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GUIDELINES ON OCCUPATIONAL SAFETY AND HEALTH (OSH) RISK MANAGEMENT FOR SMALL AND MEDIUM ENTERPRISES IN ASEAN MEMBER STATES

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PREFACE

ASEAN Labour Ministers' (ALM) Work Programme 2016-2020 and Works Plans of the Subsidiary Bodies was established for the purpose of a better quality of life for ASEAN people through workforce with enhanced competitiveness and engaged in safe and decent work derived from productive employment, harmonious and progressive workplace, and adequate social protection.

ASEAN Occupational Safety and Health Network (ASEAN-OSHNET) Work Plan 2016-2020 is one of the work plan under the ALM Work Programme 2016-2010. ASEAN-OSHNET Work Plan 2016-2020 was created to achieve harmonious, safe and progressive workplace and reach the target by 2020 to fostering safe and healthy environment in the workplace.

Thematic Area of the ALM Work Programme 2016-2020: OSH Standard and capacity for Project 10 - Development of an ASEAN Risk Managements Guidebook (focusing on SMEs) is one of programmes' to promote non-discriminatory laws, policies and practises by developing effective, responsive, accountable and transparent institution at all levels.

Small and medium enterprises (SMEs) play an important role in most economies Worldwide. SMEs are usually seen as having simpler internal organization and thus as being more flexible and faster at responding and adapting to change. At the same time, SMEs are frequently confronted with major challenges. Risk management may help SME managers to identify significant risks that could jeopardize the success or existence of the company in time to efficiently cope with them.

Misjudging or failing to recognize risks can – in the worst case – have disastrous consequences, ranging from customer loss to damaging liability, environmental damage and possibly even bankruptcy.

These Guidelines would focus on occupational safety and health risk management for small and medium-sized enterprises (SMEs) and would provide a common framework for ASEAN Member States to undertake risk management of work activities.

1.0 INTRODUCTION

Small and medium enterprises (SMEs) are often the main pillar of an economy and provide employment to a majority of the workforce in a country or state. SMEs including micro enterprises are integral to the economic development and growth of the ASEAN Member States (AMS). They constitute the largest number of establishments and contribute significantly to the labour force of AMS. SMEs account for between 88.8% and 99.9% total establishments in AMS and between 51.7% and 97.2% of total employment. *(SME Developments in ASEAN, 2018)*.

Occupational safety and health (OSH) risks management is a crucial component of any business. Deficiency in management of OSH risks may led to work-related injuries, occupational diseases or deaths in an organization or workplaces. More attention and assistances should be given to SMEs to help them in the implementation of OSH as their apparent lack of financial resources and expertise hinder their capacity to effectively implement OSH.

The use of risk management approaches has become more common among organizations, particularly those with larger scale enterprise and OSH departments, but the approach may be less common among smaller organizations in which the number of dedicated OSH personnel is limited. Therefore, it is important to develop a specific approach for small and medium size organizations to implement a risk management process by scaling it to their needs.

1.1 Purpose of Guidelines

The purpose of these guidelines is to provide a systematic and objective approach to identifying the hazard, assessing the risk, controlling the risk and monitoring and reviewing the risk management process and performance to ensure continuous improvement.

1.2 Scope and Application

These guidelines are intended for SME and provide SMEs employers with the guidance in identifying hazards, conducting risk assessment and implementing control measures which are the key aspects of risk management.

Presently, there is no common definition of SMEs among AMS. Different countries define SMEs based on their own criteria, usually benchmarking against annual sales turnover, number of employees or shareholders' funds. Eventually, SME are businesses that maintain annual sales turnover, number of employees or shareholders' funds below a certain threshold and this threshold vary from country to country.

1.3 Benefit

The benefits of these guidelines include but are not limited to the following:

(a) Enable employers to manage risk in a structured way;
(b) Assist employers with compliance to OSH legal requirement;
(c) Reduce occupational accident and occupational diseases by reducing OSH risk at the workplace;
(d) Reduce compensation cost, medical expenses and employee absenteeism hidden costs due to occupational accident or occupational diseases (such as loss of staff morale, loss of productivity, reputational damage, impact to customer satisfaction due to project delays, etc.;
(e) Improve overall performance of the workplace; and
(f) Promotion of safety culture at the workplace.

2.0 DEFINITIONS

“as far as is practicable” means practicable having regard to-

(a) the severity of the hazard or risk in question;

(b) the state of knowledge about the hazard or risk and any way of removing or mitigating the hazard or risk;

(c) the availability and suitability of ways to remove or mitigate the hazard or risk; and

(d) the cost of removing or mitigating the hazard or risk;

Note:

Some countries use different terminologies which depends on the requirement of their national OSH laws and regulations, such as ‘as far as is reasonably practicable’, which have the same meaning.

“hazard” means source with a potential to cause injury and ill health;

“hierarchy of control” means the established priority order for the types of measures to be used to control risks;

“residual risk” means the remaining risks after implementation of risk control;

“risk” means a combination of the likelihood of an occurrence of a work related hazardous event or exposure and the severity of injury or ill health caused by the event or exposure;

“risk assessment” means the process of evaluating the risks to safety and health arising from hazards at work and determining the appropriate measures for risk control;

“risk control” means measures to eliminate or reduce the risk associated with a hazard; and

“risk management” means the total procedure associated with identifying a hazard, assessing the risk, putting in place control measures, and reviewing the outcomes.

3.0 RISK MANAGEMENT

Risk management is a systematic approach to manage workplace hazards. It is a key component in any organizational management that identifies, evaluates and determines the means of reducing risks to an acceptable level to protect employees, visitors, contractors and other persons at workplace. The aim of risk management is to reduce the likelihood and consequence of a workplace incident that may result in injury, ill health or illness. An effective way to create and maintain a safe and healthy work environment is for an organisation to integrate risk management into their daily business operations.

3.1 Basic Concept of Risk

Risk is something that we as individuals live with on a day to day basis. People are constantly making decisions based on risk. Simple decision in daily life such as driving, crossing the road and money investment all imply an acceptance risk.

In mathematical term, risk can be calculated by the equation -

Risk = Likelihood x Severity

Where,

Likelihood is a work related hazardous event or exposure likely to occur; and

Severity is outcome from an event or exposure such as severity of injury or ill health.

3.2 Process of Risk Management

The key processes in risk management are outlined in **Figure 1.**

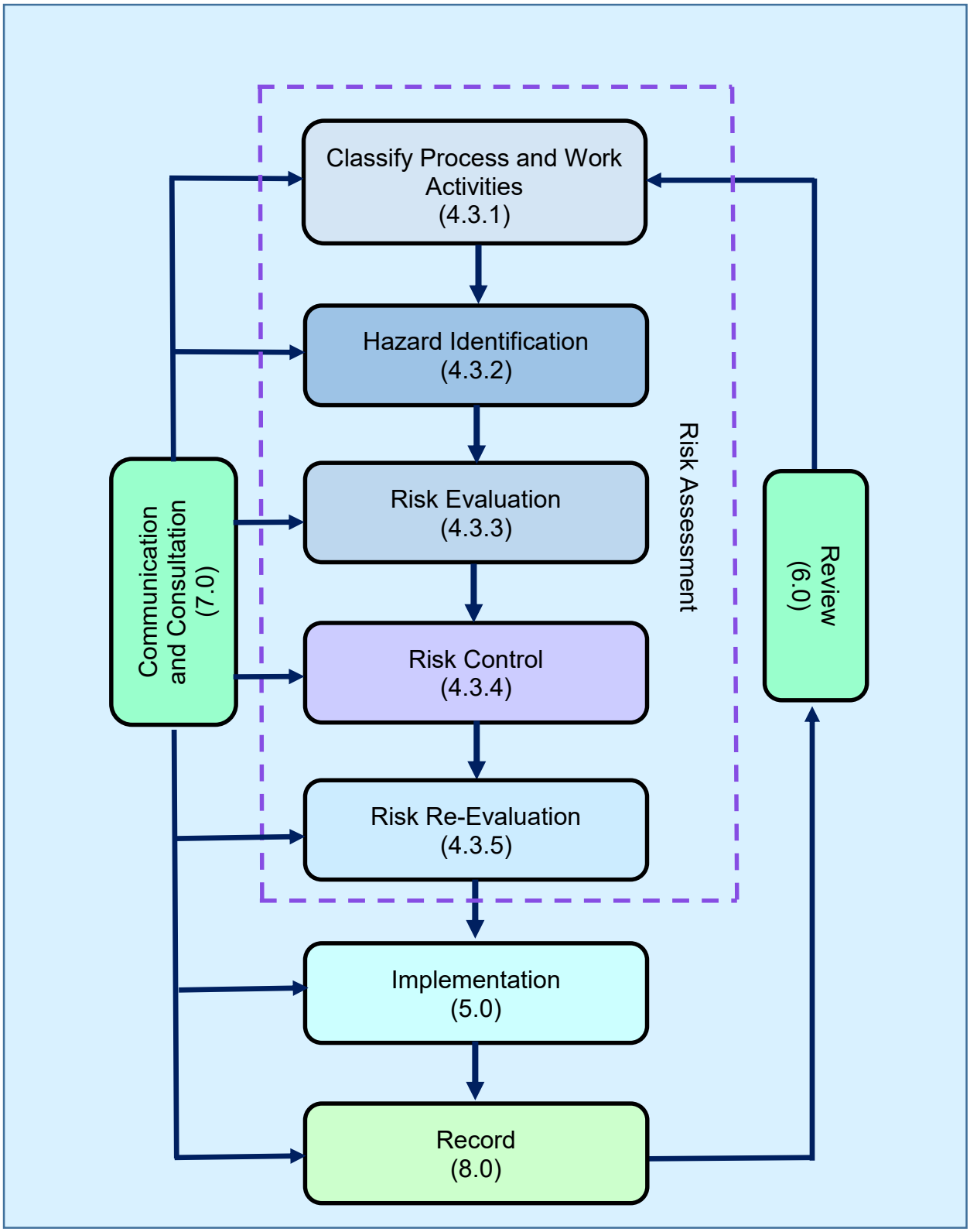


Figure 1 – Process of Risk Management

4.0 RISK ASSESSMENT

Effective risk management will depend, amongst other things, on a risk assessment being carried out and the findings being used effectively. Risk assessments enable employers to take the measures necessary to protect the safety and health of their employees and persons who are not their employees at the workplaces.

4.1 Objectives of Risk Assessment

The objectives of risk assessment are as follows: -

(a) to identify all the factors that may cause harm to employees and others (the hazards);
(b) to consider what the chances are of that harm actually be falling anyone in the circumstances of a particular case and the possible severity that could come from it (the risks); and
(c) to enable employers to plan, introduce and monitor preventive measures to ensure that the risks are adequately controlled at all times.

4.2 Planning of Risk Assessment Activities

Employer should plan and conduct a risk assessment to his employees or other persons who may be affected by his undertaking in the workplace. Ideally, the risk assessment should be conducted before new processes or activities are introduced.

The employer should appoint a trained person as a team leader and risk assessment team member(s) to conduct the risk assessment. The risk assessment team should have an appropriate knowledge and experience of the work to be assessed. For example, supervisors and employees who work with the process are the most familiar with the operation.

For a start, when considering developing risk assessment, it is important to establish some boundaries within which the risk assessment process will apply.

The employer should determine:

(a) the scope of the risk assessment (e.g., be specific about what to assess such as the lifetime of the product or the physical area where the work activity takes place);

(b) the resources needed (e.g., train a team of individuals to carry out the assessment, the types of information sources, etc.);

(c) type of risk evaluation method to be used (e.g., how exact the scale or parameters need to be in order to provide the most relevant evaluation);

(d) the relevant personnel involved (e.g., manager, supervisors, employees, employee representative, suppliers, etc.); and

(e) relevant laws, regulations, codes, or standards may apply in your jurisdiction, as well as organizational policies and procedures.

4.3 Process of Risk Assessment

Process of risk assessment requires 5 simple steps -

(a) classify process and work activities;
(b) identify all the relevant hazards;
(c) evaluate risk from each hazard, by calculating or evaluating-
    i. likelihood of occurrence, and
    ii. severity of each hazard;
(d) determine additional control measures (includes changing/ upgrading of existing control measures), if necessary
(e) re-evaluate the risk after determine additional control measures to get the residual risk.

The Risk Assessment Form (see **APPENDIX A**) is an example to document the Risk Assessment process.

4.3.1 Classify Process, and Work Activities

Process is a set of interrelated or interacting work activities which transform input into output. Classify process and work activities in accordance with their similarity, such as-

(a) geographical or physical areas within/outside premises;
(b) stages in production/service process;
(c) not too big e.g. building a car;
(d) not too small e.g. fixing a nut; or
(e) defined work activities e.g. loading, packing, mixing, fixing the door.

Table 1 shows the example of process and work activities in metal stamping process:

Name of Workplace: Steel Industry	
Department	Production
Process	Metal Stamping
Location	Press Shop
Work Activity	1. Lifting bundle of raw plate from a pallet manually
	2. Placing a raw plate into a stamping jig
	3. Punching using power press machine by hand push
	4. Trimming finished product using grinder (finishing tools)
	5. Carrying finished product to storage area manually

Table 1 – Example of Process and Work Activities

4.3.2 Hazard Identification

4.3.2.1 Introduction

Hazard identification is the process of identifying hazards in the workplace or for a work procedure. In order to understand what hazard identification involves, it is first necessary to understand the nature of hazards.

Hazard in a workplace can arise from people being exposed to hazardous substances, processes or the environment. Workplace hazards can be divided into five categories:

(a) Physical hazards;
(b) Chemical hazards;
(c) Ergonomic hazards;
(d) Psychological hazards; and
(e) Biological hazards.

Appendix B shows example of hazards in general.

Hazard identification is an ongoing and proactive process. The process of hazard identification should take into account, but not be limited to:

(a) routine and non-routine activities and situations, including hazards arising from:
    i. infrastructure, equipment, materials, substances and the physical conditions of the workplace;
    ii. product and service design, research, development, testing, production, assembly, construction, service delivery, maintenance and disposal;
    iii. human factors;
    iv. how the work is performed;
(b) potential emergency situations; and
(c) people, including consideration of:
    i. those with access to the workplace and their activities, including employees, contractors, visitors and other persons;
    ii. those in the vicinity of the workplace who can be affected by the activities of the workplace;
    iii. employees at a location not under the direct control of the workplace.

4.3.2.2 Hazard identification method

The employer has to determine the most appropriate method(s) of identifying hazards. These may include simple methods such as brain-storming, job observations, workplace inspection, exposure monitoring, review records, interviewing employees and others etc.

Another approach to identify hazard is through a systematic process reviews, such as:

(a) Process Hazard Analysis (PHA);
(b) Job Hazard Analysis (JHA); or
(c) Job Safety Analysis (JSA).

The employer should take into consideration the sources of information when identifying hazards but are not limited to the following:

(a) workplace layout plan;
(b) process or work flowchart;
(c) list of work activities in the process;
(d) list of chemicals, machines and/ or tools used;
(e) records of past incident and accident investigation;
(f) relevant legislation, industrial code of practices, standard, guidelines or specifications;
(g) observations and interviews;
(h) OSH inspection and audit records;
(i) details of existing risk controls;
(j) feedback from employees, clients, suppliers or other stakeholders;
(k) Safe Work Procedures (SWPs);
(l) Safety data sheets (SDS);
(m) manufacturer's instruction manual;
(n) copies of any previous risk assessment that are relevant;
(o) medical record (e.g., allergy) of employees in the workplace or activity being assessed; and
(p) past training records of employees;

Appendix C shows example of Job Hazard Analysis (JHA).

Table 2 shows example of identified hazards in metal stamping process:

Process: Metal Stamping		
Work Activity	**Example of Hazard**	**Category Of Hazard**
1. Lifting bundle of raw plate from a pallet manually	i. Heavy load of raw plate	Ergonomics
2. Placing a raw plate into a stamping jig	i. Raw plate with sharp edge	Physical
3. Punching using power press machine by hand push	i. Flying objects (metal chips)	Physical
	ii. Defective safety features (sensor)	Physical
	iii. Prolonged standing	Ergonomics
4. Trimming finished product using grinder (finishing tools)	i. Expose to metal dust	Chemical
	ii. Product with sharp edges	Physical
	iii. Prolonged sitting	Ergonomics
5. Carrying finished product to storage area manually	i. Heavy load of products	Ergonomics

Table 2 – Example of Identified Hazards

4.3.3 Risk Evaluation

Risk is the determination of likelihood and severity of the credible accident/event sequences in order to determine magnitude and to priorities identified hazards.

4.3.3.1 Likelihood of an occurrence

Likelihood is a work related hazardous event or exposure likely to occur. This value is based on the likelihood of an event occurring.

Likelihood levels range from “most likely” to “inconceivable.” For example, a small spill of bleach from a container when filling a spray bottle is most likely to occur during every shift. Alternatively, a leak of diesel fuel from a secure holding tank may be less probable.

Table 3 indicates likelihood using the following values –

Likelihood	Description	Rating
Most likely	The most likely result of the hazard / event being realized	5
Possible	Has a good chance of occurring and is not unusual	4
Conceivable	Might be occur at sometimes in future	3
Remote	Has not been known to occur after many years	2
Inconceivable	Is practically impossible and has never occurred	1

Table 3 – Likelihood Rating

Furthermore, evaluating likelihood is also conducted through analysis of the exposure, frequency and control measures, through document review, measurement, questionnaire, interview and subject matter expert judgement. Guidance given in **Table 4** should also be used while evaluating likelihood.

Table 4 indicates factors to consider when evaluating likelihood.

Likelihood	Description	Rating	Factors
Most likely	The most likely result of the hazard/event being realized	5	Factor to consider: **A. Occurrence of accident** i. Past accident record (self-workplace) – Had occurred before. OR **B. Exposure of hazard** i. Direct proximity to hazard, or ii. Continuous exposure to particular hazard, or iii. Almost certain frequency of exposure, and iv. No existing control measure. OR **C. Employee state** i. Job activity are unknown to the employees
Possible	Has a good chance of occurring and is not unusual	4	Factor to consider: **A.Occurrence of accident** i. Past accident record (self-workplace) – Never happen, near miss accident had occurred before. OR **B.Exposure of hazard** i. In-direct but very closed to hazard, or ii. Prolong duration of exposure to particular hazard, or iii. Routine job require frequent exposure. and iv. Insufficient existing control measure. OR **C.Employee state** i. No knowledge and awareness on hazard, or ii. No experience on activity at all.

Likelihood	Description	Rating	Factors
Conceivable	Might be occur at sometimes in future	3	Factor to consider: **A. Occurrence of accident** i. Past accident record (self-workplace) – No Record of accident but happen in other similar activities / industries. OR **B. Exposure of hazard** i. In-direct but not too closed to hazard, or ii. Intermittent exposure to particular hazard, or iii. Low frequency of exposure, and iv. Minimum existing control measure. OR **C. Employee state** i. Knowledgeable and awareness on hazard, or ii Less experience on activity. OR **D. Working environment** i. Unsafe working environment (Poor Housekeeping / weather).
Remote	Has not been known to occur after many years.	2	Factor to consider: **A. Occurrence of accident** i. Past accident record (self-workplace) – No record and never been reported anywhere. OR **B.Exposure of hazard** i.Safe distance to hazard, or ii.Low exposure to particular hazard, or iii.Non routine job requires frequent exposure, and iv.Necessary existing control measure in place. OR

Likelihood	Description	Rating	Factors
			C. Employee state i. Proper induction and on job training are provided on the related hazard. ii. Good experience on activity. OR **D. Working environment** i. Safe working environment (Excellent housekeeping / weather).
Inconceivable	Is practically impossible and has never occurred	1	Factor to consider: **A. Occurrence of accident** i. Past accident record (self-workplace) – No record and unforeseeable risk. OR **B.Exposure of hazard** i. Remote distance from hazard, or ii. Impossible exposure, or iii. Job scope not involved with the exposure of hazard, and iv. Adequate existing control measure and well maintain. OR **C. Employee state** i. Proper induction and on job training, refresher training and assessment are provided on the related hazard to the employees, or ii. Having knowledge on hazard and process activity, or iii. Competent with the activity. OR **D. Working environment** i. Safe working environment is part of organization management system, or

Likelihood	Description	Rating	Factors
			ii. Safe design of workplaces / system of work / process.

Table 4 - Factors to Consider When Evaluating Likelihood

Note:

***Routine job** is scheduled jobs, tasks, processes such as production, maintenance, laboratory, housekeeping, etc.

****Non-routine job** which is normally periodic but intensive such as periodic/preventive maintenance works, repairs, delivery, administrative work, management tasks, safety inspections, internal audits, etc.

4.3.3.2 Severity of hazard

Severity is outcome from an event or exposure such as severity of injury or ill health. It can be divided into five categories. Severity are based upon an increasing level of severity to an individual's injury or ill health. **Table 5** indicates severity by using the following table:

Severity	Description	Rating
Catastrophic	Death, numerous serious bodily injuries, multiple serious bodily injuries or numerous life threatening occupational diseases (e.g. occupational cancers or acute poisoning)	5
Major	Serious bodily injuries involving permanent disability or life threatening occupational disease involving one person (e.g. occupational cancers, acute poisoning).	4
Moderate	Injury involving non-permanent disability or ill health requiring medical treatment (includes lacerations, burns, sprains, minor fractures and dermatitis and work-related upper limb disorders).	3
Minor	Injury or ill health requiring first-aid only (includes minor cuts and bruises, irritation, ill health with temporary discomfort).	2
Negligible	Negligible injury.	1

Table 5 – Severity Rating

4.3.3.3 Evaluate Risk

Risk can be presented in variety of ways to communicate the results of evaluation to make a decision on risk control. For risk evaluation that uses likelihood and severity in a qualitative method, presenting result in a risk matrix is a very effective way of communicating the distribution of the risk throughout a plant and area in a workplace.

Risk can be calculated using the following formula:

Risk = L x S

Where:

L = Likelihood

S = Severity

4.3.3.4 Risk matrix

These guidelines recognize the various risk assessment methods and matrices practiced and preferred by workplace. The numeric 5 x 5 Risk Matrix is recommended as given in **Table 6** as shown below:

Likelihood / Severity	Inconceivable (1)	Remote (2)	Conceivable (3)	Possible (4)	Most likely (5)
Catastrophic (5)	5	10	15	20	25
Major (4)	4	8	12	16	20
Moderate (3)	3	6	9	12	15
Minor (2)	2	4	6	8	10
Negligible (1)	1	2	3	4	5

Table 6 – Risk Matrix

Legend:

High

Medium

Low

To use this matrix, first find the severity column that best describes the outcome of risk. Then follow the likelihood row to find the description that best suits the likelihood that the severity will occur. The risk level is derived from severity and likelihood rating. The risk level is determined using the equation in **4.3.3.3**.

4.3.3.5 Action for risk level

The risk value can be used to prioritize necessary actions to effectively manage workplace hazards. **Table 7** determines priority based on the following ranges:

RISK LEVEL	RISK ACCEPTABILITY	ACTION
15 – 25 (HIGH)	**NOT ACCEPTABLE**	A HIGH risk requires immediate action to control the risk so far as is practicable to medium risk level or low risk level before carry out any activity as detailed in para **4.3.4**. Actions taken should be documented on the risk assessment form including date for completion.
5 - 12 (MEDIUM)	**TOLERABLE**	A MEDIUM risk may require a planned approach to controlling the hazard so far as is practicable to low risk level and applies temporary measure (if necessary). Actions taken should be documented on the risk assessment form including date for completion.
1 – 4 (LOW)	**ACCEPTABLE**	A risk identified as LOW may be considered as acceptable and further reduction may not be necessary.

Table 7 - Recommended Action for Risk Levels

Hazards assessed, as “High Risk Level” should have immediate actions, to resolve risk to life safety and health. Individuals responsible for required action, including follow up should be clearly identified.

4.3.4 Risk Control

Risk control is a measure to eliminate or reduce the risk associated with a hazard in a manner such that the hazard does not pose a risk or to minimise the risk to employees who have to enter into an area or work on equipment in the course of scheduled work.

Control provides a means by which risks can be systematically evaluated against a set of control options (the hierarchy of controls) to determine the most effective control method(s) for the risk(s) associated with each hazard. This process involves analysing the data collected during the hazard identification and risk evaluation processes, and developing a strategic plan to control the risks identified.

The risk control process starts by considering the highest ranked risks, working down to the least significant. Each risk should be examined having regard to the "hierarchy of controls". This provides a method of systematically evaluating each risk to determine, firstly, if the causal hazard can be eliminated, and otherwise, to find the most effective control method for each risk.

4.3.4.1 Hierarchy of control

The hierarchy of control creates a systematic approach to managing occupational safety and health in the workplace by providing a structure to select the most effective control measures to eliminate or reduce the risk of certain hazards that have been identified as being caused by the operations of the business.

The hierarchy of control has five levels of control measures, the most effective measure is at the top of the hierarchy and the least effective is at the bottom. So the idea is that, start from the top of the hierarchy in choosing the appropriate control measure. Where elimination is not feasible, measures should be taken to reduce the risk by following the hierarchy in the recommended order. Do not simply jump to the easiest control measure to implement. The hierarchy of control is shown in **Figure 2** below.

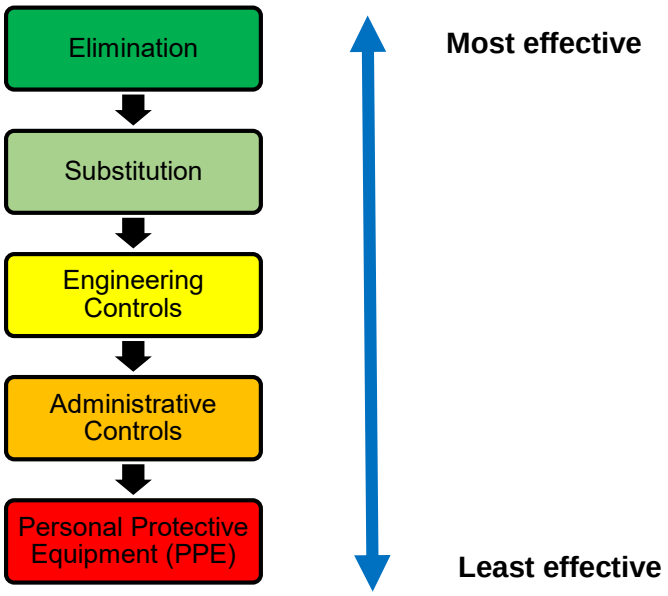


Figure 2 - Hierarchy of Control

Risk control can be applied at the source of the hazard, through engineering controls, administrative controls and personal protective equipment (PPE). Each of these controls is elaborated in **4.3.4.1.1, 4.3.4.1.2, 4.3.4.1.3** and **4.3.4.1.4.**

4.3.4.1.1 At the source of the hazard

(a) **Elimination** - total removal of hazardous work activities, tool, process, machine or substance. This is the best way of protecting employees. For example, laser marking of semiconductors eliminates the use of solvent for ink marking and laser cutting eliminates noise hazard from powered saws.

(b) **Substitution** - involves replacing the hazard by one that presents a lower risk. For example, substitution of organic solvents to water-based degreasing agent or substitution of manual spraying to automation process.

Elimination and substitution is the most effective measures of reducing risks and the best ways of protecting employees. These control measures should be implemented during design or development stage of the work activity or project.

4.3.4.1.2 Engineering control

(a) **Redesign** - Jobs and processes can be reworked to make them safer. For example, containers can be made easier to hold and lift.

(b) **Isolation** - If a hazard cannot be eliminated or replaced, it can sometimes be isolated, contained or otherwise kept away from employees. For example, an insulated and air-conditioned control room can protect operators from a toxic chemical or hazardous gas emissions.

(c) **Automation** - Dangerous processes can be automated or mechanized. For example, computer-controlled robots can handle spot welding operations in car plants. Care should be taken to protect employees from robotic hazards.

(d) **Barriers** - A hazard can be blocked before it reaches employees. For example, special curtains can prevent eye injuries from welding arc radiation. Proper equipment guarding will protect employees from contacting moving parts.

(e) **Absorption** - Baffles can block or absorb noise. Lockout systems can isolate energy sources during repair and maintenance. Usually, the further a control keeps a hazard away from employees, the more effective it is.

(f) **Dilution** - Some hazards can be diluted or dissipated. For example, ventilation systems can dilute toxic gasses before they reach operators.

Engineering controls are favoured over administrative and personal protective equipment (PPE) for controlling existing employee exposures in the workplace because they are designed to reduce the risk, before it comes in contact with the employee. Well-designed engineering controls can be highly effective in protecting employees and will typically be independent of employee interactions to provide this high level of protection.

4.3.4.1.3 Administrative controls

(a) **Safe work procedures (SWP) -** Employees can be required to use standardized safety practices. The employer is expected to ensure that employees follow these practices. Work procedures should be periodically reviewed with employees and updated. Detailed explanation on SWP can be found in **Appendix D**.

(b) **Supervision and training** – Initial training on safe work procedures and refresher training should be provided. Appropriate supervision to assist employees in identifying possible hazards and evaluating work procedures.

(c) **Job rotations and other procedures** can reduce the time that employees are exposed to a hazard. For example, employees can be rotated through jobs requiring repetitive tendon and muscle movements to prevent cumulative trauma injuries. Noisy processes can be scheduled when no one is in the workplace.

(d) **Housekeeping, repair and maintenance programs** - Housekeeping includes cleaning, waste disposal and spill clean-up. Tools, equipment and machinery are less likely to cause injury if they are kept clean and well maintained.

(e) **Hygiene** - Hygiene practices can reduce the risk of toxic materials being absorbed or adsorbed by employees or carried home to their families. Street clothing should be kept in separate lockers to avoid being contaminated by work clothing. Eating areas should be segregated from toxic hazards. Eating should be forbidden in toxic work areas. Where applicable, employees should be required to shower and change clothes at the end of the shift.

4.3.4.1.4 Personal protective equipment

Personal protective equipment (PPE) and clothing is used when other control measures are not feasible and where additional protection is needed. Employees should be trained to use and maintain equipment properly. The employer and employees should understand the limitations of the personal protective equipment.

The employer is expected to require employees to use their equipment whenever it is needed. Care should be taken to ensure that equipment is working properly. Otherwise, PPE may endanger an employee's health by providing an illusion of protection.

Administrative controls and PPE are frequently used with existing processes where hazards are not particularly well controlled. Administrative controls and PPE programs may be relatively inexpensive to establish but, over the long term, can be very costly to sustain. These methods for protecting employees have also proven to be less effective than other measures, requiring significant effort by the affected employees.

4.3.5 Risk Re-Evaluation

Risk re-evaluation is a process to evaluate again the risk after the additional control measures has been proposed and/or implemented thus ensuring that control measures is effective to reduce the risk level.

If the risk level is "High" or in "Not Acceptable" zone, the risk should be eliminated or reduced to at least a "Medium" level by additional risk controls. However, if the risk level is "Medium" further mitigation action to control the risk should be carried out so far as is practicable to ensure that the risk level is reduced within a defined time period.

When additional risk control(s) have been decided, re-rate the severity, likelihood and risk levels. The re-evaluated risk should not be HIGHER than the initial risk in the "Risk Evaluation" section. The re-evaluated risk value should preferably be kept within the Low Risk (Acceptable) zone, where feasible.

See **Appendix E** for guidance notes to conduct risk assessment and **Appendix F** for example of completed risk assessment form.

5.0 IMPLEMENT

5.1 Risk Assessment Approval

The risk assessment form should be completed by the risk assessment team and approved by the in charge personnel of the area. Thereafter the management or employer should endorse the risk assessment results.

5.2 Implementation Actions

The employer should:

(a) implement so far as is practicable the additional risk control measures immediately or in a specific timeline;
(b) ensure that an action plan is prepared to implement the measures. The plan should include a timeline and the names of the persons in charge (PIC) for implementing the measures;
(c) ensure that the plan is monitored regularly until all the measures are implemented;
(d) ensure that regular inspections and audits are carried out to make sure that risk control measures have been implemented and are functioning effectively;
(e) ensure that before performing any work, an observation is carried out to make sure all control measures are in place and employee is not exposed to associated hazards; and
(f) monitor and maintain the effectiveness of the risk controls at all times.

6.0 REVIEW

All risk assessment should be reviewed:

(a) upon any accident, incident or ill health;
(b) when there is any significant change in work process, practices or procedures; or
(c) when new information on any hazard is made known.

It is good practice to review the risk assessment on a regular basis to make sure the control measures are effective.

7.0 COMMUNICATION AND CONSULTATION

Communication and consultation with external and internal stakeholders, including all functions and levels within the workplace, should take place during all stages of the risk management process. Communication and consultation can take various forms (such as meetings, employee dialogues, trainings, notice boards and various electronic means) for different groups within the workplace. Effective communication, coordination and consultation involve two-way dialogues between stakeholders.

Proper management of hazards occasionally identified in the workplace can be done through effective process. The individual or team who identified the hazard should ensure proper communication of the hazard to the appropriate workplace authority (manager, department head, or designated person). Ultimately, the employer is responsible for ensuring that effective and timely controls are applied to the hazard and communicating the results back to the risk assessment team.

If practicable, there should be consultation with the safety and health representative(s) when identifying, evaluating and controlling risks. Consulting directly with employees and drawing on their experience and knowledge is more effective in reducing risk.

All employees or other persons not being his employee at the workplace should be communicated with on the risks they face and the risk control measures available to manage those risks to as low as is practicable. The employer should ensure that all persons exposed to the risks are communicated on the nature of risks and any measures or safe working procedures (SWP) implemented.

Finally, the employer should communicate all risk assessments to employees, monitor the follow up actions and keep records.

8.0 RECORD

Each risk assessment should be fully documented. The risk assessment form is an example to document the risk assessment process. The employer should ensure risk assessment form is kept for a specific number of years (depends on local requirement, if any) at the workplace, maintained and accessible to the inspecting authority.

9.0 TRAINING

Information, instruction and training provide employees with the skills and knowledge to perform their work in a manner that is safe and without risks to health. It enables them to -

(a) follow safety and health procedures;
(b) use risk controls set in place for their protection; and
(c) have an appreciation of the nature of the hazard; the risks associated with their use; and the reason why risk controls are used.

Employees should be retrained when they changed to a new work activities or stop working from any work activities for a long period of time or when new hazard/ risk is identified.

Trained person as a team leader and risk assessment team members who may be required to perform risk assessments should be trained in the risk management process and risk assessment methodology, and be familiar with-

(a) the regulations associated with the hazard;
(b) have a practical understanding of the work hazards; and

consult with the safety and health representative, if any.

APPENDIX A

RISK ASSESSMENT FORM

NAME OF WORKPLACE:

Department		**Team Leader**		**Approved by**	**Reference No.**
Process		Team Member 1		Signature	
Location		Team Member 2		Name	
Assessment Date		Team Member 3		Designation	
Last Assessment/ Review Date		Team Member 4		Date	

No.	HAZARD IDENTIFICATION								RISK EVALUATION					Additional Risk Control	RISK RE-EVALUATION				REMARK
	Work Activity	Hazard	Category of Hazard					Event and Consequence	Existing Risk Control (if any)	Justification on likelihood	Likelihood (L)	Severity (S)	Risk (R)		Likelihood (L)	Severity (S)	Risk (R)	PIC (due date)	
			Physical	Chemical	Biological	Ergonomic	Psychosocial												

APPENDIX B

EXAMPLE OF HAZARD

CATEGORY OF HAZARD	DESCRIPTION	EXAMPLES OF HAZARDS
1. Physical Hazards	Factors within the working environment that can harm the body without necessarily touching it. They include unsafe conditions that can cause injury and ill health.	i. Slippery floors, blocked walkway or cords running across the floor. ii. Working at heights with open edges. iii. Unguarded machinery and moving machinery parts. iv. Electrical hazards like frayed cords, missing ground pins, improper wiring. v. Working in confined spaces with poor ventilation. vi. Expose to radiation: including ionizing, non-ionizing (EMF's, microwaves, radio waves, etc.). vii. High exposure to sunlight or ultraviolet rays. viii. Expose to extremes temperature (hot and cold). ix. Expose to constant loud noise for a long time.
2. Chemical Hazards	Present when an employee is exposed to any chemical in the workplace in any form (solid, liquid or gas).	i. Expose to liquids like cleaning products, paints, acids, solvents. ii. Expose to vapours and fumes that come from

CATEGORY OF HAZARD	DESCRIPTION	EXAMPLES OF HAZARDS
	Some are safer than others, but to some employees who are more sensitive to chemicals, even common solutions can cause illness, skin irritation, or breathing problems.	welding or exposure to solvents. iii. Expose to gases like acetylene, propane, carbon monoxide and helium. iv. Flammable materials like gasoline, solvents, and explosive chemicals expose to spark. v. Expose to pesticides.
3. Biological Hazards	Associated with working with animals, people, or infectious plant materials. Work in schools, day care facilities, colleges and universities, hospitals, laboratories, emergency response, nursing homes, outdoor occupations, etc. may expose you to biological hazards.	i. Expose to contaminated blood and other body fluids. ii. Expose to fungi/mould. iii. Expose to bacteria and viruses. iv. Expose to insect bites. v. Expose to animal and bird droppings. vi. Expose to animal wreckage.
4. Ergonomic Hazards	Occur when the type of work, body positions and working conditions put strain on body. They are the hardest to spot since employees don't always immediately notice the strain on their body or the harm that these hazards pose. Short-term	i. Improperly adjusted workstations and chairs. ii. Frequent manual lifting. iii. Awkward posture movements for prolong. (e.g.: twisting, bending, over reaching, elbow above the shoulder, working with the neck or back bent without

CATEGORY OF HAZARD	DESCRIPTION	EXAMPLES OF HAZARDS
	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.	support and lack of abilities to vary posture). iv. Task with repetitive movement. v. Use of high level force while transporting or supporting load including lifting, lowering, pushing, pulling, carrying and moving a load. vi. Expose to constant vibration for a long time. vii. Prolong standing and sitting (static).
5. Psychosocial Hazards	Hazards or stressors that cause stress (short-term effects) and strain (long-term effects). These are the hazards associated with workplace issues such as high workload, lack of control and/or respect, etc.	i. Excessive workloads ii. Conflicting demands and lack of role clarity. iii. Lack of involvement in making decisions that affect the employee and lack of influence over the way the job is done. iv. Poorly managed organisational change, job insecurity. v. Ineffective communication, lack of support from management or colleagues. vi. Psychological and sexual harassment, third party violence. vii. Less work flexibility.

APPENDIX C

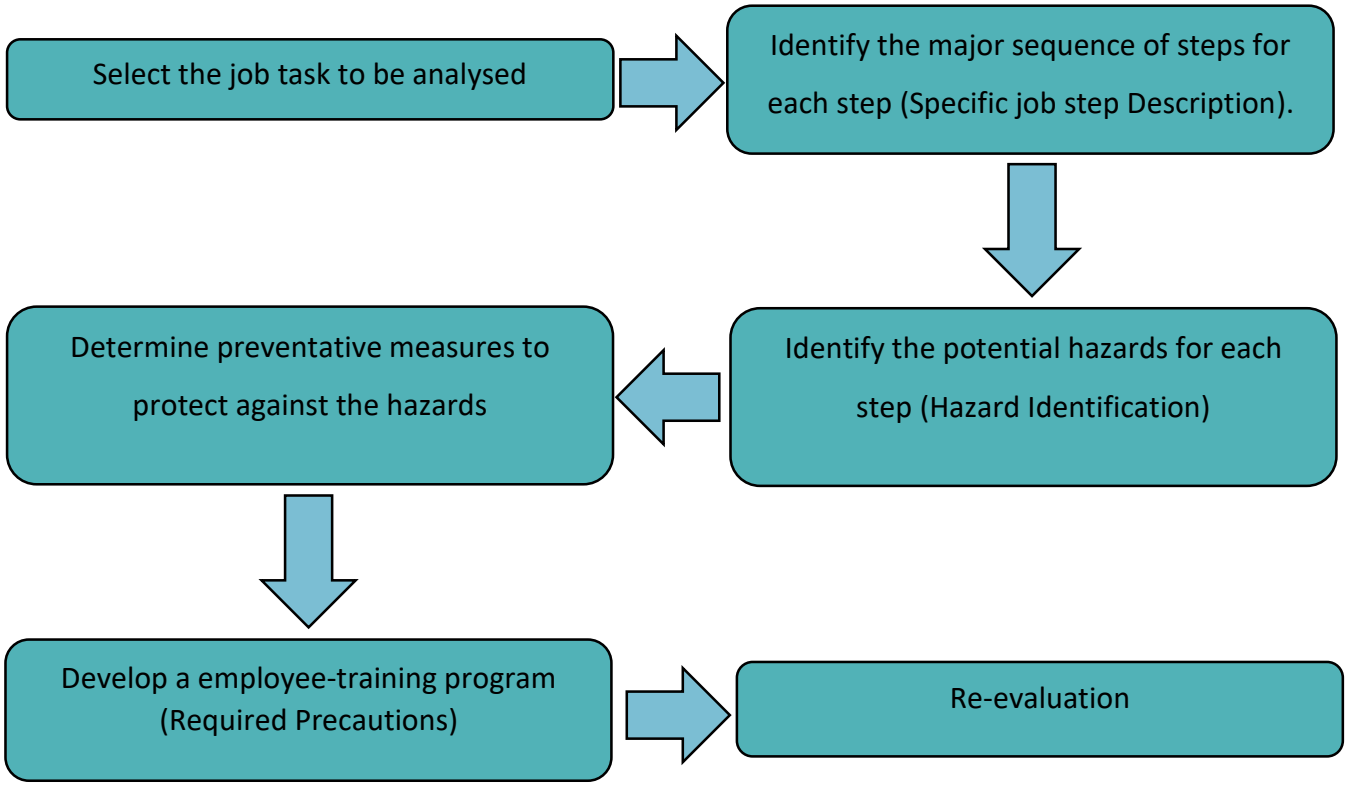
JOB HAZARD ANALYSIS (JHA)

Definition

Job Hazard Analysis (JHA) breaks a job or task into specific steps, analyses each step for specific hazards, develops safe work procedures to eliminate or reduce those hazards, and integrates safe work procedures into safety and health programs. JHAs should be developed for each job or task. Supervisors and employees should complete the JHA together.

Procedure

Basic Steps - Job Hazard Analysis is broken down into 6 major steps:



Work Example of Job Hazard Analysis.

Cleaning Inside Surface of Chemical Tank - Top Manhole Entry

Tank cleaning is an extremely hazardous activity. When working in a confined space, personnel are exposed to a number of hazards that in some cases have led to injury or even death. Below is an example of JHA for cleaning inside surface of chemical tank for top manhole entry:

STEP	HAZARD	REQUIREMENTS
1. Determine what is in the tank, what process is going on in the tank, and what hazards this can pose.	Improper oxygen level. Chemical exposure - Gas, dust, vapour - irritant, toxic. Liquid - irritant, toxic, corrosive, heated. Solid - irritant, corrosive. Moving blades/ equipment.	• Establish confined space entry procedures (Code of Practice for confine space). • Obtain work permit signed by safety, maintenance, and supervisors. • Test air by qualified person. • Ventilate to 19.5% -23.5% oxygen and less than 10% LEL of any flammable gas. Steaming inside of tank, flushing and draining, then ventilating, as previously described, may be required. • Provide appropriate respiratory equipment - SCBA or airline respirator. • Provide protective clothing for head, eyes, body, and feet. • Provide harness and lifeline.

STEP	HAZARD	REQUIREMENTS
		• Tanks should be cleaned from outside, if possible.
2. Select and train operators	Operator with respiratory or heart problem; other physical limitation. Untrained operator - failure to perform task.	• Examination by industrial physician for suitability to • work. • Train operators. • Dry run.
3. Set up equipment.	Hoses, cord, equipment - tripping hazards. Electrical – voltage too high, exposed conductors. Motors not locked out and tagged.	• Arrange hoses, cords, lines, and equipment in orderly fashion, with room to manoeuvre safely. • Use ground-fault circuit interrupter. • Lockout and tag mixing motor, if present.
4. Install ladder in tank.	Ladder slipping.	• Secure to manhole top or rigid structure.
5. Prepare to enter tank.	Gas or liquid in tank.	• Empty tank through existing piping. • Review emergency procedures. • Open tank. • Check of jobsite by industrial hygienist or safety professional. • Install blanks in flanges in piping to tank (isolate tank). • Test atmosphere in tank by qualified person (long • probe)

STEP	HAZARD	REQUIREMENTS
6. Place equipment at tank-entry position.	Trip or fall.	• Use mechanical-handling equipment. • Provide guardrails around work positions at tank top. • Provide personal protective equipment for conditions found.
7. Enter tank.		• Provide outside helper to watch, instruct, and guide operator entering tank, with capability to lift operator from tank in emergency.
8. Cleaning tank.	Reaction to chemicals, causing mist or expulsion of air contaminant.	• Provide protective clothing and equipment for all operators and helpers. • Provide lighting for tank. • Provide exhaust ventilation. • Provide air supply to interior of tank. • Frequent monitoring of air in tank. • Replace operator or provide rest periods. • Provide means of communication to get help, if needed. • Provide tow man standby for any emergency.
9. Cleaning up.	Handling of equipment, causing injury	• Dry run.

STEP	HAZARD	REQUIREMENTS
		• Use material-handling equipment

Through the completion of a Job Hazard Analysis, sometimes hazards are identified and cannot be eliminated or engineered out of a particular task. Safe work procedures are step by step instructions that allow employees to conduct their work safety when hazards are present. A safe work procedure identifies the materials and equipment needed, and how and when to use them safely.

APPENDIX D

SAFE WORK PROCEDURES (SWP)

1. Safe Work Procedures are generally prepared for: -
   (a) critical high risk jobs where accidents have or could result in severe injuries;
   (b) hazardous work where accidents occur frequently;
   (c) new or altered tasks have been introduced;
   (d) new equipment has been added to a process;
   (e) a job that requires many detailed tasks;
   (f) where two or more employees required for a job, and each should perform specific tasks simultaneously; and
   (g) specific tasks are done infrequently.

2. Safe Work Procedures should include, but not limited to:
   (a) regulatory requirements;
   (b) necessary personal protective equipment;
   (c) required training;
   (d) employee responsibilities;
   (e) specific sequence of steps to follow to complete the work safely;
   (f) required permits; and
   (g) emergency procedures.

An example of a task that requires the development of a safe work procedure is confined space entry. Individuals who should work within confined spaces should ensure that safe work procedures are developed and followed to maximize life safety.

APPENDIX E

GUIDANCE NOTES TO CONDUCT RISK ASSESSMENT

Step by step instruction to team leader and risk assessment team on how to conduct risk assessment:

General Information

1) Complete Risk Assessment Form **(Appendix A).** It is recommended to use a single form for each process.
2) Specify the names of team leader and risk assessment team members and record in respective row.
3) Specify the department, process and location and indicate in respective row.
4) Record the assessment date, last assessment date (if relevant) and review date (if relevant) in respective row.
5) Specify the name and designation of in charge personnel of the area (manager, department head, or designated person) in respective row. **(After the risk assessment is finished, the in charge personnel will check and give approval to the risk assessment done by signing and record the date of approval).**

Hazard Identification

1) List all work activities (routine, non-routine and emergency situation) under the “Work Activity” column.
2) Identify the hazards associated with each work activity and record in “Hazard” column and select category of hazard (physical, chemical, biological, ergonomic, psychosocial).
3) Determine what event and consequence of each hazard identified and record in “Event and Consequence” column.

Risk Evaluation

1) Record any existing risk control (if any).
2) Determine likelihood (L) from **Table 3** for each hazard**.** To assist in determining likelihood rating, use **Table 4** (Factors to Consider When Evaluating Likelihood) and indicate in “Justification of Likelihood”.
3) Determine severity (S) from **Table 5** for each hazard.
4) Take into consideration the existing risk control while determining likelihood (L) and severity (S).
5) Assign likelihood (L) and severity (S) rating in respective column.
6) Assign risk (R) and record in “R” column (see **Table 6 –** Risk Matrix);
7) Based on the risk assigned, recommend appropriate additional risk control (see **Table 7**).

Risk Re-evaluation

1) Re-evaluate likelihood (L) and severity (S) after recommend additional risk control and record in “L” and “S” column.
2) Assign risk (R) and record in “R” column.
3) Assign a suitable person in charge to implement the recommended additional risk control and indicate the follow up action date.
4) Indicate any additional precautions (if any) in ‘Remark” column.

APPENDIX F

EXAMPLE OF COMPLETED RISK ASSESSMENT FORM

NAME OF WORKPLACE: Steel Industry

Department	Production	**Team Leader**	Mr. Faizal	**Approved by**	**Ref. No:**
Process	Metal Stamping	RM Team Member 1	Mr. Jaziila	Signature: *Hashimal*	MS/01
Location	Press Shop	RM Team Member 2	Ms. Zarith	Name: Ms. Hashimah	
Assessment Date	9/24/2019	RM Team Member 3	Ms. Fazira	Designation: Production Manager	
Last Assessment/ Review Date	NA	RM Team Member 4	Ms. Musna	Date: 9/25/2019	

	HAZARD IDENTIFICATION								RISK EVALUATION						RISK RE-EVALUATION				
No.	**Work Activity**	**Hazard**	**Category of Hazard**					**Event and Consequences**	**Existing Risk Control (if any)**	**Justification on likelihood**	**Likelihood (L)**	**Severity (S)**	**Risk (R)**	**Additional Risk Control**	**Likelihood (L)**	**Severity (S)**	**Risk (R)**	**PIC (due date)**	**REMARK**
			Physical	**Chemical**	**Biological**	**Ergonomic**	**Psychosocial**												
1	Lifting bundle of raw plate from a pallet manually	1. Heavy load of raw plate				√		Excessive muscle stress that can cause back pain	1. Safe Work Procedure (SWP)	1. Proximity direct to hazard 2.Exposure - intermittent exposure to hazard 3. frequency-low	3	3	9	1. Provide mechanical lifting aid (e.g. hoist, pallet jack, cart or conveyors) 2.Review SWP	2	2	4	Mr. Abu (24/11/2019)	
2	Placing a raw plate into a stamping jig	1. Raw plate with sharp edge	√					Employee might get cut, pinch or scratch on his hand and may cause minor injury	1. Safe Work Procedure (SWP) 2. Wear apron 3. Wear cotton glove	1. Proximity direct to hazard 2.Exposure-continuous exposure to hazard 3.Frequency - almost certain	5	2	10	1.Review SWP 2.Provide training 3.Provide leather glove	3	1	3	Mr. Ali (24/10/2019)	
3	Punching using power press machine by hand push	1. Flying objects (metal chips)	√					Small chips particle fly and hit eye or body which can cause serious eye or body injury	1. Safe Work Procedure (SWP)	1.Past accident record- one accident had happened before 2.Proximity - direct to hazard 3.Exposure-continuous exposure to hazard 4.Frequencyalmost certain	5	4	20	1.Install downdraught system 2.Review SWP 3.Provide goggles	2	2	4	Ms. Sal (immediately)	Special precaution should be made in the event of the proposed engineering control failure.

No.	HAZARD IDENTIFICATION								RISK EVALUATION					Additional Risk Control	RISK RE-EVALUATION				REMARK
	Work Activity	Hazard	Category of Hazard					Event and Consequences	Existing Risk Control (if any)	Justification of likelihood	Likelihood (L)	Severity (S)	Risk (R)		Likelihood (L)	Severity (S)	Risk (R)	PIC (due date)	
			Physical	Chemical	Biological	Ergonomic	Psychosocial												
		2. Defective safety features (sensor)	√					Hand caught into machine (stamping zone) which can cause serious hand injury/cut	1. Safe Work Procedure (SWP) 2. Install two hand push button	1. Proximity direct to hazard 2.Exposure-continuous exposure to hazard 4.Frequency-almost certain	4	4	16	1.Install another safety feature (sensor) 2.Do daily pre-start functional test 3.Review SWP 4.Provide training	2	4	8	Ms. Mus (immediately)	special precaution : Periodic maintenance for safety feature
		3. Prolonged standing				√		Excessive muscle strain which can cause back pain	1. Safe Work Procedure (SWP)	1. Proximity direct to hazard 2.Exposure-intermittent exposure to hazard 4. Frequency-low	3	3	9	1. Review SWP 2. Implement job rotation 3. Introduce frequent break	2	2	4	Mr. Ali (24/10/2019)	
4	Trimming finished product using grinder (finishing tools)	1. Expose to metal dust		√				Inhalation of metal dust which cause problem to respiratory system	1. Safe Work Procedure (SWP)	1. Proximity direct to hazard 2.Exposure-intermittent exposure to hazard 3. Frequency-low 4. Unsafe working environment 5. Poor housekeeping	3	3	9	1.Install downdraft system 2.Implement periodic housekeeping 3. Review SWP 4.Provide dust mask (N95)	2	2	4	Mr. Abu (24/12/2019)	
		2. Product with sharp edges	√					Employee might get cut, pinch or scratch on his hand and may cause minor injury	1. Safe Work Procedure (SWP) 2. Wear cotton gloves 3.Wear apron	1. proximity direct to hazard 2.Exposure-continuous exposure to hazard 3.Frequency - almost certain	5	2	10	1. Review SWP 2. Provide training 2. Provide leather glove	3	1	3	Mr. Ali (24/10/2019)	

No.	HAZARD IDENTIFICATION								RISK EVALUATION						Additional Risk Control	RISK RE-EVALUATION				REMARK
	Work Activity	Hazard	Category of Hazard					Event and Consequences	Existing Risk Control (if any)	Justification of likelihood	Likelihood (L)	Severity (S)	Risk (R)			Likelihood (L)	Severity (S)	Risk (R)	PIC (due date)	
			Physical	Chemical	Biological	Ergonomic	Psychosocial													
		3. Prolonged sitting				√		Excessive muscle strain which can cause back pain	1. Safe Work Procedure (SWP)	1. Proximity direct to hazard 2.Exposure-intermittent exposure to hazard 3. Frequency-low	3	3	9		1. Review SWP 2. Implement job rotation 3. Introduce frequent break	2	2	4	Mr. Ali (24/10/2019)	
5	Carrying finished product to storage area manually	1.Heavy load of products				√		Excessive muscle stress that can cause back pain	1. Safe Work Procedure (SWP)	1. proximity direct to hazard 2. Exposure intermittent exposure to hazard 3. Frequency low	**3**	**3**	**9**		1. Provide trolley or lifting machine 2.Review SWP	2	2	4	Mr. Abu (24/11/2019)	