



FIRE & SAFETY ENGINEERING

BSS –DIPLOMA & Adv. Diploma

Overview of Training

What is Safety

**Basic Safety Awareness Training &
Fire Safety
Emergency response plan**

Chemical Safety

Personal Protective Equipment (PPE)

Electrical Safety

Machinery Hazards

**Work Permit System, Personal Protective Equipment
Housekeeping**

Quiz Program & Conclusion

SAFETY Targets.

Zero Accident
Zero Occupational Diseases.
Controlling Pollution
Eliminating and Controlling Risk & Hazards

DEFINITIONS

Safety :

**the protection of people from physical injury
Freedom from Danger / Freedom from accident.**

The Task completed without any accident

Health:

Freedom from Illness

Environmental Protection:

Protection of Surroundings (Air, Land and Water)

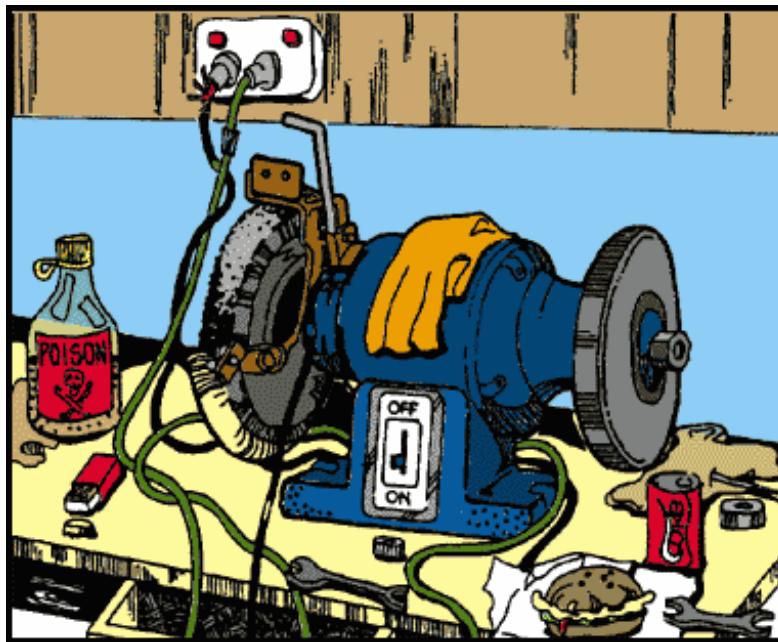
Hazard



***Hazard:**

*Something with the potential to cause harm

Examples : Noise, Vibration Electricity, Dust and fire



Hazard and Risk

Risk

A combination of the probability
and severity

Risk = Probability X Severity



UNSAFE ACT

***UNSAFE ACTS: these are where the action (omissions) of the people in the workplace directly cause or contribute to the incident:**

- *Operating without permission
- *Operating or working at unsafe speed
- *Not using safety devices
- *Knowingly using unsafe equipment
- *Unsafe methods of work
- *Adopting an unsafe position or posture
- *Failure to wear safe clothing or PPE
- *Acting reckless manner (jokes)
- *Not reporting safety problems
- *Working under the influence of alcohol



UNSAFE CONDITION

***UNSAFE CONDITIONS:** These are where the physical conditions at the workplace, or the methods of work, directly cause or contribute to the incident.

- * Unguarded Machinery or absence of guard
- * Inadequate guarding (height, strength)
- * Unsafe equipment (defective, not maintained)
- * Unsafe floors (slippery, cracked)
- * Unsafe system of work
- * Unsafe PPE (not providing, inadequate)
- * Bad housekeeping (dirt, blocked ways)
- * Unsafe layout and design of workplace
- * Unsafe environmental conditions



Accident / incident Reporting

**every injury no matter how
slight must be reported
immediately**

Accident / incident Reporting

ALL accidents and incidents MUST be reported, as soon as possible by the individual involved or someone on his/her behalf.

Accident / incident Reporting

If you see an incident

Inform your supervisor

Accident / incident Reporting

Investigation is required to identify the root cause to prevent re-occurrence

Incident must be reported

Unsafe act



Incident must be reported

Unsafe Condition



Incident must be reported

Near Miss



Incident must be reported

Property damage



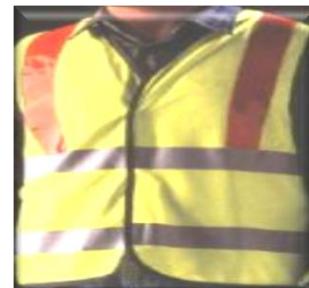
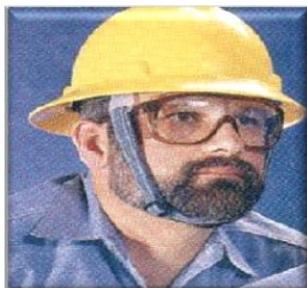
Incident must be reported

Accident



Personal Protective Equipment (PPE)

Wear your Safety Helmet, Safety Glasses, Safety Boots/Shoes, High visibility vest and gloves.



PPE,s (Personal Protective Equipments/Life Saving quipments)

- * **What are the PPE,s**

- * **What are PPE,s**
- * Hard Hats
- * Safety Glasses
- * Safety Goggles
- * Face Shields
- * Gloves
- * Earplugs and Ear Muffs
- * Respirators
- * Aprons, Safety belts and Full Body Harness

Head Protection (Hard Hats)

- * **Hard Hats protect from**
- * Falling and Flying objects
- * Bumping of head against fixed objects
- * Resists Penetration
- * Absorb shock and blow
- * Exposed electrical wires

Head Protection (Hard Hats)

- * **Types of Helmets**
- * **Type 01 (Helmets with full brim)**
- * **Type 02 (Brimless Helmets)**

Head Protection (Hard Hats)

- * **Classes of helmets**
- * **Class A (Plastic or Fiber Helmets)**
- * Construction, Mining, Shipbuilding, and industries
- * **Class B (Hard Plastic)**
- * Electrical helmets protect from high voltages

Head Protection (Hard Hats)

- * **Class C (Made of Light weight aluminum)**
- * Designed for comfort, offers limited protection
- * • Protects against bumps from fixed objects, but does
- * not protect against falling objects or electrical shock

Eye and Face Protection

- * **Protects from**
- * Flying particles, Molten metal, Liquid chemicals, Acids, Chemical Gases and vapors,
- * Light radiations,
- * Caustic burns
- * Chemical Burns

Eye Protection Criteria for Selection

- * **Protects against specific hazard(s)**
- * • **Comfortable to wear**
- * • **Does not restrict vision or movement**
- * • **Durable and easy to clean and disinfect**
- * • **Does not interfere with the function of**
- * **other required PPE**

Eye and Face Protection

- * **Types of Eye and Face Protectors**
 - * Safety Glasses
 - * Safety Goggles
 - * Face Shields
 - * Welding Goggles
 - * Laser safety Glasses

Foot Protection (Safety Shoes)

- * **Protects from**
- * Heavy objects such as barrels or tools
- * that might roll onto or fall on employees'
- * feet
 - * Sharp objects such as nails or spikes that
 - * might pierce ordinary shoes
 - * Molten metal that might splash on feet
 - * Hot or wet surfaces
 - * Slippery surfaces

Foot Protection (Safety Shoes)

- * **Types of Safety Shoes**
 - * Insulated Rubber Sole
 - * Long Synthetic Material
 - * Metal Plated Sole
 - * Steel Caped toes

Hand Protection (Gloves)

- * **Gloves Protects from**
- * Burns
- * Bruises
- * Abrasions
- * Cuts
- * Punctures
- * Fractures
- * Amputations
- * Chemical Exposures
- * Extreme heat and cold



Hand Protection (Gloves)

- * Types of Gloves
- * There are 3 main following types of gloves

- * Metal Mesh , Leather or Canvas Gloves
- * Fabric and Coated Fabric Gloves
- * Chemical and Liquid resistance Gloves
- * Insulated Rubber Gloves

Metal Mesh, Leather or Canvas Gloves

- * These gloves are made up of metal mesh, leather or canvas and protects from burns, cuts, and sustained heat. It has further three types.
 1. **Leather Gloves:** These gloves protect from sparks, moderate heat, blows, chipping, and rough objects, .
Uses: Used for welding, cutting, chipping work, and grinding work

Metal Mesh, Leather or Canvas Gloves

2. Aluminized Gloves:

These gloves are made of a metal mesh or a kind of aluminum.

Uses: These gloves are used for welding, furnace and foundry operations, and other cutting work. These gloves required a kind of leather gloves to be inserted under them.



Metal Mesh, Leather or Canvas Gloves

3. Aramid fabric gloves:

These gloves are made of a kind of synthetic material.

Uses: These gloves protects against heat and cold.



Fabric and Coated Fabric Gloves

- * Fabric and coated fabric gloves are made of fabric and cotton. It has further two types .
 1. **Fabric Gloves:** These gloves are made of cotton or fabric.
Uses: These gloves are used for the protection from dirt, moderate heat, and friction. These gloves can also be used to work with rough, sharp, and heavy materials.

Fabric and Coated Fabric Gloves

2. **Coated Fabric Gloves:** These gloves are made up of fabric or cotton and on the other side coated with plastic type material.

Uses:

Coated fabric gloves are used bricks and blocks handling, masonry work, wire rope handling and many other operations.



Fabric and Coated Fabric Gloves



Chemical and Liquid Resistance Gloves

- * These gloves are made of rubber like latex, nitrile, butyle, or plastic. It has further following types.

1. **Neoprene Gloves:**These gloves are used to protect workers from burns, irritation, and other skin problems caused by oils, gases, solvents, and other chemicals.



Chemical and Liquid Resistance Gloves

2. Butyle Rubber Gloves:

These gloves protect against nitric acid, sulfuric acid, hydrofluoric acid, and many other kinds of acids.



Chemical and Liquid Resistance Gloves

3. Natural Latex or rubber gloves:

These gloves are used handle acids, alkalies, salts, and ketones.

These gloves are also used for sandblasting, grinding, and polishing work.

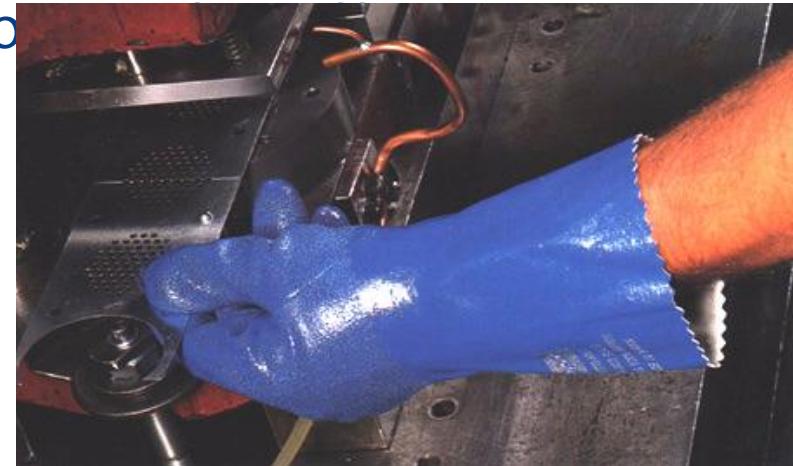


Chemical and Liquid Resistance Gloves

4. Nitrile Rubber Gloves:

These gloves protect from tears, punctures, and snags.

These gloves are also
chemicals.



Insulated Rubber Gloves

- * Insulated rubber gloves are made of special kind of rubber which gives protection against the electricity.



Respiratory Protection Devices

- * Respiratory protection devices are used to protect the workers from different kinds of gases, vapors, and fumes and in some conditions to provide them oxygen. It falls into two types.
 1. Air Purifying Devices
 2. Air Supplying Devices

Air Purifying Devices

- * Air purifying devices are basically used to purify the air from different kinds of harmful elements. Its has following five types.
 1. Mechanical Filter Cartridge
 2. Chemical Filter Cartridge
 3. Combination of mechanical and chemical
 4. Gas Mask
 5. Powered Air Purifying Respirator (PAPR)

Air Purifying Devices

1. **Mechanical Filter Cartridge:** This kind of respirator filters the air mechanically and removes the harmful particles like, dusts, mists, metal fumes, smoke etc. But it gives no protection against gases.



Air Purifying Devices

2. Chemical Filter Cartridge:

These filters uses chemical filter to remove different kinds of gases and vapors 1



Air Supplying Devices

1. Supplied Air respirators

- * The supplied air respirators are used in different places like air plane, hospitals, confined spaces etc.
- * The air is supplied from an external source through the pipes or hoses and then to the mouth piece.



Air Supplying Devices

2. Self Contained Breathing Apparatus SCBA

- * SCBA contains a cylinder and a mouth piece.
- * The user or workers become totally independent of the outside atmosphere as the air or oxygen is self contained and carried by the worker.
- * It is used in confined spaces or at the places where there is a deficiency of oxygen.

SCBA



Hearing Protection

- * When it's not feasible to reduce the noise or its duration – use ear protective devices.
- * Ear protective devices must be fitted properly.

Permissible Noise Exposures

Duration per day, in hours	Sound level in dB*
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

Hearing Protection

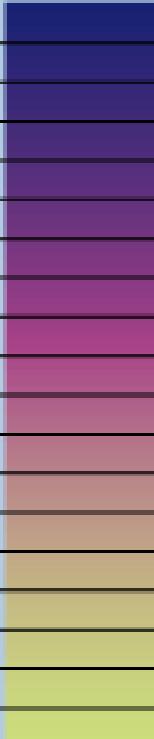
	DECIBEL - dB(A)	EQUIPMENT
Double protection recommended above 105 dB(A)	112 110 108 107 102-104 102 101-103 97 96 96 95 94 90 87 86 85-90 85 60-70	 Pile driver Air arcing gouging Impact wrench Bulldozer - no muffle Air grinder Crane - uninsulated cab Bulldozer - no cab Chipping concrete Circular saw and hammering Jack hammer Quick-cut saw Masonry saw Compactor - no cab Crane - insulated cab Loader/backhoe - insulated cab Grinder Welding machine Bulldozer - insulated cab Speaking voice
Hearing protection recommended above 85 dB(A)		

Table 1: Some typical noise levels found on construction sites

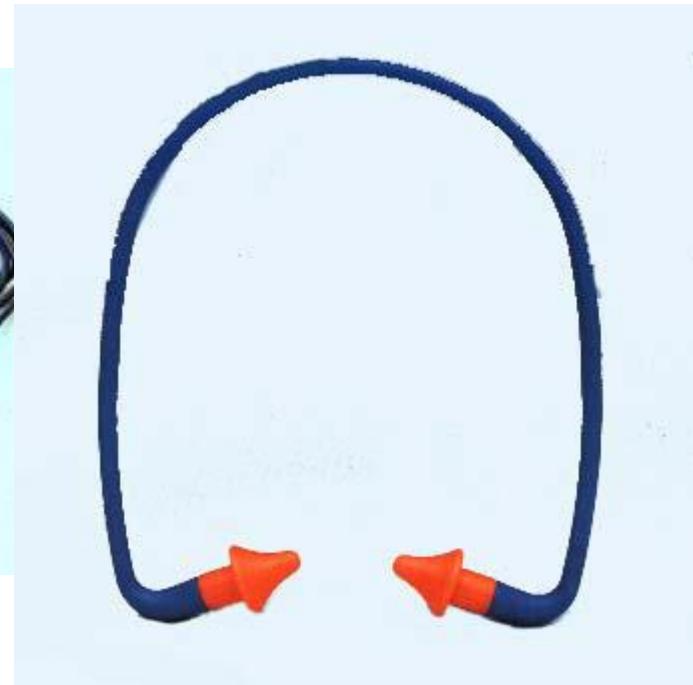
Hearing Protection

- * Examples of Hearing Protectors

- * Ear muffs Ear Plugs



- Ear Canals



Personal Protective Equipments (PPE)

Wear protective clothing at all times and / or special protection mentioned on permit.

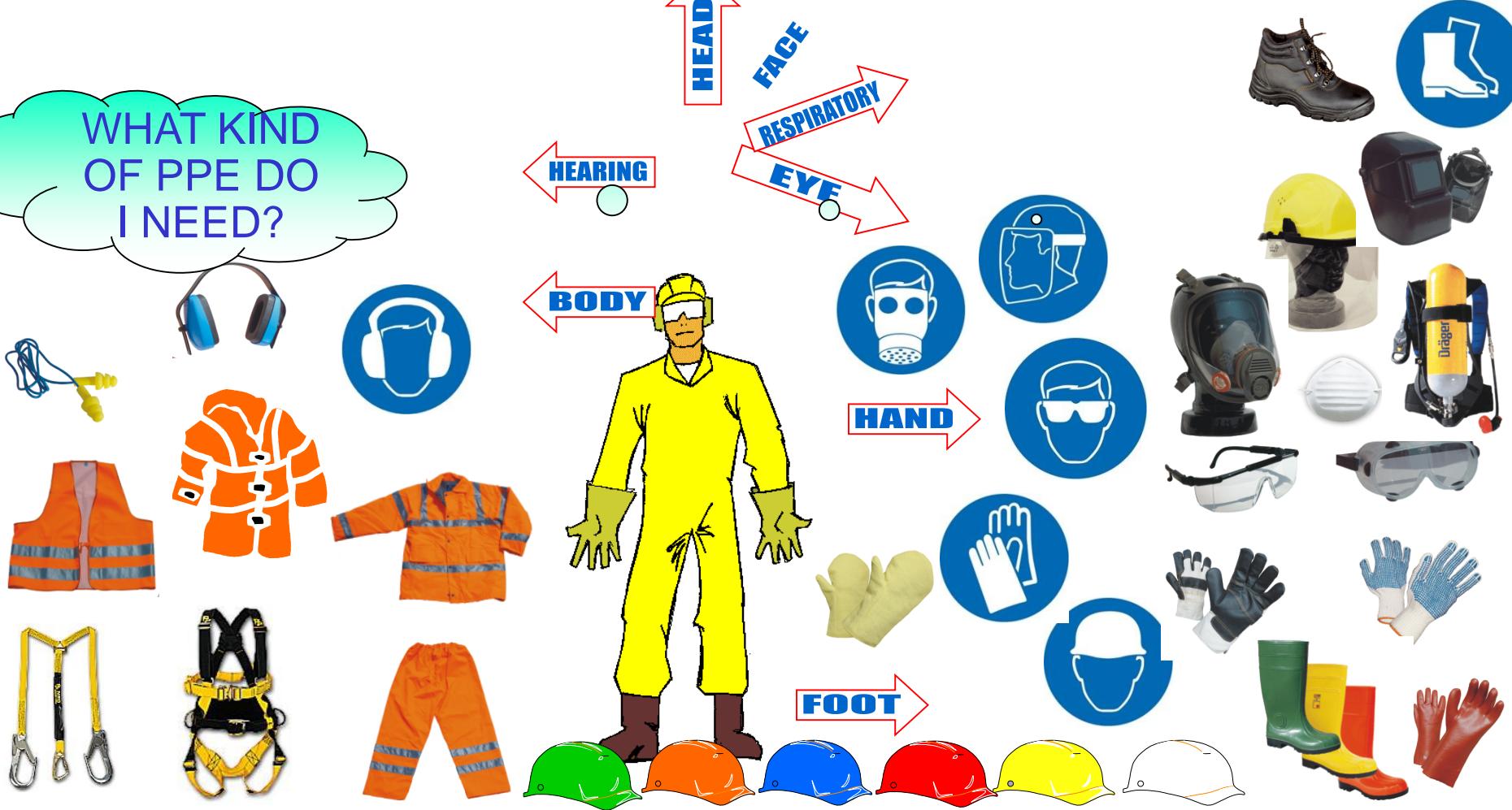


Personal Protective Equipments (PPE)

Change damaged PPE
immediately

HEAD TO TOE GOOD TO GO!

WHAT KIND
OF PPE DO
I NEED?





Contents

- * Purpose
- * Objective
- * Responsibility
- * Permits & Certificates
- * Flow of Work Permit
- * Coordination Meeting
- * CWP; HWP

Contents

- * Excavation
- * Electrical Isolation
- * Confined Space Entry
- * Safe Lifting
- * Hazards in Radiography
- * T.B.T & JHA

Purpose

- **The purpose of a Work Permit is to ensure**
 - ✓ **that the risk is reduced to an acceptable level and remains under control while performing activities.**
 - ✓ **Safe working environment is achieved by providing management control over the various work activities.**
 - ✓ **It is also as a legal and compulsory document to be observed and used by all Subcontractors.**

Objectives & Functions

To ensure

- Authorization is given to carry out the work**
- Job Performer clearly understand the nature of the work & Hazards of the job**
- Precautions are taken to start the job safely, perform the job safely & close out based on the hazards.**
- Supervisors are fully aware of the work being done.**
- Control The work permit**

Responsibility

Personnel should be aware that the Permit to Work system is not an absolute safeguard in itself.

It is the responsibility of each individual to be alert to hazardous situations that may arise during the operation.

Responsibility of P.H.

- **Permit Holder (Job Performer)**: Once a permit has been issued the person(s) carrying out the work shall ensure that the work is carried out safely.
- Should understand the permit condition.
- Shall carry out and supervise the works in compliance with the relevant permit prescription
-

ISSUING AUTHORITY

- ❑ An authorised person to carry out the task as required by the Permit to Work Procedure.
- ❑ Responsible for reviewing the submitted Permit after confirming that the worksite has been examined and all precautions are identified.
- ❑ Confirm that no conflict exists with other Permits.

Permit Coordinator

- * Person authorised by the Contractor Project Manager for Construction to coordinate issue of all Permits to identify potentially conflicting work tasks, both on a geographical and time basis.

ROLES AND RESPONSIBILITIES

Authorized Gas Tester

After appropriate training, the Authorized Gas Tester is authorized to test for the presence of flammable gas or vapor, toxic gas and oxygen in Confined Spaces.

Should record all the readings in the permit



Fire Watchers

Personnel appointed as Fire Watchers shall be adequately trained and shall monitor work areas, and the precautionary measures taken in those areas, when specified by the Issuing Authority on the PTW. Fire Watchers shall undertake fire response activities as required.

Fire Watch / Safety Watch

- * Supervisor will nominate a competent person.
- * The person on fire watch shall remain in attendance during the hot work period.
- * Conduct gas tests within a 15 m radius of the work site at regular interval as mentioned in the Permit.
- * Maintain visual surveillance of the work area
- * Be in a position to quickly shut down the tools or equipment being used & monitor any sparks that may escape from an enclosure
- * Be in radio contact with the Control Room.
- * Ensure there is ready access to the fire fighting equipment

Project Manager

- * Ensure the proper coordination of construction activities between Contractor and subcontractors;
- * Verify that the subcontractor is providing the correct information and equipment for the scope of work;
- * Ensure training is given to all persons requiring to use a Permit to Work

FIELD HSE MANAGER

- * Ensure adequate training to all personnel involved in this procedure;
- * Ensure that suitable and sufficient inspections and audits are carried out;
- * Evaluate the effectiveness of this procedure and change amend as is required or becomes necessary to achieve its purpose;
- * Advise the contractor management of any irregularities or areas of concern in order to investigate and to implement corrective actions; remove any permit signatory from the list, found to be in breach of the required duty and responsibility.

Permit Display Status Board

- * Copy of the Live Permits with the copy of the attachments.
- * All the out Standing Permits.
- * PC & PA are responsible to update the status board on their locations.

Piper Alpha Disaster



Analysis of Piper Alpha

- * Permits
 - * There are two permits (one only identified)
- * Flow of PTW
- * Close out of Permit system
- * Non availability of permit status board
- * Communication gap (no one is known that PCV is removed)
- * Improper Blind (not standard)

WORK PERMIT SYSTEM

- * HOT WORK PERMIT (PRINCIPLE PERMIT)
- * COLD WORK PERMIT
- * RADIOGRAPHY PERMIT
- * MISCELLANEOUS CERTIFICATES (SECONDARY)

TYPES OF WORK PERMITS

- * HOT WORK PERMIT
- * RADIOGRAPHY WORK PERMIT
- * ELECTRICAL WORK
- * EXCAVATION WORK PERMIT
- * CONFINED SPACE ENTRY
- * WORKING AT HEIGHT
- * LIFTING CERTIFICATE



saipem

SGD 2 & 3 Packages

Work at Height with Lifeline Campaign



Supplementary Certificates

- For the below five critical activities, supplementary certificates are provided for the extra safety.**
- These certificates are to be attached along with the Hot or Cold work**

- ELECTRICAL WORK CERTIFICATE
- EXCAVATION WORK CERTIFICATE
- CONFINED SPACE ENTRY CERTIFICATE
- WORKING AT HEIGHT CERTIFICATE
- LIFTING CERTIFICATE

Cold Work Permit (BLACK)

- ❑ A Cold Work Permit, shall be used for tasks that do not involve hot work but have high risk potential, need to be covered by a permit.**
- ❑ Such Cold Work tasks / activities are such :**
- ❑ Any constructional activities, scaffolding erection, pressure test etc.**

Hot Work Permit (RED)

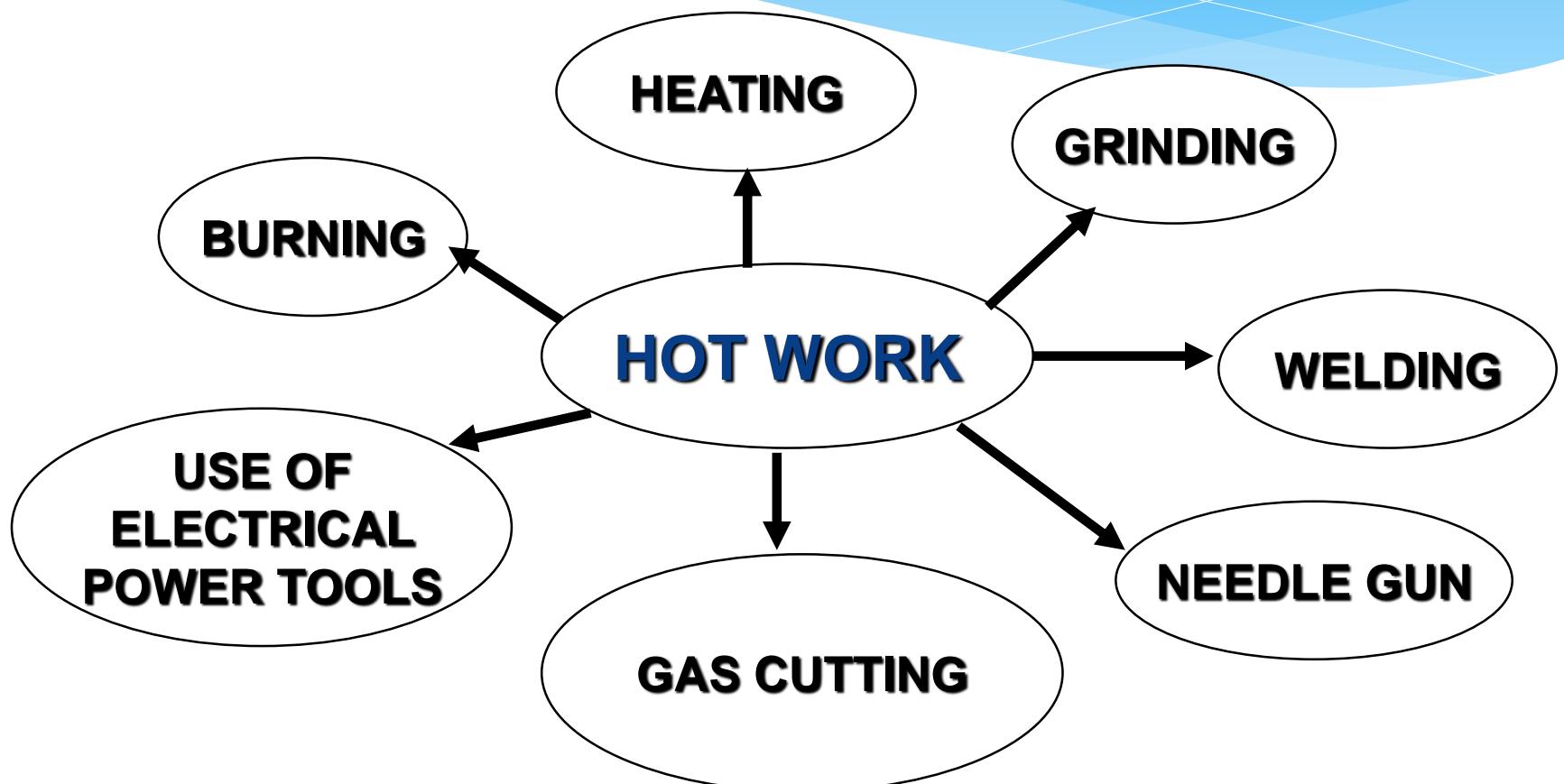
A Hot Work Permit, will be required for all works involving the use of a naked flame or potential ignition sources in areas where flammable or combustible materials may be present.

Activities that may produce or expose a possible source of ignition include, but are not limited to, the following:

Works requiring a Hot Work Permit

- Welding / flame cutting.
- Electrical pre-heating / stress relieving.
- Use of heat shrink blowers.
- Grinding (e.g. abrasive wheel).
- Opening live junction boxes.
- Use of air or hydraulic powered metal cutting, chipping or caulking tools.
- Use of electrical soldering irons.
- * Use of explosives and perforating guns.
- * Use of powered steel wire brushes.
- * Dry grit / shot blasting.
- * Sand blast
- * Use of battery powered camera with or without flash.
- * Use of mobile phones.
- * Needle gunning.
- * Jack Hammer
- * Other sparks-producing activities as recognized by SAIPEM

WORK PERMIT SYSTEM



Condition for permit to seize (invalidation)

- Gas testing & work commencement period:- 30 minutes
- The conditions on the permit are not complied with;
- Area or unit conditions change, e.g. Venting or spillages of hazardous materials occurred etc
- Plant fire & gas leak and the emergency alarm is released;
- Work is carried over to the next shift; in this case the permit to work can be renewed; the renewal shall be done before the next shift is starting its activity.

Excavation Certificate

- **An Excavation Certificate, is required for all excavation and trenching work having more than 15 cms depth.**
- **There may be a potential for damage to underground utilities or facilities, collapse of banks, etc**
- .
- **Permit should be applied 48 hrs prior to the excavation. It should be signed by Mechanical, Electrical, Instrument & IT supervisors.**
- **Floor openings, holes and edges.**

Precautions for excavation

- * Check for over head lines when doing excavation
- * Barriers should be provided 1.5 m away from the edge of the excavation.
- * Mechanical excavation should be 5 m away from the buried live cables.
- * Within 5 m use only hand excavation with extra care.
- * The minimum distance from the crane boom to power cable is 6 m.

Excavation & Trench

- * **Excavation:**
- * Width is greater than the depth and also when the depth exceeds 4.5m.
- * **Trench:**
- * Depth is greater than the width as long as the width is not greater than 4.5m.

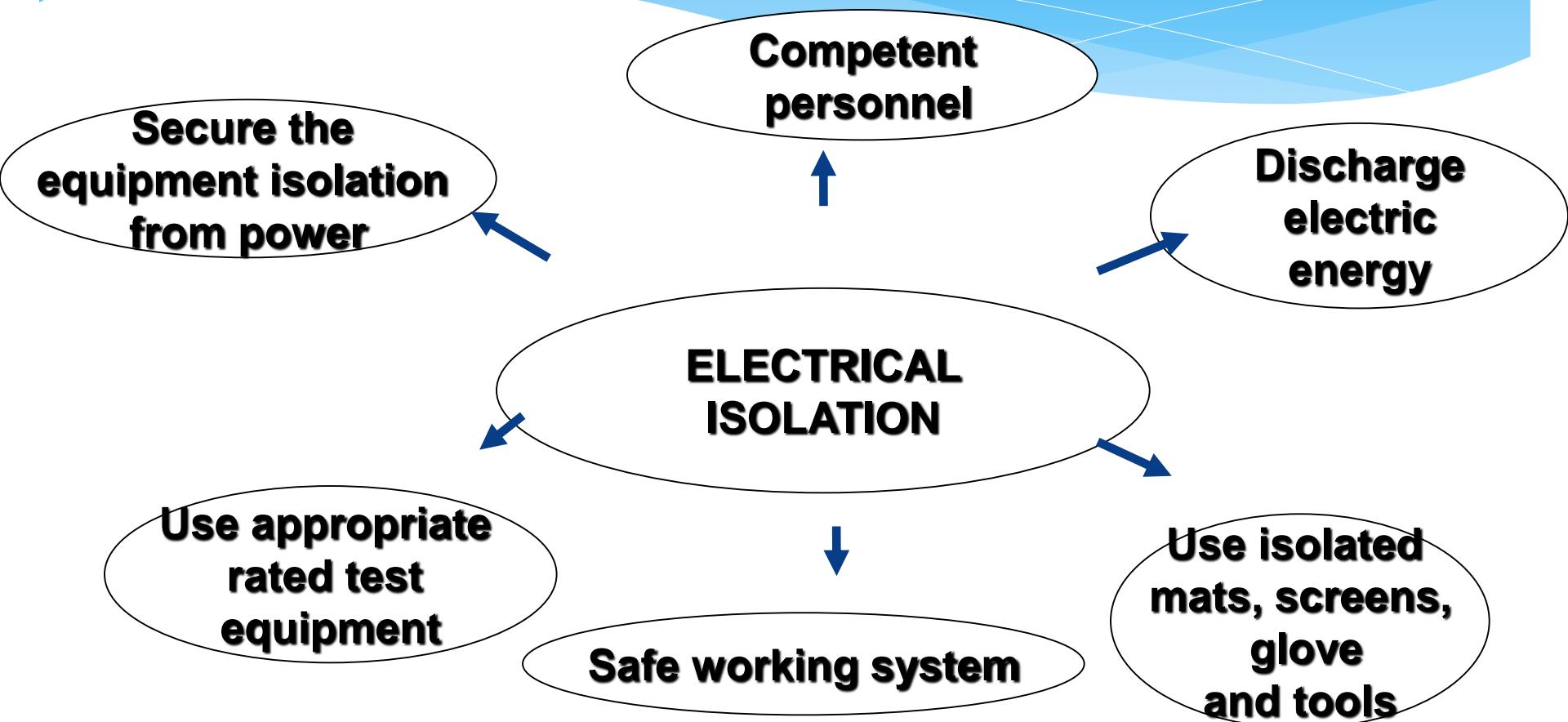
Electrical Certificate

30% of electrical accidents result in fatalities

An Electrical Certificate, will be required for all works involving in the electrical equipment and supply. Such Electrical Work includes, but is not limited to, the following:

- ✓ Work on isolated electrical equipments
- ✓ Earthing / grounding
- ✓ Maintenance
- ✓ Continuity checks
- ✓ Installation.
- ✓ Installation of instrumentation pipe work, cable and terminations (no live tie-ins).

WORK PERMIT SYSTEM METHODS OF ISOLATION



Confined Space Certificate

A “confined space” is defined as any space:

- **Large enough and so configured that an employee can bodily enter and perform assigned work.**
- **With limited or restricted means of ingress or egress.**
- **With limited or no natural ventilation.**
- **Not designed for continuous occupancy.**
- **Excavations, trenches (normally deeper than 1.2 meters considered as confined space)**

Confined Space Certificate

A Confined Space Permit, will be raised when it is necessary for personnel to enter confined spaces (for work or inspection purposes).

As per the Confined Space Entry Procedure, a Hazard and Risk Assessment must be completed before any entry into a confined space .

LIFTING CERTIFICATE

- * Objective: Ensure correct work practices to be followed for safe lifting operation.
- * Pre Check before raising permit for lifting
 - * Inspected soil for adequate
 - * Crane load indicating device with overload cut-off
 - * Signs & barriers are installed
 - * Radius of the lift beam measured by tape
 - * Weight of the load calculated & documented

Safe Lifting Operation

- * Tandem lifting shall only be with the consent of Company.
- * A check must be made to ensure that the crane complies with assessed requirements and is fitted with the correct length of boom or jib.
- * A copy of the current Crane Test Certificate must be available at the site for examination.
- * The crane must have been inspected within the previous seven days

Radiography / Ionization Radiation

- * Purpose:
- * To provide instruction for controlling Non Destructive Testing on site detailing the requirement for the safe handling and monitoring of all radioactive sources for protecting personnel from radiation hazards.
- * I.R. includes alpha, beta, gamma, and x-rays, but does not include sound or radio waves, visible light, or infrared or ultraviolet light.

Radiation

- * Radiation is categorized into two groups:
- * Non-ionising: This does not cause ionization as it passes through the body. Examples are visible, infrared and ultraviolet light.
- * Ionising: This ionizes matter as it passes through, and can therefore damage body tissue.
- * Examples are alpha, beta particles and electromagnetic radiation such as x-rays and gamma.

WORKING AT HEIGHT

- * To establish minimum requirements and guidelines to provide maximum prevention/ protection against falls from elevation.
- * Minimum standard of training necessary to ensure personnel understanding and compliance with the program.
- * The goal is to achieve 100% fall prevention to potential falls

Primary & Secondary Fall

prevention
Primary Elimination of fall: Use of guardrail systems, aerial lifts, scaffolds or alternate work methods such as pre-assembly at ground level.

Secondary Elimination of fall: Utilization of fall arrest equipment such as

- ✓ Full body harness and
- ✓ Shock absorbing lanyard as a backup to primary fall
- ✓ To be used at all-time while working at height of > 1.8 mt

Anchorage point

- * The followings shall NOT be used for anchorage points.
- * Screw Pipe, Conduit Pipes, Bolt heads, Cable Trays
- * Welded Pipe Less Than 2" & Wooden Handrails etc
- * 100 mm dia pipe should be used for anchorage.
- * Anchoring should be just above the head
- * Wider the anchoring will cause swing more & Cause accident.

JHA /JSA

A process where the

- * **Hazards associated with each step of a job are identified**
- * **Control measures** are put in place to mitigate the risk to **PEME** . (Person, Equipment, Material & Environment)

Main Steps for JHA

- * Divide the job into steps of the activity
- * Identify hazards for each step
- * Write the control measures for each Hazard identified in the steps.

TOOL BOX TALK

- * Review the previous TBT for that activity
- * Identify the tools & Hazards of the activity
- * Simultaneous activity in that area
- * Time to start & time to finish
- * Emergency action

~~TAG OUT AND LOCK OUT PROCEDURE~~

- * OBTAIN CERTIFICATE FOR ISOLATION
- * PERFORM THE ISOLATION AND SECURE WITH PADLOCK
- * ATTACH TO THE PADLOCK THE PART 2 OF IDENTIFICATION LABEL
- * PUT THE PART 1 OF IDENTIFICATION LABEL, THE PADLOCK KEY AND THE COPY OF CERTIFICATE IN THE LOCK OUT BOX

LOCK OUT & TAG OUT (LOTO)



Definition

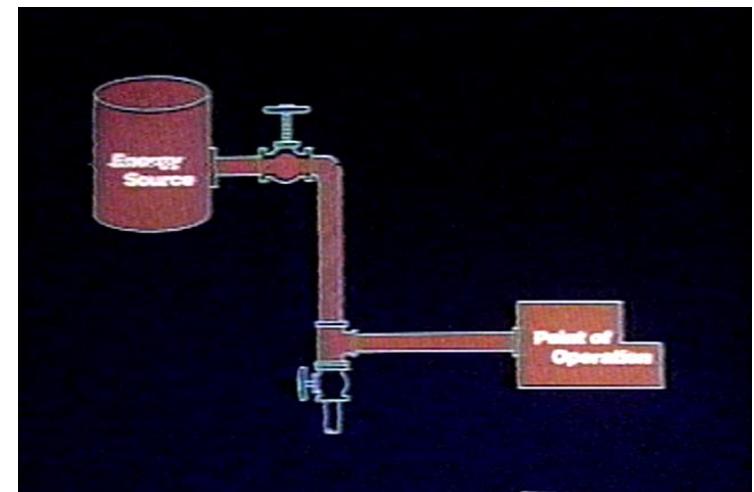
- * Lockout/tagout procedures are intended to prevent accidents and injuries caused by accidental release of energy.
- * Any powered machinery (electrical, hydraulic, water, pressure) or electrical equipment that could move in a way that would put people in danger is a hazard that can be prevented by lockout/tag out.



* Lockout

How Does Lockout Work?

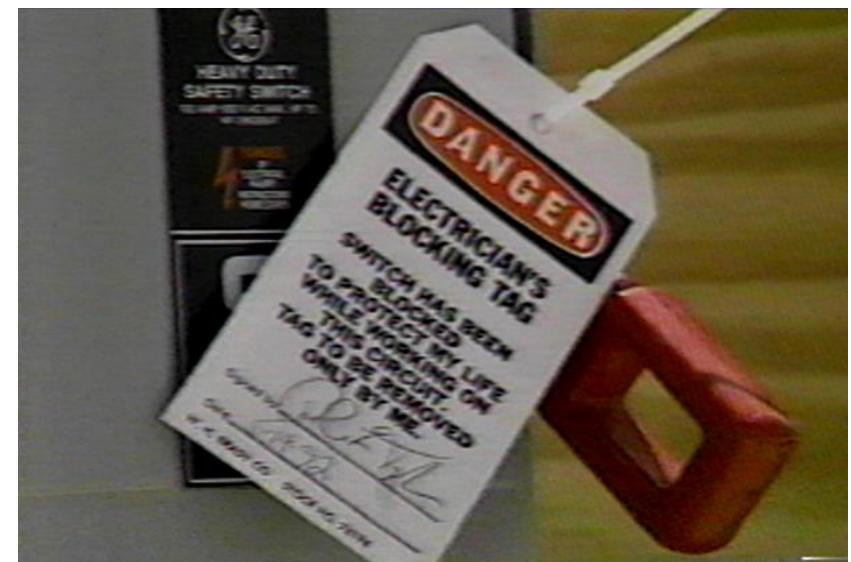
- * Refers to the process of blocking the flow of energy from a power source to equipment, keeping it isolated from the power source.
- * Accomplished by using a lock or similar device
 - * Padlocks
 - * Multiple hasps
 - * Blocks (pancake)
 - * Blinds
 - * Valve blocking device
 - * Chains



How Does Tagout Work?

* Tagout

- * Refers to the process of placing a tag on an energy source
- * Tag serves as a warning
- * Not a physical restraint
- * Administrative control hazards



Energy Control Program

- * Isolation of non-electrical equipment
- * Lockout of electrically-driven equipment
- * Isolation procedure
- * Safety/Departmental Permits
- * Confined space entry
- * Purgung, venting, isolating various pipes/lines



What You Must Do

- * Make sure you understand what the tags and locks mean.
- * When in doubt, ask your supervisor or the HSE Department.
- * Strict adherence of the lockout/tagout procedures are expected at all times.
- * Disciplinary actions will be taken for failure to follow the procedures.
- * You will receive more detailed training on this project's lockout/tagout procedure.

Contents of Tag

- * The padlock has to be provided with a tag reporting:
- * ID number as recorded in the isolation log book.
- * Date and time of lock out.
- * Name and signature of the individual who installed the padlock and the reason of the installation

Tags

- * When you find a tag of an equipment found in the ground, what is your action?
- * Hand over to the responsible person who signed in the tag.

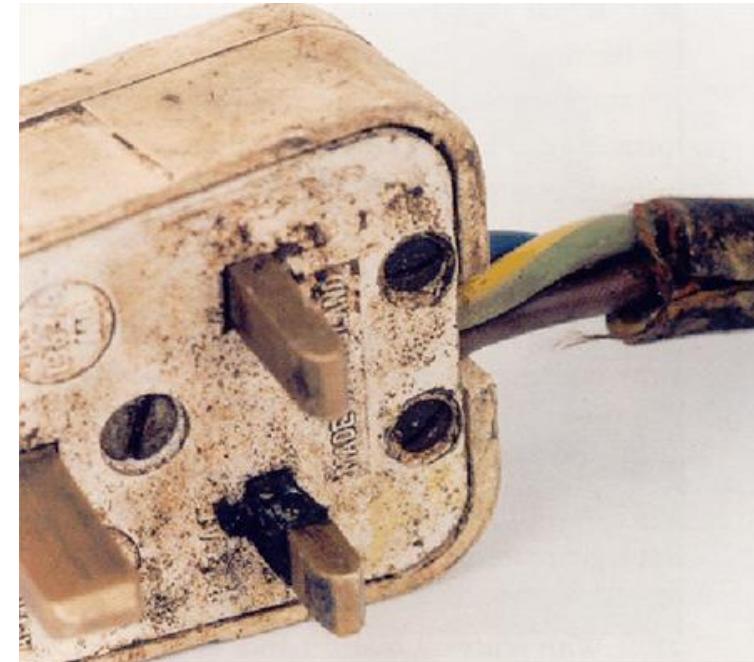


Electrical Safety.

The Hazards of Electricity

PRIMARY HAZARDS

- Electric shock
- Electric fire & explosion
- Electric flash
- Electric burns



The Hazards of Electricity

Secondary Hazards

- * Person falling from height
- * Dropping of tools & objects
- * Health hazards due to release of toxic gas & production of UV rays
- * Psychological effects

Severity of Shock Influenced By:

- **Voltage** – the higher the voltage, the greater the current
- **Duration** – the length of time that a person is exposed
- **Resistance** – skin condition, clothing, etc.
- **Environmental factors** – metal surfaces, humidity, etc.

Electrical Terms...

- * **Conductors:**

- * A material that allows electricity to flow easily:- e.g. cooper, steel, water

- * **Insulators:**

- * Materials that not allows electricity to flow easily: e.g. plastic, rubber, wood.

Electrical Safety.



Connections must be well protected & covered.



One cable,
One tool



Ensure power tools are inspected "PRIOR" to use.



Never carry or lower a power tool by its cable.

Ensure power tools are DRY.

Do's & Don'ts

- All electrical work must be carried out by competent electricians
- Temporary electrical panels, extension cables and other electrical tools must be checked and inspected prior to use
- ELCB's Must be installed in all panels
- Follow Lock out & Tag out procedures

Do Not Touch Electrical Appliances if You Are Not Authorized & Competent



Electrical Safety

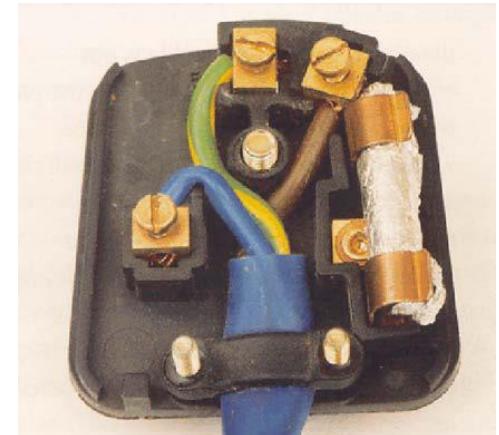
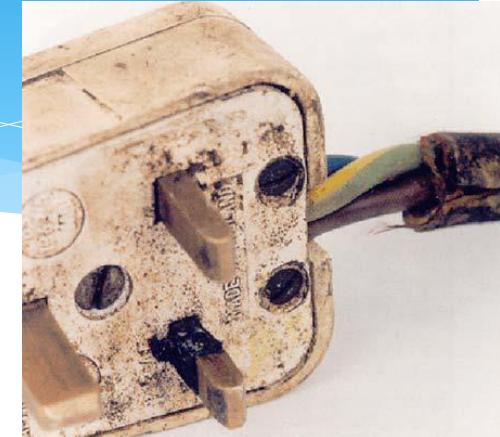
- Display electrical equipment & cable routing layout
- All electrical installation to be tested & commissioned as per BIS codes
- All DB's should be covered
- Earthing of all electrical installations
- Regular maintenance

ELECTRICAL SAFETY

- ❑ Records to be maintained, ELCB
- ❑ Display caution boards
- ❑ Provide ELCB for portable equipment
- ❑ Follow rules and regulations
- ❑ Follow safety measures
- ❑ Adopt protective system
- ❑ Insulation
- ❑ Regular inspection

User Checks

- Damage to cable sheath
- Damage to plug
- Cable not fully insulated
- Inadequate joints
- Unsecured cable
- Wet or contaminated
- Damage to casing of equipment
- Burns/scorch marks



STICKERS



FIRE WARDEN

RESCUE TEAM

FIRST AIDER

Accident Prevention

- * Slips, trips, and falls are the number one preventable accident in the workplace
- * Good Housekeeping is the basis for preventing slips, trips, and falls:
 - * Cleaning up spills immediately
 - * Marking wet areas
 - * Mopping or sweeping debris from floor
 - * Removing obstacles from walkways and keeping them free of clutter
 - * Securing mats and rugs to floor to lay flat on floor
 - * Covering/ taping down cables across walkways
 - * Keeping work areas well lit
 - * Put away tools

Warning Signs

YELLOW-Warning



Warning Signs

Red

Prohibition Sign

Prohibits behavior likely to increase or caused danger, e.g. stop, shut-down, emergency cut-out devices, evacuate



Red

Fire Sign

Identifying the location and type of fire fighting equipment



Yellow

Warning Sign

Giving warning of a hazard or danger, e.g. be careful, take precautions, examine



Blue

Mandatory Sign

Must be done, prescribing specific behavior, e.g. wear personal protective equipment



Green

Safe condition Sign

Information on emergency exits, first-aid, or rescue equipment and activities



Special Assignments

Concerned Supervisor shall conduct tool box talk to brief:

Special PPE requirement

Follow the Color coding system for the different types of waste

Classification of waste bin	Colour of waste bin	Pictogram at waste bin	Type of waste collected
Recyclable including scraps			Paper, plastic, wood, bottles, metal, rubber etc.
Bio Medical Waste			Used cottons, bandages, shredded needles, syringes etc.

Housekeeping

Poor Housekeeping Creates Hazards



Housekeeping

Tidy up your own mess, avoid slip, trips and falls

