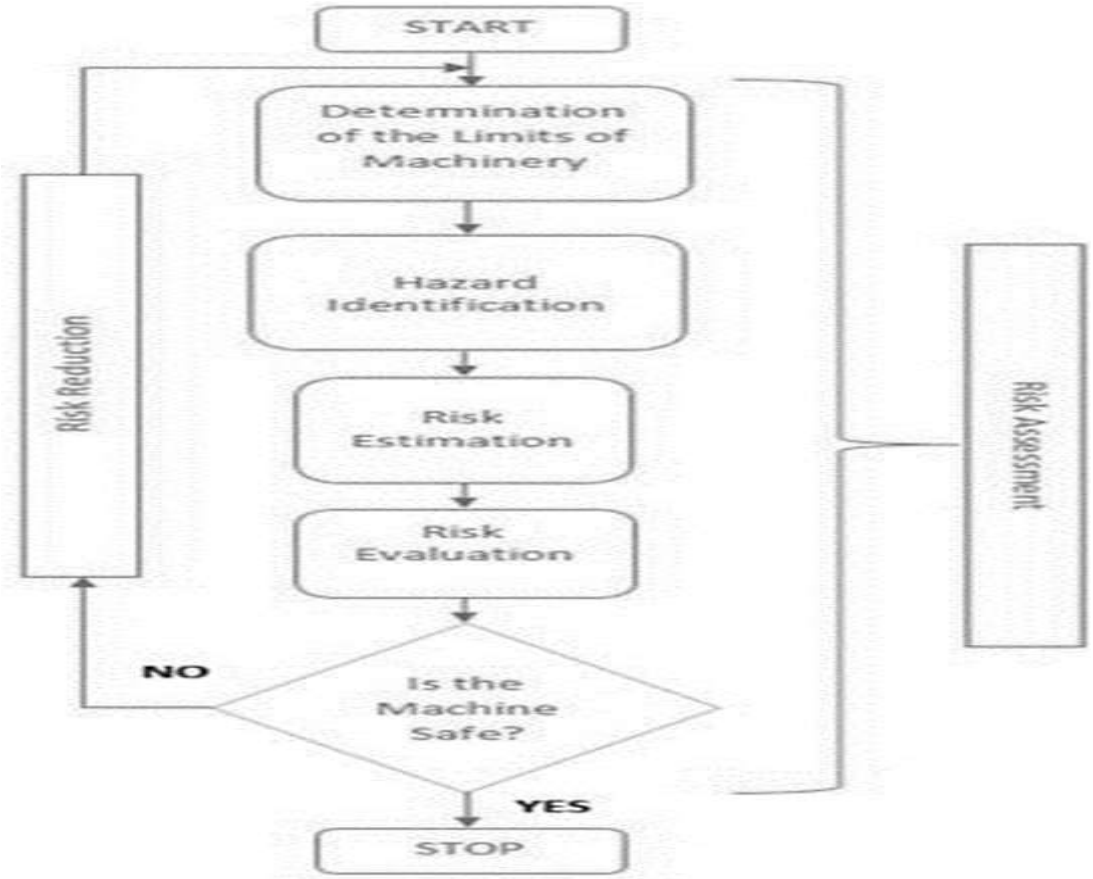


Figure 6.1 Risk Assessment Flow

6.1 Identify the hazards

The first step to creating your risk assessment plan is determining what hazards your employees and your business face, including:

- Natural disasters (flooding, tornadoes, hurricanes, earthquakes, fire, etc.)
- Biological hazards (pandemic diseases, foodborne illnesses, etc.)
- Workplace accidents (slips and trips, transportation accidents, structural failure, mechanical breakdowns, etc.)
- Intentional acts (labour strikes, demonstrations, bomb threats, robbery, arson, etc.)
- Technological hazards (lost Internet connection, power outage, etc.)
- Chemical hazards (asbestos, cleaning fluids, etc.)
- Mental hazards (excess workload, bullying, etc.)
- Interruptions in the supply chain
- Determine who might be harmed and how

As you look around your organization, think about how your employees could be harmed by business activities or external factors. For every hazard that you identify in step one, think about who will be harmed should the hazard take place.

6.2 Evaluate the risks and take precautions

Now that you have gathered a list of potential hazards, you need to consider how likely it is that the hazard will occur and how severe the consequences will be if that hazard occurs. This evaluation will help you determine where you should reduce the level of risk and which hazards you should prioritize first.

6.3 Record your findings

If you have more than five employees in your office, you are required by law to write down your risk assessment process. Your plan should include the hazards you've found, the people they affect, and how you plan to mitigate them. The record—or the risk assessment plan—should show that you:

- Conducted a proper check of your workspace
- Determined who would be affected
- Controlled and dealt with obvious hazards
- Initiated precautions to keep risks low
- Kept your staff involved in the process

6.4 Review assessment and update if necessary

Your workplace is always changing, so the risks to your organization change as well. As new equipment, processes, and people are introduced, each brings the risk of a new hazard. Continually review and update your risk assessment process to stay on top of these new hazards.

CHAPTER 7 RISK MANAGEMENT

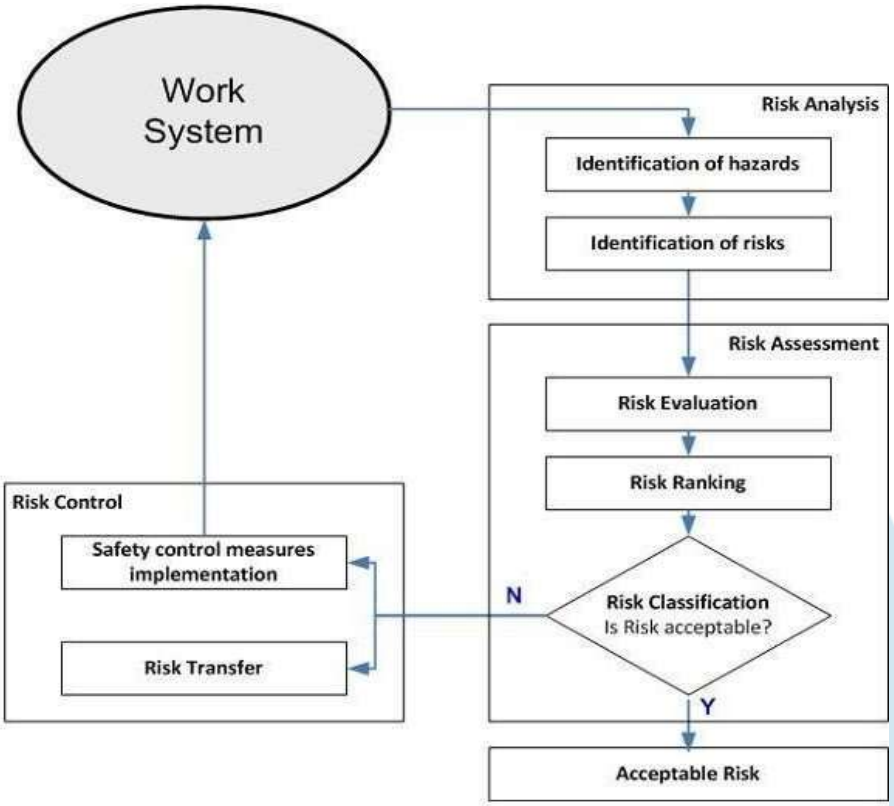


Figure 7.1 Risk Management

7.1 Risk analysis

The risk analysis activities involve:

- Identification of hazards present in the workplace and work environment.
- Identification of hazards discovered in previous risk management.
- Identification of potential consequences of the recognized hazards – risks, i.e., the potential causes of injury to workers, a work accident, an occupational disease, or a work-related disease

Several means can be used to support these activities. For instance:

- Direct observation – walkthrough.
- Interviews with workers and managers.
- Checklists.
- Deviation analysis.
- Energy analysis.
- Job safety analysis.
- Previous risk assessment data.
- Employee (satisfaction) survey

7.2 Risk evaluation

Risk evaluation involves the determination of a quantitative or qualitative value for the risk. Quantitative risk evaluation requires calculations of the two components of the risk: the probability that the risk will occur, and the severity of the potential consequences. This approach is seldom applied in practice

Qualitative risk evaluation is more common and usually adopts a methodology based on a matrix, for instance the matrix proposed. It is a simple method for estimating risks. Risks are estimated according to their likelihood and potential severity of harm, combining the severity and likelihood categories, as shown on

PE- Probability of a hazard event or person being exposed to a hazard	
0.1	Almost not possible, only under certain unusual circumstances
0.5	Highly unlikely but possible
1	Occasionally possible
2	Possible but unusual
5	Possibility exists, can occur
8	Probable, not unexpected
10	Assume that it will happen
15	Definite, without doubt

Table 7.1 Probability of Exposure

FE-Frequency of person being exposed to hazard	
1	Monthly
1.5	Weekly
2.5	Daily
5	Constantly

Table 7.2 Frequency of Exposure

MPL- Maximum probable loss (Injury)	
0.1	Scratch, bruise, light blow or minor injury
0.5	Minor burns, laceration, medium injury
	Short-term illness
1	Deeper cuts, breakage, crushing of fingers or toes
2	Breakage, torn ligaments, crushing of arms or legs
	Mid-term illness
4	Partial or complete loss of fingers or toes
8	Partial or complete loss of arm or leg
	Loss of hearing or sight
	Long-term illness
10	Partial or complete loss of two arms or legs
	Almost 100% loss of hearing or sight
12	Serious illness, severe burns
15	Fatality, major paralysis of nervous system

Table 7.3 Maximum Probable Loss

	NP- Number of persons exposed to risk
1	1-2 persons
2	3-7 persons
4	8-15 persons
8	16-50 persons
12	More than 50 persons

Table 7.4 Number of persons Exposed to risk

HRN = PE x FE x MPL x NP

HRN		Assessment
HRN ≤ 10		Permissible, low
10 < HRN ≤ 50		Medium, but significant
50 < HRN ≤ 500		High, considerable
500 < HRN		Too high, prohibited
Actions according to risk category		
High, Too high	Immediate requirement to review and investigate the case for removing / reducing the risk or improving the control measures.	
Medium	Risk not broadly acceptable, need investigation to consider reasonably practical improvements.	
low	Some risk controls may still justify	

7.3 Risk categorization

It should be highlighted that a particularly careful assessment of individual risk exposure should be performed to workers of special groups (for example, vulnerable groups such as new or inexperienced workers), or to those most directly involved in the highest risk activities] (i.e., the most exposed group of workers).

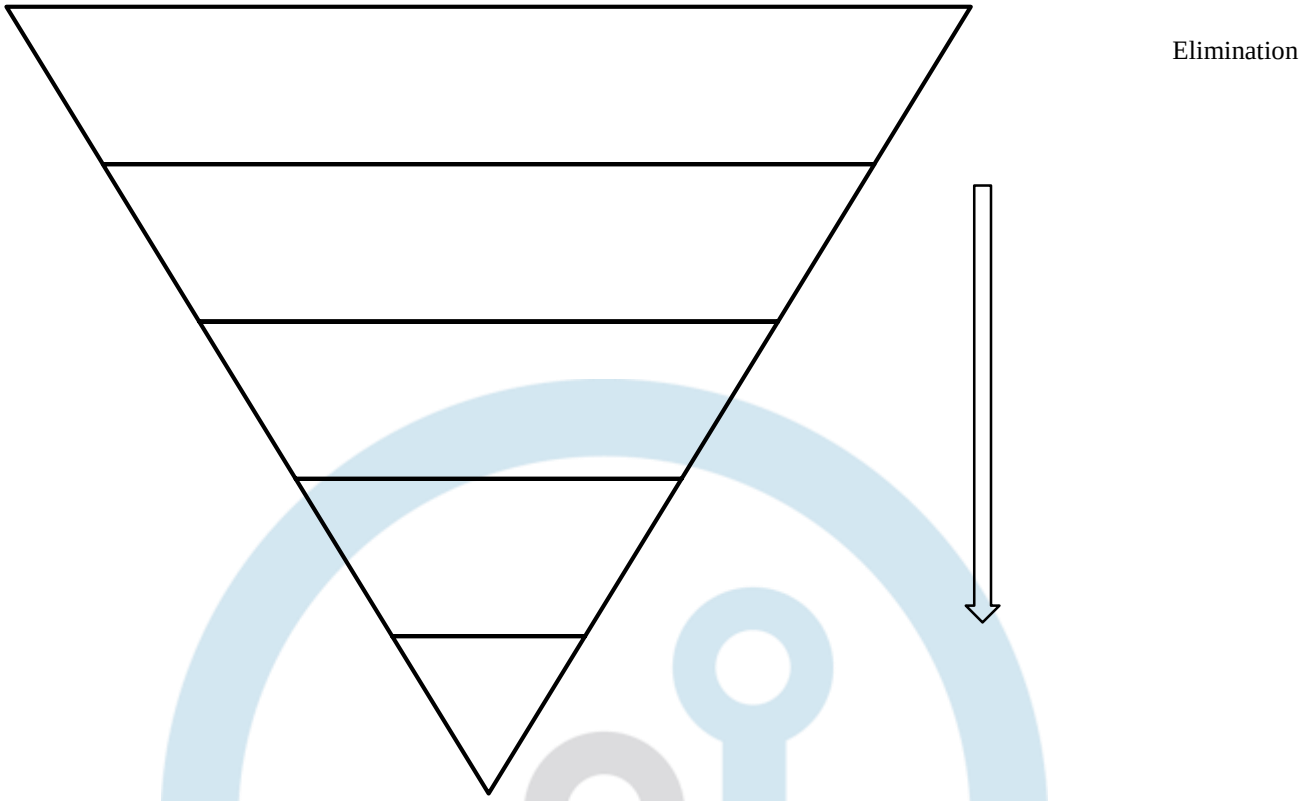
This risk classification is the baseline for selecting safety actions to be implemented and when defining the timescale, i.e., the urgency of the implementation of the corrective safety measures. As an example, table depicts a simple risk categorization and the respective guidance to the application of corrective safety measures proposed.

To have a consistent base for all risk assessments the company should first establish the acceptability criteria. This should involve consultation with workers representatives and other stakeholders and should take account of legislation and regulatory agency guidance, where applicable.

7.4 Risk control

Risk control is the stage where the actions to identify and implement safety measures to control risks are performed having in mind the protection of workers' health and safety, as well as their monitoring over time. The safety measures implemented should be the ones that best protect everyone exposed to the risk. However, it is important not to forget that additional or different safety measures may be required to protect workers belonging to special groups, namely workers with special needs (such as pregnant women, young workers, aging workers and workers with disabilities) and maintenance workers, cleaners, contractors and visitors. It is very important to take account of the number of individuals exposed to the risk when setting priorities and timescales to the implementation of safety control measures. Risk control includes design, planning and implementing of safety control measures, as well as training and workers information.

Safety control measures are implemented based upon Hierarchy of Safety control


Elimination

Most Effective

Substitution

Engineering controls

Administrative controls

PPE

Least Effective

Figure 6.2 Hierarchy of Safety Control

7.5 Design safety control measures

The first step of risk control is the design of the safety control measures to eliminate risks. The risks that cannot be avoided or eliminated should be reduced to an acceptable level, i.e., the residual risk shall be minimized according to the ALARP (as low as reasonably practicable) principle. This means employers must perform a cost- benefit analysis to balance the cost (include money, time, trouble, and effort) they could have to reduce a risk against the degree of risk presented. It should be demonstrated that the cost involved in reducing the risk further would be grossly disproportionate to the benefit gained. The residual risk should be controlled.

7.6 Implement safety control measures

The safety control measures to be implemented should be based on up-dated technical and/or organizational knowledge, and good practices. Safety control measures implementation should be done using the following hierarchy order:

- Prevention measures
- Protection measures

- Mitigation measures
- Prevention measures

The aim of implementation of prevention measures is to reduce the likelihood of work accident or occupational disease occurrence. Several examples, also in hierarchical order, that can be used to achieve this objective are:

a) Using engineering or technical measures to act directly on the risk source, to: Remove it, i.e., ensure that during the workplace design phase risks are 'designed out' Reduce levels of hazardous materials. For instance, provide effective ventilation through local or general exhaust ventilation systems.

Replace it, i.e., substitute the risk by a less risky material, equipment, or substance These measures are more efficient and economical when accomplished during the workplace design phase.

b) Using organizational or administrative measures to force changing of behaviours and attitudes and promote a safety culture:

- Information and training (awareness)
- Establish appropriate working procedures and supervision
- Management and proactive monitoring
- Routine maintenance and housekeeping procedures

7.7 Protection measures

Implementation of Protection measures should consider, first, collective measures and then individual measures. Several examples of measures (sorted by priority) that can be used to achieve this objective are:

7.7.1 Collective Protection measures:

Enclose or isolate the risk using guards, protection of machinery and parts, or remote handling techniques.

Physical barriers (anti-drop networks, railings, packaging, acoustic, thermal or electrical barriers);

Using organizational or administrative measures to diminish the exposure duration:

- job rotation of workers.
- timing the job so that fewer workers are exposed.
- Implementation of safety signs, for instance restricting entry to authorized persons.

7.7.2 Individual Protection:

Use of Personnel Protective Equipment (PPE) to protect worker from the residual risk. The worker should participate in the selection of PPE and should be trained in its use.

7.8 Mitigation measures

When prevention and protective measures fail a work accident, or an occupational disease could happen. The company needs to be prepared (emergency preparedness) and to have mitigation measures implemented. The aim of mitigation measures is to reduce the severity of any damage to facilities and harm to employees and public. Several examples of measures that can be used to achieve this aim are: emergency plan, evacuation planning, warning systems (alarms, flashing lights), test of emergency procedures, exercises and drills, fire-extinguishing system, or a return-to- work plan.

7.9 Training and information

Managers must know the risk their workers are exposed to. Workers must know the risks they are exposed to. Providing information and Training courses to workersis a legal requirement in EU. In the U.S., according to the federal Occupational Safety and Health Act of 1970 (OSH Act), workers have the “Right to Know” – about the hazards they are exposed to, the harm they might cause, and precautions that could prevent these harmful effects.

Some common methods of controlling risk are:

- replacing a hazardous system, e.g., using mechanical aids to reduce or eliminate the need for manual handling
- replacing a substance with a less hazardous substance, e.g., replacing a flammable substance with a non-flammable substance
- designing the workplace to reduce risk, e.g., providing guardrails around roof- mounted equipment or designated walkways and crossing points through areas with moving vehicles
- ensuring a clean and tidy workplace to prevent trips and slips
- extracting or containing the hazard at source, e.g., providing a fume cupboard with extraction
- adapting the work to the individual, e.g., providing adjustable height tables or chairs to reduce muscle injuries
- ventilating an area of the workplace where extraction at source is not possible
- isolating the process or the worker, e.g., switching off and isolating machines before carrying out repairs or alterations
- safeguarding machinery, e.g., providing interlocked guards that switch off the machine if someone tries to gain entry to dangerous parts of it
- providing adequate training and supervision

- establishing emergency planning procedures, including first aid
- providing protective equipment, clothing, or signs (they should be used only as a last resort after all other ways of eliminating the hazard have been fully explored)
- setting up adequate health surveillance programs including pre-placement or regular health checks where appropriate
- analysing and investigating accidents (including ill-health) and dangerous occurrences
- using permit-to-work systems or safe working procedures
- putting in place adequate welfare facilities

The Safety Statement must specify the arrangements to be used for consultation with and participation by employees on safety and health matters. These would include the procedures to facilitate effective co-operation and communication on safety and health matters between the employer and employees. Consultation and participation arrangements and the extent of their usage will depend on the size and complexity of the organization. This may range from informal one to one discussion to a more formal safety committee. Consultation areas include:

- any issues which can substantially affect safety and health
- the employment of competent persons and safety and health experts to study company safety and health activities
- appointment of persons to deal with emergencies and any prevention measures
- carrying out Risk Assessments and the outcome of such Assessments
- provision of safety and health information to employees
- the planning and organization of safety and health training
- procedures to be used to facilitate effective co-operation and communication on safety and health matters between employer and employees
- preparation, and revision of, the Safety Statement, with reference to the written procedures covering the role of the safety representative, the operation of safety committees, or informal safety discussions by work crews, which might take place as necessary
- the introduction of new technology, equipment or chemicals and their effect on working conditions and environment.

The two key components of measuring safety and health performance are:

Active monitoring (before things go wrong). The employer needs to carry out routine inspections and checks to see that standards are being maintained. Are the objectives and standards that were set being achieved? Are they effective?

Reactive monitoring (after things go wrong): investigating injuries, cases of illness, bullying complaints, property damage and near misses - specifying in each case because performance was sub-standard.

- Reviewing the Safety Statement, employers should consider at least the following:
- Were the aims in the Safety Statement relevant and appropriate?
- Did it identify the significant hazards, assess their risks and set out the necessary preventive and protective safety measures?
- Were the safety and health measures, which were identified, implemented in practice? Was the planned progress achieved?
- Were new work practices or processes introduced since the last review and if so, were they risk-assessed?
- Did you put in place the measures necessary to comply with the relevant statutory provisions (e.g., on safety and health management, safety consultation and training, etc.)?
- Did you comply fully with safety and health performance standards (including legislation and approved Codes of Practice)?
- Are there areas where standards are absent or inadequate?
- Have you analysed your data to find out the immediate and underlying causes of any injuries, illness or incidents? Have you identified any trends and common features?
- What new safety and health measures were applied following any reportable accidents or other incidents, or following any enforcement measures relating to your workplace?
- Were adequate financial, physical, human, and organizational resources committed to safety and health?
- What improvements in safety and health performance need to be made?

As part of the review, employers will find it helpful to refer to any records which have been kept, such as accident/incident reports, health-surveillance results, training records, inspection and audit reports, maintenance logs, or atmospheric monitoring figures. Employers must also consult safety representatives and others who may be affected by the review

Implementing the Safety Statement should be an integral part of everyday operations and so it must always be relevant. Therefore, it should be revised periodically, at least annually, and whenever significant changes take place, or when Risk Assessments are carried out and improvements are made that have an impact on safety and health. Such changes may include changes in the way

work is being carried out, the introduction of new work activities, changes in the organizational structure due to redundancies and to available manpower etc.

Employers should bring any changes made to the attention of the safety representatives, employees and any other persons who may be affected by the new measures set out in the Safety Statement. They must be informed about the new findings and of any changes in the required safety and health precautions. Make sure all modifications or improvements required by the new Risk Assessments and Safety Statement review are implemented as soon as possible.

A Risk Assessment must always be prepared for that place of work. However, if 3 or fewer people are employed and a Code of Practice relating to Safety Statements, prepared by the Authority, exists for a sector or work activity, then compliance with that code is sufficient. See section 20(8) of the 2005 Act. Codes of Practice have been prepared for several sectors including Construction, Agriculture and Fishing.

Different workplace settings will identify differing hazards, dependent on the work activities being carried out. Therefore, assorted control measures shall be considered for the various risks in such workplaces, e.g.:

Risk of a slip, trip or fall, e.g., all workplaces:

- Slips, trips, and falls are the second most common type of accident in most places of work. The risk depends on:

Person Slipping in a Shopping Centre

- the premises being kept clean, tidy, and uncluttered
- the flooring and stairs being kept in good repair and on the type of flooringused
- the control of other trip hazards
- the quality of lighting
- spillages of liquid being cleaned promptly

The extent of injury may vary from relatively minor to severe, depending on a variety of factors including the nature of the fall, whether at the level or from a height.

Vehicles in the workplace are a risk to other employees on foot. The risk is a combination of the chance that someone will be struck, together with the likely severity of the injury. This will depend on:

- whether pedestrians use walkways which keep them away from moving fork- trucks
- the number of pedestrians and fork-lift trucks using the same areas
- the training and instruction provided to both drivers and pedestrians
- the degree of supervision and enforcement of safe procedures (e.g., for separating pedestrians and forklifts)
- the mechanical condition of the fork-lift truck (e.g., brakes and flashing beacons)
- the wearing of high-visibility PPE

Paints containing isocyanates are a hazard to health. The Safety Data Sheet (SDS) and the label on the paint container give this information. Breathing in isocyanate fumes can cause asthma. The risk is a combination of the chance that someone's lungs will be damaged together with the extent of the likely damage. This will depend on:

- the amount of isocyanate in the air
- how often the job is done (all day every day or once or twice a year)

the work method – how the paint is used (e.g., if it is sprayed the risk will be greater than if brushed on)

- the number of people that could be affected (i.e., does just one-person work with the paint or do many? Could their work affect others?)
- what could go wrong (the errors that could lead to spillage and atmospheric emissions).
- the adequacy of precautions taken, such as exhaust ventilation and personal protective equipment (Do they comply with the legal requirements? How do they compare with good practice and national or 'trade' guidance?)

The extent of the likely damage is severe. An employee could develop asthma, which might make him or her unemployable in that industry. The Authority has produced extensive Guidance on preventing exposure to all sorts of chemicals (including an Information Sheet on Isocyanate use).

A permit-to-work system is a written system of the procedures which must be taken to safeguard workers doing work such as repair, maintenance, or cleaning work in potentially dangerous areas or with dangerous operations. It involves mechanical, electrical or process isolation procedures or monitoring the atmosphere for the presence of dangerous fumes. It sets out in a systematic way the work is to be done, the hazards involved and the precautions to be taken.

Situations where this is necessary include when machinery could be restarted with the worker still inside it or working in confined spaces where there is a danger ofchemical or physical contamination.

The employer should write down in the Safety Statement what work activities require a permit-to-work system. Please see the Working in Confined Spaces part of our website. Employers may also need to consider other sector specific Guidance from the Authority as detailed in our Publications area

The Safety Statement should contain an organisation chart showing the safety and health management structure and the names and responsibilities of key personnel. As a minimum, it must include the name of the person at senior management or director level with delegated responsibility for safety and health in the company. It must also be ensured that the board of Directors or other management body in charge know they have safety and health responsibilities as well.

Responsibilities should be clearly identified:

- identify people responsible for safety and health jobs, especially where special expertise is called for, e.g., for carrying out Risk Assessments, monitoring compliance with safety and health standards, driving forklift trucks, etc.
- ensure that managers, supervisors, and team leaders understand their responsibilities and have the time and resources to carry them out.
- lines of communication should also be laid down between the different levels of responsibility.
- ensure that everyone knows what they must do and how they will be held accountable - set objectives.
- lead by example. Demonstrate a commitment and provide clear direction. Let everyone know that safety and health is important.

Section 18 of the Safety, Health and Welfare at Work Act 2005 states that, where a competent employee (in matters relating to health and safety), is available to an employer, that person should be utilized to address issues relating to safety, health and welfare. If the employer does not have access to a competent person "in-house", s/he should obtain the services of someone from outside the organization to assess and advise on the safety, health and welfare requirements.

Prior to engaging the services of a consultant, the employer should make reasonable enquiries that the person or company being employed has an adequate level of competence to address the work activities under consideration. This might involve checking the consultant's qualifications and experience, to be assured that s/he has the requisite competence to address the issues of health and safety within the workplace. Generally, a person specializing in safety consultancy will have, in addition to relevant experience, a certificate, diploma, degree or other qualification in the field of occupational health and safety. They might also be a member of a professional body specializing in occupational health and safety, such as the Institute of Occupational Safety and Health (IOSH), the Chartered Society for Worker Health Protection (BOHS) and/or other professional institutes.

Depending on the work activities and the workplace under consideration, the consultant might need to have additional qualifications and experience in the type of activity being assessed. S/he might also need to have access to specialist information and expertise to be in a position to be adequately informed before assessing the nature and extent of the hazards within a workplace and the appropriate control measures and systems to put in place to adequately address those hazards on an ongoing and systematic basis.

CHAPTER 8 DOCUMENTATION OF PROCEDURE

Documenting the process helps to ensure that the identified risk control measures are implemented in the way they were intended. It will also assist in managing other hazards and risks that may be in some way like ones already identified. Adequate record keeping of the risk management process should show that the process has been conducted properly. This information should include:

- Hazards identified
- Assessment of the risks associated with those hazards
- Decision on control measures to manage exposure to the risks
- How and when the control measures are implemented
- Evidence of monitoring and reviewing of the effectiveness of the controls

CHAPTER 9 CONCLUSION

Thus, after completing the procedure of Risk Assessment list of machines that come under different category based on the severity will be classified and safety controls for mitigating risk will be implemented.

CHAPTER 9

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