



SAFETY MANUAL

ON

OCCUPATIONAL SAFETY AND HEALTH

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Occupational Safety and Health:

Occupational Safety and Health helps prevent job-related injuries and illnesses. It also has a role to support and develop employee health in the workplace. There are many reasons to pay importance to safety and health issues in the workplace. Every year a significant number of workers fall victim to injuries and even die from work-related health hazards. Beside this, every year some hundred thousand work days worldwide are lost due to work-related accidents and physical illnesses. As a result, various industries are incurring huge financial and goodwill losses. On top of this can be added the cost of court cases, compensation and any salaries and wages due. All of these combined can have a considerable impact on any organization.

Thus, an effective Occupational Safety and Health Programme brings significant and long-term benefits to the organization as well as the workers. Employers, employees and also the general public should be well aware of occupational safety and health issues, not only to ensure safety but also for economic, legal and ethical reasons.

Occupational Safety and Health is about how a workplace affects the surrounding environment and what kind of health hazards it creates for employees and local people. It is about how hazards can be prevented and what necessary measures need to be taken to do so.

In one sentence: *Occupational wellbeing indicates that no adverse or unsafe situation is created in a workplace which may be hazardous for the health of employees.*

Points to be adopted to ensure Occupational Safety and Health at the workplace:

- Everyone should try to ensure safety for himself, workers and others
- All accidents are preventable
- Abide by all the policies, procedures and statutory requirements
- Assess risk, stop work and think
- Be vigilant of safety problems and perspectives in advance
- Do not work without appropriate training and awareness
- Use appropriate equipment for lifting and transporting heavy items
- Ensure appropriate supervision

Points to ensure workplace safety:

- Put up danger-signs where applicable
- Risk assessment
- Prioritize
- Eliminate/reduce danger
- Planning and implementing safe work procedures
- Supervision and evaluation
- Taking the initiative

Why it is important to ensure Occupational Safety and Health:

Unhealthy and unsafe workplace



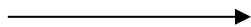
- Accident & injuries
- Work-related illness
- Job dissatisfaction
- Lack of commitment
- Depression
- Workplace conflict



- Absence
- Short and long-term disability
- Health insurance and compensatory expenses



- Increase in expenses
- Reduced productivity
- Quality of goods and services declines
- Penalty/jail



Business losses

FIRE SAFETY

Fire

We are all familiar with fire. Generally, its uses are positive such as for cooking. It also has a number of negative consequences such as fire incidents in Ready Made Garment factories. Fires do not start and spread on their own. For this, a number of conditions must be fulfilled. Moreover, there are different kinds of fire each with their own characteristics and risks.

Definition of fire:

Fire is a continuous burning process through a chemical reaction as a result of the combination of fuel, oxygen and a heat/ignition source.

How does fire start?

Generally, fire is created from a combination of three elements and a chemical reaction.



The elements are 1) Fuel 2) Oxygen 3) Heat/ignition point and a continuous chemical reaction.

As long as these three elements and the chemical reaction continue, the fire will burn. If any one of these three elements is absent then fire will not start.

Three elements of fire (Fire Triangle)

Fuel

Fuel is such an element which burns or helps to burn. Fuel can be of solid, liquid or gaseous form. For example, solid form fuel can include wood, paper, cotton etc; liquid form can include petrol, diesel thinner etc; gaseous form can be ethane, methane, propane etc.

Oxygen

Oxygen is an element of air, which we inhale during respiration. Without oxygen, there would not be any life in the world. And there would not be any fire too, as without oxygen fires cannot start or burn.

Heat/ignition source

In order to ignite a fire a chemical reaction is required at the ignition source, which provides enough energy to create an explosion or set things on fire. This energy can come in different forms. It could be a spark, a short-circuit, a burning match or cigarette etc. Heat itself is a source of energy which helps to create fire.

How to extinguish fire?

We know that fire is created by a combination of three elements and a chemical reaction. If any one element is removed or the chemical reaction is stopped the fire triangle will break and fire will be extinguished.

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| <p><u>Various causes of fire</u></p> <ul style="list-style-type: none"> • Factory floor cleaning related risks • Ingredients, raw materials, products are kept/stored in a haphazard way • Inappropriate storage of flammable liquids • Fabric soaked in oil/paint • Storage of waste products <p>Electrical risks</p> <ul style="list-style-type: none"> • Inappropriate multi-plugs for high voltage usage • Feeble joints • Risky fuse rating/ Overloading of circuits • Loose electrical connections • Weak/substandard electric wire socket, and equipment/materials • Worn-out insulation • Connection of many machines to one socket <p>Flammable liquid products</p> <ul style="list-style-type: none"> • Oil based products such as diesel • Mixing solvent/turpentine for paint and varnish • Chemical products (acetone, thinner, bleach) • Danger from machinery • The friction caused by high-speed rotational machinery • High resistance and heat generating motors • Inappropriate/risky maintenance of equipment/machinery <p>Open flames</p> <ul style="list-style-type: none"> • Kitchen fire/ Welding/ Open flames/Torch-battery and cutting machineries • Use of match/lighter at warehouse | <p>Extinguishing fire</p> <p>In order to extinguish fire safely, it is important to know what kind of fire is ablaze, whether the fuel is solid, liquid or gas.</p> <p>Whether the fire has started due to an electrical fault or started from flammable gases.</p> <p>Each kind of fire needs to be extinguished in a specific process and needs a specific kind of extinguisher.</p> <p>Fire extinguishing process</p> <p>The temperature of a fire can be cooled in order to extinguish it. Every flammable product will only burn at certain temperature.</p> <p>The temperature can be reduced with the help of water, carbon-dioxide, foam etc. to extinguish the fire.</p> <p>Fire can also be put out by reducing the flow of oxygen. If oxygen can be disconnected from the fire then the fire will stop burning.</p> <p>Dry chemical powder, carbon dioxide gas, sand, ash, blankets and foam can be used in this process to put out fires.</p> <p>The fuel is the food of the fire. If fuel is removed then the fire will be extinguished.</p> <p>The fire can also be put out if the chemical reaction is disengaged. If the chemical reaction is broken by using any extinguishing material/media, then the blaze will end.</p> <p>Fire extinguishing media/materials</p> <p>Water Foam Dry chemical powder Carbon dioxide gas Dry sand Blanket Ash etc</p> |
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Using fire extinguishers-

1. Pull out the pin

2. Point the nozzle towards the source of fire

3. Press the handle

4. Spread powder on the source of the fire through the nozzle

STOP – if you have fire on your body, then don't panic and don't run

LIE DOWN– Lie down on the floor and cover your face with your both hands

ROLL ON THE FLOOR –Roll on the floor and at the same time cover your face with both your hands, so that smoke does not enter your respiratory tract

What to do during an emergency-

- If you see a fire, press the fire alarm.
- Identify the nearest EXIT route.
- Follow the EXIT signs to get out quickly through the EXIT route.
- Walk quickly towards the Emergency Exit, DO NOT RUN.
- Walk until you reach the safe assembly point .
- Stay at the safe assembly point until you are counted.
- In case of thick smoke, go down on all fours and crawl to see things clearly.

- Exiting during emergency situations.
- During emergencies the only priority should be to exit safely to a safe place.
- If the way out to ground floor is totally blocked, then go up on the roof.
- If your clothing has caught fire don't run. Lie down on the floor and roll to smother the flames.

What NOT to do during an emergency-

- Continue to do whatever you are doing until someone calls you.
- See if the fire is burning.
- Looking for the source of fire.
- Searching/looking for valuables or important things.
- Collecting personal belongings.
- Looking for friends or colleagues to ensure that they are out of danger.
- Thinking the fire alarm is just a drill.
- Running out.



ELECTRICAL SAFETY

Electricity

Electricity is a very important type of energy. On the other hand, it can also be very dangerous. The role of electricity in a building is similar to the role of blood in a human body. Any building or organization must have electricity.

Without electricity the modern lifestyle cannot be imagined. But electricity has lot of risk also, as it can be the cause of accidents and death. Since electricity is very risky, it should be used carefully.

The probable causes of electrical accidents:
Faulty and substandard machines, damaged or loose connection wires or unintentional contact with the electrical conductor causes electrical accidents. The list of such causes is listed below:

- Incomplete or faulty designs
- Substandard and faulty work
- Loose connection
- Damaged insulation
- Torn electrical wire
- Small sized wire
- Oversized wire
- Small or sub-resistant material
- Over-resistant material
- Uneven wiring and power or electrical distribution
- Over connection to one multi-plug or electrical board
- Using low-voltage electricity
- Using high-voltage electricity
- High pressure electrical wiring
- Faulty or unfit earthing arrangement
- Faulty or unfit lightning preventer
- Substandard and low power electrical wiring

- Substandard resistant material
- Substandard switch and socket etc.
- Twisted wires and soldered wires
- Working with unskilled/untrained staff
- Substandard or defective preservation mechanism

The consequences of electrical accidents:

The consequences of electrical accidents can be very dangerous and potentially fatal. The consequences can be direct or indirect. Direct examples include being electrocuted. Indirect examples include fires and explosions.

Electrocution

Direct result The biggest risk from electricity is electrocution. When the human body comes into contact with electricity, it passes through the body. If someone gets electrocuted then the power connection or electricity supply must be disconnected immediately.

Indirect Result Fire and explosion: During a short-circuit a lot of energy is generated which can cause a fire or explosion. For this reason, wherever inflammable gas is used, electrical connections must be installed very carefully. For example, the power switches in these places must be of very high quality, as a substandard switch may spark while being switched on/off, which may cause fires. Too high voltage and/or loose connections can also cause fire and explosion.

Other indirect results In case of sudden contact with an electric circuit or upon getting an electric shock a person may panic, which can create the risk of a secondary accident. For example, if someone received an electric shock while standing on a ladder, they may end up falling due to sheer panic.

Safe use of electricity

Proper earthing must be ensured for any electrical installation. Safe earthing ensures that faulty equipment does not activate.

In other words, safe earthing also prevents electrocution.

- Wear safety equipment and using properly insulated instruments/equipment
- Appoint skilled and experienced workers
- Check all electrical equipment once a year
- Maintain an updated list of all electrical equipment/machinery/instruments
- Check wires, connections, extension leads, sockets etc. before use
- Use the correct type of approved wiring
- Avoid twisted and soldered wire
- Use separate sockets for each connection
- Change damaged materials/ equipment immediately
- Use quality electrical machinery and equipment
- Arrange training programmes to raise awareness about electrical usage
- Use 'Caution' signs where applicable
- Collect and analyze information about electrical accidents and learn from the lessons
- Using double insulation for equipment which needs to be operated by hand
- Ensure proper earthing and checking of connections for mobile electrical equipment
- Use circuit breakers to help to prevent short-circuits
- Use safe electrical machinery

- Maintain a safe distance from high voltage equipment and machinery to avoid electrocution
- Use rubber, ceramic, or other non-conductors for insulating/covering electrical wires
- Double insulate electrical equipment such as drills and grinders. Earthing cannot be done for this double insulated machinery

Additional information

Electrical endurance limits-

The more powerful high-voltage electricity is, the greater the risk. For example, 0.5 micro amperes electricity will create a mild sensation in the body.

At 10 micro amperes the muscles will start contracting.

At 20 micro amperes the contraction is so strong that it is difficult to move the body from the active wire.

At 30 micro amperes the body contracts so severely that respiration is hampered and people can die from suffocation.

At 75 micro amperes the electricity passes through the heart, contracting it severely. At 1 ampere the heart stops.



HANDLING DANGEROUS SUBSTANCES

Dangerous substances

Dangerous substances are those which are dangerous for human health and can also be harmful for the environment. They can be detrimental to human health through poisonous effects or a burning sensation. They can also cause fires, explosions or the destruction of farm land. Any material can be dangerous. For example, edible salt is not generally dangerous, but if salt water is taken in large quantities, then it can be very harmful for the body even though salt is not considered to be a harmful substance. A substance becomes harmful because of the way it is being used or if it is not being used in the right measure.

Types of dangerous substances

Dangerous elements can be gaseous (e.g., natural gas, LPG, butane and acetylene, fumes such those from petrol and paint); solid materials (rock, minerals, wool and metal); liquids (e.g., solvents, acetone, coloring materials, marking materials, methylated spirits, degreaser etc.); vapours (e.g., from sulfuric acid etc.) as well as dust (e.g., asbestos). Based on the degree of harm they may cause the harmful substances are divided into different sub-sections. Based on their features and the status of the different materials (solid, liquid, gas) the risk is assessed. There are many such materials all with different risk factors.

Poisons

A substance is risky when it harms any function of the human body. Poisonous elements can cause harm even in a very small quantities. These elements can enter the body through the skin, breathing and the mouth. For example, pesticides, flammable gas (e.g., carbon monoxide) and toluene, methanol, H₂S, sewerage gas, metal gas which is generated from mercury, lead etc.

Harmful

Harmful elements have comparatively a lesser effect on the human body. They can enter the human body through skin, respiration and food. Harmful elements may include gum, varnish in solvent, cleaning agents etc.

Explosive

Explosive products can explode if they come in contact with other materials, electric charges or any kind of friction. Explosive elements can blow up even without coming in contact with oxygen. Explosive gases include natural gas, hydrogen used while recharging batteries and acetylene gas during welding.

Highly inflammable products

Highly inflammable products easily ignite in the presence of a flame, source of heat or a spark. These products may even ignite at a temperature of below zero degrees centigrade. Petrol, methanol, white spirit, floor cleaner and acetone are examples of highly inflammable products.

Oxides

Some oxides when in contact with other products may produce oxygen and can burn any inflammable material very quickly. While working with these products it is important to ensure protection of the skin and clothes. Examples of oxides are hydrogen peroxide, ozone and oxygen.

Erosive products

Erosive products can seriously burn and damage live cells when in contact with the human body. These products can seriously harm clothes, skin, eyes and lungs. Examples of erosive products include stain removers, oven cleaners or powerful acids (e.g., sulfuric acid) like battery acids as well as alkaline solutions such as ammonia and soda.

Burning sensation

When these kind of products comes into contact with skin and mucus membrane a burning sensation may occur. Different kinds of cleaning agent, bleach etc. include this kind of ingredient.

Harmful for the environment

Environmental pollutants can be very harmful for animals or plants in the area. These chemicals can affect plants, animals, water, air and land therefore they should not be disposed of into the environment. Examples of such polluting products include fuel, different kinds of solvents, paint thinner, waste oil, paint residue and spray can propellant (CFC) etc.

Carcinogenic

If carcinogenic products are absorbed by the body then new cell generation and cell functions are barred, which increases the risk of cancer. Asbestos, benzene, vinyl chloride and pesticides are example of carcinogenic products.

Allergic products

Allergic products can cause an increase or higher level of sensation/allergic reaction. Examples of these reactions are asthma and other severe allergic reactions. Some types of coloring products are examples of allergic elements.

How harmful elements are absorbed in the body
These elements are absorbed directly in the human body or blood stream through injection, contact with skin, broken/bruised skin or respiration.

Through respiration

Breathing at the workplace is a general through which harmful elements can be absorbed into the body. Such as in the form of dust, smoke, gas or Vapour.

Through skin or mucus membranes

Skin pores, bruised skin, eczema or any other skin infection can be a channel for harmful products to enter the body or blood stream.

Through the mouth

Eating carelessly, without washing the hands.

Blood stream

Harmful products can also enter the blood stream through small cuts, damaged nails, or by using dirty shoes.

Effects of dangerous elements on the human body

The effect of a harmful product on the human body depends on the nature of the element, the density of the element in the surrounding air, physical conditions during the time of contact, the duration of contact, the area of skin which came in contact with harmful product, the thickness of skin, and temperature of the room. The affect can be immediate and extremely harmful or long term.

Due to the dangerous affect, the affected person may faint or even may die. Before that, other symptoms could include headaches, a spinning head, imbalance and dizziness, thirst, stomach upset, palpitations, chest tightness and blurred or double vision.

Avoid contact as much as possible

Eliminate the harmful element at source or use an alternative product.

Reducing risk at source

Risk may be reduced by using non-poisonous products (or if there is no other option then using less poisonous products). For example, using water solvent paint instead of oil-based paint.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

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| <p>Personal Protection Equipment Personal Protection Equipment (PPE) means the clothing or equipment that needs to be used to avoid specific or general safety and health issues. PPE does not prevent accidents; however, it can protect workers from probable consequences of accidents. PPE is only used when risks cannot be minimized and should always be a last resort. The employer must ensure purchase and use of appropriate PPE in line with the risk. The employer must ensure proper usage of PPE by ensuring proper training for users. All PPE must be properly cleaned and maintained, checked and appropriately placed. Workers must check and use PPE as instructed.</p> <p>Risk of absorption into the human body can be significantly reduced by using sufficient personal protective equipment (PPE).</p> <p>In case that contact with harmful elements cannot be avoided and other preventive measures cannot be taken then the only option is to use PPE.</p> <p>It should be noted that PPE must be used when other necessary steps and protective measures cannot be taken.</p> <p>To save the user's eyes and face from harmful products such as liquid sprays, spectacles/goggles can be used.</p> <p>To ensure protection of the respiratory tract and skin from harmful gas and smoke, masks and protective garments such as special gloves and safety shoes should be used.</p> <p>Health rules Harmful elements are absorbed into the body through respiration, the mouth, skin or blood stream.</p> | <p>Product information, especially risk factors, ingredients and safety measures must be clearly stated on packaging.</p> <p>Each bottle, box, spray can, drum etc. must have such packaging.</p> <p>In addition to legally required packaging, suppliers must also provide a safety information sheet.</p> <p>What should be written on packaging? As per GHS (Globally Harmonized System) the information on packaging should include the product name, quantity, supplier's name, warning signs and warning information (such as highly poisonous, very harmful for aquatic animals etc.). Safety Information Sheet (Material Safety Data Sheet) Each manufacturer that markets dangerous products must provide a Safety Information Sheet for users. It is mandatory that the supplier must include all relevant safety information on the Safety Information Sheet. The Safety Information Sheet must include standard information in an easily understandable manner. The sheet should also include detailed information regarding dangers, packaging and first aid. The Safety Information Sheet must be made available to the safety specialist, manager, emergency workers and workers.</p> <p>Safety information at the workplace All information regarding health and safety must be made available to all. This information must be provided as information cards, booklets in any other format that ensures all staff can access it.</p> <p>It is very important to know how to identify harmful elements. This is generally controlled by the national law which in turn controls products in the market.</p> |
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SPECIFIC SAFETY MEASURES

Fencing of machinery

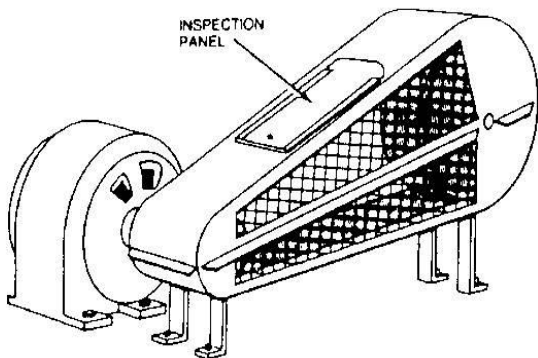
- Any machine part, function, or process which may cause injury must be safeguarded.
- Where the operation of a machine can injure the operator or other workers, the hazard must be controlled or eliminated

Basic Areas To Be Safeguarded

- Point of Operation
- Power Transmission Apparatus
- Other Moving Parts

Fixed Guards

- Advantages
 - Maximum protection
 - Variety of applications
 - In-house fabrication
 - Low cost & maintenance
- Disadvantages
 - Poor visibility
 - Must remove for repairs requiring LOTO (Log out Tagout procedure)



Interlocked Guards

- Interlocking device in such manner that when opened stops power
- Advantage
 - Maximum protection
 - Portion of guard easily removed for access
- Disadvantage
 - Can be overridden by employee
 - High cost
 - Maintenance required

Pressure Plants

Generally, a pressure vessel is a storage tank or vessel that has been designed to operate at pressures above atmospheric pressure.

Potential health and safety hazards of leaking vessels include poisonings, suffocations, fires, and explosion hazards. Rupture failures can be much more catastrophic and can cause considerable damage to life and property.

Safety precautions for pressure vessels

- Timely Maintenance
- Proper Knowledge and Training
- Understanding Operating Conditions
- Installing Protective Devices (safety valve/rupture disc, etc.)
- Installing monitoring devices (Pressure gauge/sensors/detectors/alarms, etc.)
- Periodic test and examination by competent person

Precaution for escape during emergency:

- Must have at least two staircases at each floor.
- All doors must be opened towards outside.
- Mark safe access on passages.
- Keep the access free from objects or materials.

SPECIFIC SAFETY MEASURES

Confined Space

Many workplaces contain areas that are considered "confined spaces" because while they are not necessarily designed for people, they are large enough for workers to enter and perform certain jobs. A confined space also has limited or restricted means for entry or exit.

Confined spaces include, but are not limited to, tanks, vessels, silos, storage bins, vaults, pits, manholes, tunnels, pipelines, etc.

The hazards associated with confined spaces include:

- Toxic Atmosphere
- Oxygen Deficiency
- Oxygen Enrichment
- Flammable or Explosive Atmospheres
- Flowing Liquid or Free Flowing Solids
- Excessive Heat

Precautions to be taken before working in confined space:

- Competence, training, supervision and suitability
- Permit-to-work procedure
- Gas purging and ventilation
- Dangerous residues
- Testing and monitoring of the atmosphere
- Mechanical, electrical and process isolation
- Respiratory protective equipment
- Other personal protective equipment
- Safe use of work equipment
- Communications
- Access and egress
- Flammable or explosive atmospheres
- Combustible materials
- Certificate from a recognised competent person

Power Press

The main causes of power press accidents are lack of training, lack of effective guarding, and bypassing of guards. Guards between the operator and the point of operation must be designed to prevent the operator from reaching under the ram during the downward stroke. The power presses must be examined by a recognised competent person.

Various types of guards and sensing devices that are required on presses may be considered.

In operations where stock is automatically fed into a progressive die and it is not necessary for the operator to reach under the ram, a fixed barrier guard can be used.

In secondary operations where there is danger of hands or fingers being caught in the press, various types of guards and point-of-operation devices can be used.

When cleaning, repairing, servicing, setting-up, and adjusting power presses, lockout/tagout procedures must also be followed for protection against unexpected energization or start-up of the machine.



FIRST AID

First Aid

First Aid is the assistance given to any person suffering a sudden illness or injury. Care is provided to preserve life, prevent the condition from worsening, and/or promote recovery. It includes initial intervention in a serious condition prior to professional medical help being available, such as performing CPR while awaiting an ambulance as well as the complete treatment of minor conditions, such as applying a plaster to a cut.

First Aid is generally performed by the layperson who has received training or by others who are willing to do so from acquired knowledge.

The Objective of First Aid

Preserve life: the overriding aim of all medical care, including First Aid, is to save lives and minimize the threat of death.

Prevent further harm, the condition from worsening, or danger of further injury. This includes external factors such as moving a patient away from any cause of harm.

Applying first aid techniques to prevent worsening of the condition, such as applying pressure to stop bleeding becoming dangerous. To stop broken bones from moving through various techniques

To reduce pain as much as possible

To promote recovery: First Aid also involves trying to start the recovery process from the illness or injury, and in some cases might involve completing a treatment, such as in the case of applying a plaster to a small wound.

What should be done during First Aid/ The DO'S of First Aid

Be calm and carefully deal with the patient's injuries and/or situation

Help ensure that the injured understands what is happening, relaxes and contact the emergency service or hospital if needed

Utilize available resources

Attend to shock, bleeding and respiratory problems first as these can be life threatening

Keep the patient warm

Keep the injured in the open air so they can breathe freely

Keep the injured as comfortable as possible

Loosen the clothing of the injured

Change any wet clothes

What should not be done during First Aid/ The DON'Ts of First Aid :

Consider oneself to be a doctor

Declare the injured dead

Let a poisoned patient sleep

Make a faint patient eat something



FALL, SLIP, TRIP

Stumbling, slipping and falling

Generally, when addressing safety concerns a lot of time and resources are spent on dangerous/hazardous jobs. Common incidents such as stumbling, slipping and falling are often ignored or emphasized less however these can also cause serious injuries.

The causes/reasons of stumbling, slipping and falling

If floors are uneven or slippery or if wire or other materials are left lying around on the floor then they can result in stumbling or slipping. This may also happen if the level of the floor is slightly higher or lower in some places or if there are slopes. For example, the risk of falling or slipping becomes higher while walking on floors with slopes or on slanted walkways. To prevent any accidents, one must be watchful/careful for loose tiles, soft shoe soles or wet floors. One should not run on verandas or stair cases. While using the stair case place your feet carefully to prevent falling.

Preventive measures

In order to prevent stumbling, slipping or falling two types of actions can be taken: to lessen the risk at the source and by identifying the risk and putting up signs so that people are aware of the hazard and take care.

Source

The best way to prevent accidents is to remove it at source. For example, designing a building in a safe and user-friendly manner. For example, an architect should be careful while designing staircases to ensure that there are no irregular or sudden deviations in height. The stairwell and movement areas should be well lit. It must also be ensured that the workplace is appropriate for the work being undertaken.

Maintenance of the building and the premises is also crucial. Open verandas, clean floors,

housekeeping discipline and cleanliness must be of primary concern. Small barriers must be removed and boards, machinery, equipment boxes or wires must not be left lying around on the floor. The factory must be maintained in a clean condition.

Barriers/fences

If risk cannot be removed through prevention measures then barriers or fences must be used to create a blockade to keep the risk as far away as possible.

Advice/tips

People may get seriously injured due to stumbling, slipping and falling. Sometimes they may even lose the capacity to work. Therefore, it is very important to be careful. It is advised not to rush or run. Barriers or blockades must not be climbed over. Workers must not run if called by superiors or other colleagues. The workplace must be kept neat and clean. It is a must to watch where you are going and that is by far the best preventive measure to avoid stumbling, slipping and falling.

Using signs and symbols

All signs must be clearly visible and understood by everyone. The signs and symbols must be appropriate. One sign and symbol must always be used for identifying one risk and should not be changed.

Staircase

People often fall on staircases.

In case if you have to lift or carry something then first ensure that you can see the walkway or stairs. There must be safety railings on the stairs. The first and the last stairs must be clearly visible. All steps must be of the same size and height.

ERGONOMICS AND MENTAL WELLBEING

Workers' skills at workplace and ergonomics

Workers' skills at the workplace and ergonomics are a science which helps to increase worker productivity. It does this by studying and analyzing an individual's limitations and ability to operate a particular machinery or equipment. Consider the problem someone may have with their spine, neck and shoulders as a result of operating a sewing machine for a long time. Ergonomics is concerned with appropriate design for people, the design of systems, processes, equipment and environments so that tasks and activities required of them are within their limitations but also make the best use of their capabilities.

Work – worker

There is always an interaction between work and the human being. Humans operate and control the machine and products while carrying out work. Beside this, workers are also affected by two factors: firstly, environmental aspects such as machine, sound, vibrations and other situations such as ventilation, temperature and light. Secondly, are human aspects such as physical pressure (sitting, standing, lifting weights, change of place) and mental pressure such as (worries, communication, behavior).

Factors affecting ergonomics

Light

Light is very important at the workplace. Sufficient light increases attention to work, helps workers deliver the correct output and reduces the pressure on the eyes. The intensity of light will depend upon the kind of work and the boundary of the workplace. The use of natural light is always good.

The intensity of light must be consistent with the type of work. Blinding light or reflections must be avoided or minimized as much as possible. The difference or contrast between light and dark must not be too much. The high contrast between shadow, light or dark creates pressure on the eyes.

Sound and vibration

High sound volumes can create nausea, headaches as well as gastric or intestinal problems. In the long run hearing may be damaged temporarily or permanently. Too much workplace noise prevents workers hearing danger alarms. Vibrations in the hands, arms or body can also be quite harmful.

Temperature

For ergonomics, the temperate of the environment is considered ideal when the workers do not feel too cold or too hot. The temperature must be kept at comfortable level which is around 20-24 degrees Celsius. If this cannot be maintained then other measures have to be taken. Moreover, the work times and break times must be well synchronized. One must drink sufficient water and wear appropriate clothing for work.

Static strains/ drag sprains

Repetition of certain actions for lengthy periods such as pressing a button continuously or sitting in one place for a long time can have negative consequences. Possible issues can be numbness due to the lack of blood circulation. Other affects include enduring tiredness, muscle pain and contractions.

Dynamic strains

Muscular changes due to alternate physical stimulation and rest may create this. Examples include pulling and dragging, walking and stopping, weight lifting and carrying, pulling and pushing. These kinds of actions can create physical problems such as enduring tiredness, muscular pain, stress on the heart and blood vessels as well as injuries of bones and joints.

Heavy work

Work-related physical postures, movements and pressure application may create stationery or moving pull/sprains. Sitting or standing for long time, bending forward, being attached to something vibrating, applying pressure to do something repeatedly may create health hazards.

Break

Break within a work schedule helps muscles to gain back lost energy and to regain blood circulation. During breaks it is important to rest appropriately and not use the muscles involved in doing heavy work. If work demands sitting then one must regularly stand up and walk around. If weights must be lifted the correct posture must be used while hands must also be rested during breaks.

Weight lifting

Lifting weights and carrying loads can cause back pain and other physical ailments. The risk not only depends on the weight itself, it also depends on the individual, work and the environment. Age, sex, physical build, capability, appropriate weight lifting training and practices are also criteria to be considered. Helpful measures should be taken for lifting and carrying weights.

Factors affecting weight lifting and moving
Lifting and carrying weights may increase the risk of spinal pain and injuries. These factors are related to the weight, work type, work environment and individual. Generally, the mass of the load is a very important factor, but the volume and shape (which affects the center of gravity) of the load is also a big concern. For example, moving a bigger size box of the same weight is harder than moving a smaller size box. It must also be considered if the worker is trained in lifting weights and if s/he is physically capable of lifting them. Another issue is whether workers are male, female, young or old as older workers generally suffer more from spinal problems.

Sitting

Many people sit through the whole day in their office or at a counter. In this case, even if someone is not feeling any physical pressure, sitting for a long time in one position can be harmful for the health. To prevent this one must change positions or get up and walk for a while. They should also sit with a proper posture. The upper part of the legs should be appropriately positioned on the chair and back supported by the chair. Besides this, arm rests can reduce the pressure on the shoulder.

Standing

In certain circumstances it is better to work standing up than sitting down. This may be the case if:

- there is insufficient leg room
- the worker has to stand up frequently
- the worker reaches far or use great forces to perform his duties or if downward forces have to be exercised.

HOIST AND LIFT

The lifting, hoisting and relocation of loads, regardless of whether this is done manually or with accessory equipment such as tackle or a hoisting crane, is frequently associated with serious risks. Manual lifting is a heavy burden for the human body.

Lifting equipment consists of machines for hoisting or possibly relocating loads, such as tackles, rolling bridges or hoisting cranes. Lifting equipment is subject to obligatory regulations, which may vary from country to country. The hoisting machine must be placed in a stable position. Both the hoisting equipment and the hoisting tools must be certified, the permitted working load may not be exceeded and hoisting works may not be carried out as of a certain wind speed.

The signaller, and the person who attaches the load and guides it, must be able to communicate well with one another.

Lifting and hoisting equipment should be provided with a load limiter. Hoisting equipment with a variable operating distance, such as tower cranes, must also be fitted with a load moment limiter.

Lifting and hoisting equipment must be regularly inspected, to make sure that it is safe. Crane operators must be properly trained and experienced, and people that will work with the hoisting equipment must carry out a control every time for each use. Special training should be provided for them.

Legally specified inspection intervals are minimum criteria and if lifting and hoisting equipment, accessories and tools are used in extreme or harsh conditions then they should be specially constructed for such use. An inspection certificate must be available for all the equipment.

Straps, slings, hoisting belts: Pieces of cable or rope, which are provided with a loop at both ends. A hoisting belt must be identified with a label, which contains the necessary information about the obligatory inspection. Before using a hoisting belt, the belt must be checked to see if it is strong enough for the load. Also pay attention to sharp corners of the load.

It is recommended not to let hoisting belts lie too long in the sun. Check hoisting belts before each use, especially when the belts are lined. Hoisting belts must be replaced when necessary.

Forklift truck: vehicle for lifting and moving heavy loads with the help of forks. A lift and a reach truck are the best known types. Many countries specify that drivers of forklift trucks must have followed a special training.

Be especially careful when walking about at locations where forklift trucks are used at the workplace. Forklift truck drivers must also be especially careful, and they must make sure that they have an optimal overview.

Passengers may not be carried on forklift trucks, unless a special seat is provided. It is also forbidden to lift or move persons with a forklift truck, unless special work containers are used and the security regulations are fulfilled.

Manual lifting: Manual lifting can be dangerous for the back and your limbs. Always lift with a straight back, bend your knees and avoid twisting your spine. Hold the load as closely as possible to your body. Always lift with both hands in front of your body, and preferably do not lift loads of more than 25 kg. A list of the most important lifting techniques is provided in the overview.

| | |
|--|--|
| <p>A tackle is a special type of lifting tool. A tackle is usually not fitted with a drive motor and is operated manually instead.</p> <p>A tackle that is overloaded can be highly dangerous.</p> <p>The maximum allowed lifting force is indicated on the tackle. A slip-coupling is used for preventing too heavy a load being lifted with a tackle. In case of tackles that are operated with a handle, such a handle may not be extended by using a pipe.</p> <p>Never attach tackles to railings, pipes or scaffolding. A tackle must always be checked before it is used.</p> <p>Tackles should be inspected once every year or as advised by the competent person.</p> <p>Hoisting tools consist of all the exchangeable and interchangeable equipment that is, for instance, installed on a crane.</p> <p>Hoisting tools are preferably hung up for storage at the location that is provided for this purpose. In a safe condition and regularly inspected by a competent person.</p> <p>Make sure that the tools are handled properly both before, during and after the work.</p> <p>Each hoisting tool is subject to certain rules, specific regulations for safe use also apply to each of these items.</p> <p>Chains: The maximum permissible load must be indicated on all chains. Each chain must be accompanied by a certificate, and all chains must be inspected regularly by a competent person or a specialised certification company.</p> | <p>Never use any chains that are damaged, rusted or worn. A chain that has been subjected to too heavy a load, may no longer be use.</p> <p>Steel cable consists of a hard core, around which strands of steel wire have been wound.</p> <p>Steel cables must be inspected regularly and an inspection certificate must therefore be available. Steel cables must also be maintained in a good state.</p> <p>Steel cables must be stored in dry, well ventilated rooms, far removed from acids, alkalis or any other substances that can attack the steel.</p> <p>A cable must also be regularly degreased, so that it can be inspected for rust and wear. Never turn a steel cable into knots.</p> <p>Always protect a cable with wooden wedges or an old tyre against sharp corners. Remove the cable when necessary .</p> <p>The employer is obliged to limit the hazards of manual lifting to a minimum.</p> <p>If the work cannot be carried out safely, then the employer must permit a different working method.</p> <p>If the risk assessment carried out for that operation shows that there is a risk of injury, then other methods should be adopted with the use of lifting aids or mechanical equipment.</p> <p>Special careful with particularly sensitive groups. It is recommended to use supporting equipment.</p> <p>All Hoists, lifts and lifting tools & tackles must be periodically examined by recognised competent persons as per statutory requirements.</p> |
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PERMIT TO WORK SYSTEM

A P.T.W. system is a formal written system used to control certain types of work which are identified as potentially hazardous. It is also a means of communication between site/installation management, plant supervisors and operators and those who carry out the work.

Essential features of P.T.W system are:

clear identification of who may authorize particular jobs (and any limits to their authority) and who is responsible for specifying the necessary precautions

training and instruction in the issue and use of permits

monitoring and auditing to ensure that the system works as intended.

The terms “P.T.W”, “permit” or “work permit” refer to the certificate or form which is used as part of an overall system of work and which has been devised by a company to meet its specific needs.

A P.T.W system aims to ensure that proper planning and consideration is given to the risks of a particular job.

The permit is a written document which authorizes certain people to carry out specific work, at a certain time and place, and which sets out the main precautions needed to complete the job safely.

Permits to Work should be considered whenever it is intended to carry out any work which may adversely affect the safety of personnel, the environment or the plant.

They are normally considered to be more appropriate to non-routine activities which may require some form of Job Safety Analysis prior to work commencing.

There will, however, be activities closely related to plant operations where P.T.W systems will be required.

Maintenance work carried out by plant operators, for instance, should be subject to P.T.W procedures.

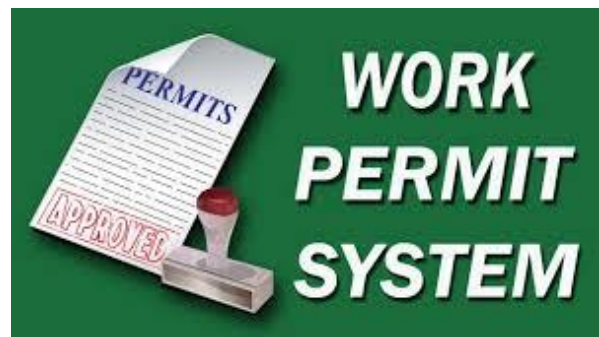
It is also advisable to use a P.T.W system when two or more individuals or groups or people, perhaps from different trades or different contractors, need to co-ordinate their activities to ensure that their work is completed safely. This will apply equally when there is a transfer of work and responsibilities from one group to another.

It is suggested that companies assess the risk of their activities and list specific operations and types of work which should be subject to P.T.W systems.

It is not intended that P.T.W procedures be applied to all activities as experience has shown that their overall effectiveness may be weakened.

It is very important for clear understanding by personnel moving from site to site, (especially contractors), that P.T.W systems are, as far as possible, harmonized between the different locations of the same Company.

It is in any event essential that anybody starting work is familiar with the local instructions detailing when and how P.T.W systems are to be applied at a particular location.



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PERMIT TO WORK SAMPLE

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|---|--|
| Installation Installation manager Permit no. Type of permit: | Permit issuer..... Task supervisor Date of issue |
| Description of work (including work location)..... | |
| Issue time Valid until | <u>Item:</u> |
| Question | Answer (Y/N) |
| Distribution and display: Have permit copies been properly distributed, and where necessary is a permit prominently displayed? | |
| Is the work description on the permit adequate, <i>i.e. does it adequately describe the work location, the equipment to be worked on, and the exact nature and scope of the work?</i> If not, explain deficiency: ____ Validity The permit should clearly state the time and dates between which it is valid. Is permit revalidation being signed and dated by Permit Issuer? Are revalidations up to date? | |
| Hazards Are hazards clearly identified? Are they directly applicable to job being undertaken? | |
| Precautions Are appropriate precautions identified and specific enough? Have other affected personnel outside the permit area been notified of the permit work? If yes - have they appended their signature? Have all precautions been implemented at the worksite? | |

| | |
|---|--|
| <p>If not - explain deficiency.</p> | |
| <p>Gas Tests Have gas tests been undertaken? Are tests valid for this period? Are portable gas monitors fully operable at worksite and calibrated? Are on-site personnel knowledgeable on how to operate equipment? Have they been properly trained in its use? Has periodic testing been carried out as appropriate?</p> | |
| <p>7) Precautions Taken by Task Supervisor Has Task Supervisor briefed everyone in the Work Party? Have all the persons in the Work Party read the permit? Do all persons fully understand the safety requirements and the precautions stated on the P.T.W?</p> | |
| <p>8) Isolation Are isolation certificates attached to the permit? Are they cross referenced? Do certificates or attachments detail specific isolation points? Are all isolations secure? Are all isolations tagged? If more than one task on same isolation, has multiple lock/key system or other suitable control been used?</p> | |
| <p>9) Work Suspended/On Hold/Completed Has site been left in a safe and tidy condition? If work not complete, are isolations secure? Is Permit Issuer aware of status? Is Control Room aware of status?</p> | |
| <p>10) Please specify the measures taken by permit issuer, in case of non-compliances:</p> | |

RISK ASSESSMENT CHECKLIST: HAZARD MAPPING AND PREVENTIVE MEASURES

General checklist

| Sl. no. | Question | Yes | No |
|---------|--|-----------------------|-----------------------|
| | Uneven or slippery floor (on which someone may stumble or slip) | <input type="radio"/> | <input type="radio"/> |
| | Moving vehicles and machines | <input type="radio"/> | <input type="radio"/> |
| | Moving parts of the machine | <input type="radio"/> | <input type="radio"/> |
| | Hazardous base/edge of materials or machinery (sharp, blunt) | <input type="radio"/> | <input type="radio"/> |
| | Hot or cold base, material etc. | <input type="radio"/> | <input type="radio"/> |
| | High-rise workstation (which may result in items falling) | <input type="radio"/> | <input type="radio"/> |
| | Hand tools | <input type="radio"/> | <input type="radio"/> |
| | High pressure instruments | <input type="radio"/> | <input type="radio"/> |
| | Electrical connections and machinery | <input type="radio"/> | <input type="radio"/> |
| | Fire | <input type="radio"/> | <input type="radio"/> |
| | Explosion | <input type="radio"/> | <input type="radio"/> |
| | Chemicals present in the air (with dust) | <input type="radio"/> | <input type="radio"/> |
| | Sound/noise | <input type="radio"/> | <input type="radio"/> |
| | Trembling of hands and arms | <input type="radio"/> | <input type="radio"/> |
| | Trembling of the whole body | <input type="radio"/> | <input type="radio"/> |
| | Light | <input type="radio"/> | <input type="radio"/> |
| | UV, IR, laser and microwave radiation | <input type="radio"/> | <input type="radio"/> |
| | Electromagnetic field | <input type="radio"/> | <input type="radio"/> |
| | Hot or cold weather | <input type="radio"/> | <input type="radio"/> |
| | Weight lifting and carrying | <input type="radio"/> | <input type="radio"/> |
| | Disinterest towards work/physical weakness | <input type="radio"/> | <input type="radio"/> |
| | Bacterial problem (virus, micro-organism, bacteria, parasites) | <input type="radio"/> | <input type="radio"/> |
| | Mental stress | <input type="radio"/> | <input type="radio"/> |
| | Others: include below and tick 'Yes' | <input type="radio"/> | <input type="radio"/> |

CHECKLIST OF WORKER'S ACTIVE PARTICIPATION

The following two checklists should be considered to increase workers participation in Occupational Safety and Health related issues. The first checklist is for the workers and the second checklist is for the labour representative. In case of any 'No' response it must be seen if there are other steps can be taken to remedy this.

| Sl. no. | Questions for workers | Yes | No |
|---------|--|-----------------------|-----------------------|
| | Do the workers participate in hazard mapping and are they consulted in this regard? | <input type="radio"/> | <input type="radio"/> |
| | Do the workers receive training regarding occupational health and safety issues and preventive measures? | <input type="radio"/> | <input type="radio"/> |
| | Are the workers interested to provide their opinions regarding OSH? | <input type="radio"/> | <input type="radio"/> |
| | Are the workers trained to find problems/faults in the employer's management of risk? | <input type="radio"/> | <input type="radio"/> |
| | Do the workers participate in developing the instructions, processes, and rules and provide their feedback where applicable? | <input type="radio"/> | <input type="radio"/> |
| | Are workers informed and consulted before implementing any planned changes? | <input type="radio"/> | <input type="radio"/> |
| | Are workers sufficiently trained to actively seek occupational safety and health related training? | <input type="radio"/> | <input type="radio"/> |
| | Are workers involved in the procurement process of machinery materials and personal protection equipment? | <input type="radio"/> | <input type="radio"/> |
| | Are workers asked to provide their recommendations and advice before taking any decision? | <input type="radio"/> | <input type="radio"/> |

| Sl. no. | Questions for worker representatives | Yes | No |
|---------|--|-----------------------|-----------------------|
| | Is there a universally accepted process to ensure participation of worker representative? | <input type="radio"/> | <input type="radio"/> |
| | Do workers receive training regarding occupational health and safety issues and preventive measures? | <input type="radio"/> | <input type="radio"/> |
| | Are workers trained to find problems/faults in the employer's management of risk? | <input type="radio"/> | <input type="radio"/> |
| | Do the workers participate in developing instructions, processes, and rules and provide their feedback where applicable? | <input type="radio"/> | <input type="radio"/> |
| | Are workers informed and consulted before implementing any planned changes? | <input type="radio"/> | <input type="radio"/> |

RISK ASSESSMENT CHECKLIST: HAZARD MAPPING AND PREVENTIVE MEASURES-
 -----Chemical hazards

Are these hazards present in the workplace?

Please note the following list does not include all the possible hazards.

| Sl. no. | Question | Yes | No |
|---------|---|-----------------------|-----------------------|
| | Are hazardous chemicals (highly poisonous, poisonous, harmful, erosive, stimulant, sensitive, carcinogenic, cell destroyer, harmful for reproduction, explosive, oxidizing, highly inflammable, moderately flammable or flammable) labeled? | <input type="radio"/> | <input type="radio"/> |
| | Is all the safety information of all relevant hazardous chemicals listed in the Information Sheet? | <input type="radio"/> | <input type="radio"/> |
| | Are all the hazardous chemicals properly MSDS (Material Safety Data Sheet) labeled? | <input type="radio"/> | <input type="radio"/> |
| | Are all hazardous chemicals properly used? | <input type="radio"/> | <input type="radio"/> |
| | Are the workers properly and regularly informed about the hazards posed by the chemicals they handle? | <input type="radio"/> | <input type="radio"/> |
| | Do young workers and pregnant women come in contact with harmful chemicals? | <input type="radio"/> | <input type="radio"/> |
| | Do you ensure and maintain the appropriate levels of oxygen in the workplace? | <input type="radio"/> | <input type="radio"/> |
| | Is the level of chemicals in the air lower than the maximum density acceptable for the human body? | <input type="radio"/> | <input type="radio"/> |
| | Are preventive measures (ensuring proper air circulation) installed in areas where chemicals are used? | <input type="radio"/> | <input type="radio"/> |
| | Are personal protective equipment (gloves, goggles, face shield, respirator) given to workers who handle harmful chemicals? | <input type="radio"/> | <input type="radio"/> |
| | Are medical checkups of workers who handle harmful chemicals done regularly? | <input type="radio"/> | <input type="radio"/> |
| | Is special care given to the workers who handle carcinogenic products? | <input type="radio"/> | <input type="radio"/> |
| | Are the workers properly trained to deal with hazardous chemicals? | <input type="radio"/> | <input type="radio"/> |

Preventive measures which help to reduce risk

Using lesser harmful chemicals in place of highly hazardous chemicals

Using machinery to handle highly harmful products

Displaying safety instructions regarding safe usage of harmful chemicals

Ensuring all hazardous chemicals are properly labeled and safely used

Keeping fuel and inflammable materials in separate places

Ensuring the safety of workers by providing Personal Protective Equipment (PPE)

Ensuring good ventilation where the air is more prone to acquiring hazardous chemicals (e.g. where spray, paint or varnish is used)

RISK ASSESSMENT CHECKLIST: HAZARD MAPPING AND PREVENTIVE MEASURES-

----- Fire hazards

Are these hazards present in the workplace?

Please note the following list does not include all the possible hazards.

| Sl. no. | Question | Yes | No |
|---------|---|-----|----|
| | Are oxidizing or combustible products such as paint, finishing, adhesives and solvent used? | O | O |
| | Are the oxidizing and combustible products stored in a well-ventilated space? | O | O |
| | Are all the hazardous chemicals properly labeled and attached with a Material Safety Data Sheet (MSDS)? | O | O |
| | Is there an open source of ignition such as open fire, electrical equipment, electrostatic charge or high temperature? | O | O |
| | Is the area properly marked for fire hazards? | O | O |
| | Are the workers properly and regularly informed about the dangers and hazards of the inflammable materials they handle? | O | O |
| | Are the fire extinguishers in place and in proper usable condition? | O | O |
| | Are the fire extinguisher chemicals active and is the extinguisher equipment regularly serviced? | O | O |
| | Are the fire extinguishers kept in an easily accessible place? | O | O |
| | Is there an emergency exit plan? | O | O |
| | Are the emergency exit routes properly marked? | O | O |
| | Is there a fire alarm system in place? | O | O |
| | Is a fire drill and firefighting practice regularly carried out? | O | O |
| | Is firefighting training held regularly? | O | O |

Preventive measures which help to reduce risk

Storing explosive and flammable products properly (so that the temperature will not be more than the highest permissible temperature according to MSDS information)

Keeping explosive and inflammable materials in separate places

Eliminating sources of sparks (together with No Smoking).

Display Material Safety Data Sheet (MSDS) to all hazardous inflammable products

Risky areas should be identified as being dangerous places

Gaining permission to working with an open fire

Providing sufficient fire extinguishers (relative to the size of the factory and number of inflammable products).

Checking electrical equipment regularly

Ensuring that fire extinguishing equipment is kept in specified and appropriate places

Ensuring regular checks and servicing of fire extinguishers

Ensuring adequate space and an approach path for emergency and rescue workers

RISK ASSESSMENT CHECKLIST: HAZARD MAPPING AND PREVENTIVE MEASURES-
 -----Hazards - explosions

Are these hazards present in the workplace?

Please note the following list does not include all possible hazards.

| Sl. no. | Question | Yes | No |
|---------|--|-----------------------|-----------------------|
| | Are any explosive substance used? | <input type="radio"/> | <input type="radio"/> |
| | Are Material Safety Data Sheets available for all explosive chemicals used? | <input type="radio"/> | <input type="radio"/> |
| | Are explosive chemicals properly labeled? | <input type="radio"/> | <input type="radio"/> |
| | Are explosive mixtures produced in work processes (e. g., air and gases – hydrogen or methane, air and Vapour of benzene or acetone, air and wood dust)? | <input type="radio"/> | <input type="radio"/> |
| | Are there any areas where there is a risk of explosion (e. g., rooms in which paints or solvents, flammable liquids or gases are stored)? | <input type="radio"/> | <input type="radio"/> |
| | Are there any areas where there is a risk of explosion as a result of contamination with flammable substances, increased storage temperatures, or excessive quantities of products being stored? | <input type="radio"/> | <input type="radio"/> |
| | Are gas installations closed and regularly checked? | <input type="radio"/> | <input type="radio"/> |
| | Is the electrical equipment used in explosive areas properly selected? | <input type="radio"/> | <input type="radio"/> |
| | Are there any fire sources in explosive areas? | <input type="radio"/> | <input type="radio"/> |
| | Are there any high temperature sources in explosive areas? | <input type="radio"/> | <input type="radio"/> |
| | Are there any electrostatic fields in explosive areas? | <input type="radio"/> | <input type="radio"/> |
| | Is there a ventilation system installed and is it checked regularly? | <input type="radio"/> | <input type="radio"/> |
| | Is the risk (explosion) area marked properly? | <input type="radio"/> | <input type="radio"/> |
| | 14. Is the concentration of explosive substances in explosive areas continuously monitored? | <input type="radio"/> | <input type="radio"/> |
| | Are monitoring devices regularly checked? | <input type="radio"/> | <input type="radio"/> |
| | Are the workers properly and regularly informed about the dangers and hazards of the explosive materials they handle? | <input type="radio"/> | <input type="radio"/> |

Preventive measures to help reduce risk

Using ventilation and ensuring inspection

Ensuring explosive materials are properly labeled and attached with a Material Safety Data Sheet (MSDS)

Preventing or eliminating sources of sparks

Avoiding contact with explosive products with items which may create sparks

Avoiding keeping more than one item together and keep storage to a minimum

Ensure marking of emergency exit routes and keeping the emergency path free of obstructions

RISK ASSESSMENT CHECKLIST: HAZARD MAPPING AND PREVENTIVE MEASURES-

----- Hazards – Moving parts of machinery

Are these hazards present in the workplace?

Please note the following list does not include all possible hazards.

| Sl. no. | Question | Yes | No |
|---------|---|-----|----|
| | Do the moving parts of machinery have safety covers (including all optional/additional parts or tools?) | O | O |
| | Does the safety cover give protection to the worker’s hand, arms or any other body parts from the moving parts? | O | O |
| | Are all the parts of the machinery secured/attached properly so that it cannot be opened easily? | O | O |
| | Can anything fall from above onto the moving parts of the machinery? | O | O |
| | Do safety covers create more difficulty to operate machinery? | O | O |
| | Can machines be oiled without opening the safety cover? | O | O |
| | Is it possible to open the machine while it is operating or while parts are moving? | O | O |
| | Does the machine have any uncovered gears, sprockets, pulleys or any other wheels? | O | O |
| | Is there any open belt or chain? | O | O |
| | Is there any open screw, key ways, collar? | O | O |
| | Can the operator reach the power switch easily? | O | O |
| | Is there one single control mechanism for all the workers? | O | O |

Preventive measures to help reduce risk

Ensuring that machines are operated only by trained and approved workers

Ensuring all safety guards are in place and are in working condition

Using posters and signs to remind workers about the safety mechanisms

Checking the machine properly before switching it on

Ensuring that areas surrounding the machinery are neat, clean and free of any obstructions

Ensuring that all pathways provide sufficient space for the movement of workers

Ensuring the use of appropriate Personal Protection Equipment

Ensuring that the machinery and its surroundings are well lit

Ensuring availability of information about how to stop faulty machinery which accidentally starts

Ensuring inspection of machinery and that faulty machinery is fixed at the earliest opportunity

Ensuring that there is a sufficient gap between the moving and the stationary parts of the machine

RISK ASSESSMENT CHECKLIST: HAZARD MAPPING AND PREVENTIVE MEASURES -

-----Hazards – Electrical connections and machinery

Are these hazards present in the workplace?

Please note the following list does not include all the possible hazards.

| Sl. no. | Question | Yes | No |
|---------|---|-----------------------|-----------------------|
| | Are all safety measures and switches in place and in good condition? | <input type="radio"/> | <input type="radio"/> |
| | Are there any problems with wiring (such as exposed wires)? | <input type="radio"/> | <input type="radio"/> |
| | Is damaged wire properly housed? | <input type="radio"/> | <input type="radio"/> |
| | Is the electrical material store marked with an appropriate safety sign ? | <input type="radio"/> | <input type="radio"/> |
| | Is there any faulty plug basket? | <input type="radio"/> | <input type="radio"/> |
| | Is it possible to use electrical materials without following rules and regulations? | <input type="radio"/> | <input type="radio"/> |
| | Is damaged electrical wire re-used? | <input type="radio"/> | <input type="radio"/> |
| | Are nay workstations very close to electrical circuits? | <input type="radio"/> | <input type="radio"/> |
| | Are there any live wires near workstations? | <input type="radio"/> | <input type="radio"/> |
| | Is there any open wire which has not been earthed? | <input type="radio"/> | <input type="radio"/> |
| | In there an electrostatic charge? | <input type="radio"/> | <input type="radio"/> |

Preventive measures which help to reduce risk

Checking everything before starting work

Having electrical connections checked by experts

Using only IEC (International Electro-technical Commission) standard materials

Immediately disconnecting damaged electrical equipment from electrical supply and informing relevant staff about the damage

Ensuring that only assigned expert staff repair electrical damage

Using appropriate materials

Carrying out work as per instructions

Disconnecting electrical supply lines

Clearly marking lifting areas

Checking the earthing after fixing any fault or damage