# RISK & HAZARD REPORT

## HAZARD IDENTIFICATION AND RISK MANAGEMENT

### INTRODUCTION

Today we find that despite every effort by one and all, the accident rate is not reducing below a certain limit. This necessitates more initiative to be taken so as to minimize the loss of manpower, equipment, and property. This will ultimately lead to reduction in accident and improved equipment condition, thus channeling of more and more resources towards more improved method of working by enhancing the skill and environment which is more conducive to better health hygiene and thus improve morale of the work force and making them more creative at work. This will naturally result in enhanced productivity on a sustained basis. In this chapter, an attempt has been made towards hazard identification and risk assessment with regards to the incident leading towards losses and to prioritize the action for either eliminating the hazard or minimizing the effect of it.

'Hazard' has been defined as a source of potential harm to people, property or the environment. Alternatively, hazard is an agent (either chemical, biological, or physical) or it is a set of conditions that presents a source of risk. In any given situation hazards are fixed, they can vary in two ways-their intrinsic nature (e.g. high pressure/low pressure) and their scale (more or a less).

### Hazard Identification & Risk Assessment (HAZID-HIRA)

The steel manufacturing industry is labor intensive and uses large scale and potentially hazardous manufacturing processes. The industry experiences accident rates that are high compared with some other manufacturing industries. Some examples of such hazards likely to occur in proposed Induction Furnace, Continuous casting machine (CCM), Billet Caster and Rolling Mill at M/s Sri Venkatesh Iron & Alloys (India) Ltd. are given below:

These mainly impact on those working within the industry, although health hazards can also impact on local communities.

- Fire at Lubrication, Hydraulic & fuel oil installations
- Physical Hazards due conveyor system, material handling
- Fugitive Dust of Raw Material Handling at charging bay, storage yard,
- Collapse of Structures/Fall of Material, stacking failure
- Loading/ Unloading failures
- Electrocution/ Electrical Hazards
- Accidental Spillage of hot molten metal

**Identification of source of Ignition at M/s. SVIAIL**

- Self-ignition of hot material
- The electrical Discharge (thunderbolt, electrostatic charges, short circuits), Static charge

**Identification of sources of Fire & Explosion at M/s. SVIAL**

- Oil and Lubricant Room (spillage)
- Fine Coal Hoppers
- Coal Storage area
- Electrical Substations (Short circuit)
- Induction Furnace

**Fire & Explosion Index**

- Fire and Explosion Index (FEI) is useful in identification of areas in which the potential risk reaches a certain level. It estimates the global risk associated with a process unit and classifies the units according to their general level of risk. FEI covers aspects related to the intrinsic hazard of materials, the quantities handled and operating conditions. This factor gives index value for the area which could be affected by an accident, the damage to property within the area and the working days lost due to accidents.
  - Fire and explosion index is then calculated as the product of Material Factor (MF) and Unit Hazard Factor. Degree of hazards based on F& EI given in the following Tables.

**Degree of Hazards Based on F & EI**

| FEI Range | Degree of Hazard |
|---|---|
| 0 – 60 | Light |
| 61 – 96 | Moderate |
| 97 – 127 | Intermediate |
| 128 - 158 | Heavy |
| 159 and Above | Severe |

**Thermal radiation**

Table Enlists damage consequences due to different Heat Loads are given

**Table: List of Damages Envisaged at Various Heat Loads**

| S. No. | Heat loads ($kW/m^2$) | Type of Damage Intensity | |
|---|---|---|---|
| | | Damage to Equipment | Damage to People |

| | | | |
|---|---|---|---|
| 1 | 37.5 | Damage to process equipment | 100% lethality in 1 min. 1% lethality in 10 sec |
| 2 | 25.0 | Minimum energy required to ignite wood | 50% Lethality in 1 min. Significant injury in 10 sec |
| 3 | 19.0 | Maximum thermal radiation intensity allowed on thermally unprotected equipment | -- |
| 4 | 12.5 | Minimum energy required to melt plastic tubing | 1% lethality in 1 min |
| 5 | 4.0 | -- | First degree burns, causes pain for exposure longer than 10 sec |
| 6 | 1.6 | -- | Causes no discomfort on long exposures |
| **Source:** World Bank (1988). Technical Report No. 55: Techniques for Assessing Industrial Hazards. , Washington, D.C: The World Bank. | | | |

**Physical Hazards onsite**

- Dust Exposure at coal crushing area
- Fall of Sling rope of EOT Crane during material handling
- Accident due to Conveyor feeding system
- Slip/Trip/ Fall due to improper stacking of material
- Contact with Hot molten Mild steel

**Loading/Unloading operation/ Storage**

- Approach of heavy good vehicles for unloading material
- Excessive Dust during Loading/unloading operation
- Conveyor moving parts
- Cleaning of overflows
- Unauthorized passages ,travelling over transportation system
- Motor overloading
- Unclean platforms causing staggering and falls

**Hazards in Induction Furnace**

- Heat Radiation
- Exposure to molten metal Fumes
- Electrical hazards.

**Hazards at Steel Melting Shop (SMS)**

The main hazards arise out of the use of hot metal and oxygen at the spillage of hot metal cause serious burn injuries and fires. Severe explosions are also caused due to hot metal

falling over a pool of water, resulting in injuries to persons, fire and damage to equipment due to flying of hot splinters & splashing of liquid metal/slag.
Sudden break out of molten metal result in heavy explosions, due to their coming in contact with water, thereby causing serious burn injuries to persons and damage to equipment

**Hazards at Proposed Captive Power Plant (CPP)**

Total power generation for the proposed power plant is taken as 16 MW using Steam Turbine Generator set. WHR Steam generators and AFBC Boiler are the sources for production of steam required for Heat generation.
Flue gas and other gases, is hazardous, if it is not handled and used properly.

- Steam Handling and Pressure drop (Steam Explosion)
- Physical Hazards
- Fire Hazard
- Explosion (Air leakage into the gas system, - Air penetration during refueling, Air leakage into cold gasifier still containing gas which can ignite)
- High Surface temperature
- Spark During Refueling
- Toxic Hazard
- Design failure
- Fly Ash handling
- Failure of Safety Relief devices
- Id fan/PA fan/SA fan failure
- Turbine system failure
- Furnace bed maintenance for FBC Boiler
- Dosing System Failure(HP and LP)
- Failure of fuel firing system / Burner Management system(BMS)
- RCC chimney blockage
- Temperature drop and failure of Air cooled condenser, Low pressure(LP) and High Pressure(HP) heater and Drain cooler
- Failure of re-circular system
- Pump failure (Boiler feed, HSD unloading, Transfer)

**Waste Heat Recovery Boiler (WHRB Unit)**

- Blast Over pressure
- Steam Pressure drop
- Leak , Catastrophic rupture in steam lines
- Temperature drop in Boiler, Pre heater
- Process failure, Explosion due to Blast overpressure

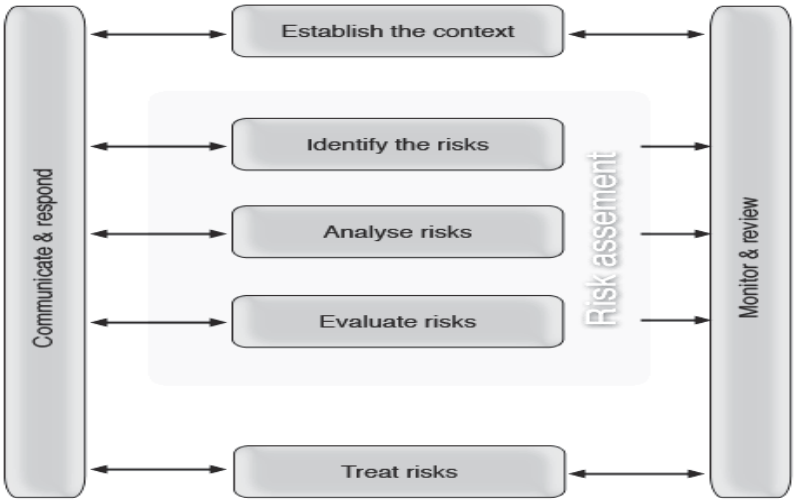
**Electrical Hazard due to Dust**

Electrical equipment such as motors, circuit breakers, transformers, and switchgear can produce sparks and ignite dust clouds and hybrid dust/air mixtures in the vicinity. Reference is taken from CCPS Guidelines for safe handling of Bulk solids.

- Ingress of dust into enclosures with subsequent ignition causes smoldering or burning (fires)
- Dust that enters an enclosure will settle out as layers on internal surfaces and become heated
- Electrically conductive dusts causes short-circuiting when deposited on exposed electrical components and circuits
- Abrasive and/or corrosive dusts damages components of electrical equipment
- Electric shock

**RISK ASSESSMENT**

Risk assessment is the determination of quantitative and qualitative value of risk related to a concrete situation and a recognized threat. Activities requiring assessment of risk due to occurrence of most probable instances of hazard and accident are both onsite and off-site.




The risk management measures for the proposed project activities will be adopted as required for best safety practice within the works boundary. In addition, the design and engineering of the proposed activities will take into consideration of the proposed protection measures towards maintaining environmental norms.

**5 x 5 Matrix for Risk Assessment**

**Likelihood**

5. Almost Certain
4. Probable

3. Possible
2. Possible (under unfortunate circumstances)
1. Rare

**Severity**

5. Fatality
4. Major Injury, resulting in disability
3. Injury Requires, Doctor's or Hospital attendance
2. Minor Injury, 1st Aid required
1. Minor Injury, 1st Aid not required

**Risk Value = Likelihood x Severity**

| Probability score (likelihood) | Impact score (severity) | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| 1 | 1 (Low) | 2 (Low) | 3 (Low) | 4 (Low) | 5 (Med) |
| 2 | 2 (Low) | 4 (Low) | 6 (Med) | 8 (Med) | 10 (High) |
| 3 | 3 (Low) | 6 (Med) | 9 (High) | 12 (High) | 15 (High) |
| 4 | 4 (Low) | 8 (Med) | 12 (High) | 16 (High) | 20 (Very high) |
| 5 | 5 (Med) | 10 (High) | 15 (High) | 20 (Very high) | 25 (Very high) |

**1-4 = LOW RISK,**
safe

**5-9 = MEDIUM RISK,**
identify suitable control measures

**10-16 = HIGH RISK,**
do not carry out procedure

**20-25 VERY HIGH RISK,**
do not carry out procedure

**Risk Rating**

Risk Rating is calculated by multiplying the likelihood against the consequences, e.g. taking a likelihood of 4, which is classified as Probable, and multiplying this against a consequence of 2, which is classified as a Minor Injury1st aid required, would give you and overall risk rating of 8, which would be risk rated as a low risk.


| | |
|---|---|
| High Risk<br>(16 – 25) | High Risks activities should cease immediately until further control measures to mitigate the risk are introduced |
| Medium Risk<br>(9 – 15) | Medium Risks should only be tolerated for the short-term and then only whilst further control measures to mitigate the risk are being planned and introduced, within a defined time period.<br>Note: Medium risks can be an organizations greatest risk, its 199 chilles heel, this due to the fact that they can be tolerated in the short-term. |
| Low Risk<br>(1 – 8) | Low Risks are largely acceptable, subject to reviews periodically, or after significant change etc. |

| S.No. | Hazards & Details | Persons at Risk | Control Measures | Action Plan in case of Emergency | Risk | | |
|---|---|---|---|---|---|---|---|
| | | | | | Likelihood | Severity | Risk Rating |
| | | | | | L | S | RR=L×S |
| 1 | Induction Furnace- Fire hazard caused by fuels/ignitable substances | Persons working in the Furnace area | • Emergency alarm to be put on to signal the emergency.<br>• Emergency Kit is kept ready near the plant.<br>• Fire -fighting equipment Power/Foam type extinguishers on vehicles and mounted on walls are kept readily available.<br>• Water hose is provided.<br>• No smoking zone is declared.<br>• Plant workers are trained to fight fire. | • Switch off the system<br>• Fire extinguishers are to be used immediately.<br>• Water hose will be operated to set out the fire depending on the situation.<br>• Outside fire brigade is to be called if the fire cannot be extinguished immediately.<br>• Inform the occupier/ manager and activate the onsite emergency plan.<br>• Immediate first aid to the victims and sent to the hospital for treatment. | **2** | **3** | **6** |
| **2** | In case of Furnace crack, molten metal may leak causing splash of hot metal. | Persons working in the tapping area. | • Continuous monitoring of Furnace shell is done to maintain and observe proper temperature.<br>• Movement of staff and labour is not permitted near the furnace.<br>• Heat zone is displayed near the furnace.<br>• Safety shoes, safety goggles, hand gloves, apron and safety | • Immediately drain out the Furnace by pouring or tapping out. Molten splashed metal is allowed to cool down before removing.<br>• Further process is stopped till repairs are conducted.<br>• In case of Fire, Fire- | **2** | **4** | **8** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | helmet provided to the workers. | fighting equipment is used to set out the fire**.** | | | |
| **3** | Molten hot metal may fall on Human body. | Persons working in the tapping area. | •Whole process is done under super vision of qualified/trained persons.<br>•Only trained labours are allowed with proper heat proof dress/gum boots/ aprons.<br>•Entry of other workers/persons is strictly prohibited. | • No entry zone should be declared.<br>• First aid should be given to the victim and sent to the hospital for further treatment. | **3** | **4** | **12** |
| 4 | Hoist rope breakage in E.O.T Crane. | Persons standing below the crane, bay and nearby areas. | •No movement of strange people in crane bay and nearby areas.<br>•Frequent checking of rope and other load bearing material before process is started.<br>•Cranes are not allowed to operate without line clear signal.<br>•Weak rope is immediately replaced. | • Crane movement is carried out only after getting the signal of line clearance. | **1** | **5** | **5** |
| **5** | Electrical Transformers – Electrical shock and Fire. | Persons near the transforme r | Shock proof insulated PCC platform. | • Cut off power supply.<br>• Treat the injured for electrical shock.<br>• If fire is caused, immediately fight fire with available resources, summoning outside help if necessary. | **2** | **3** | **6** |
| **6** | Lab chemicals- In case of bottle | Persons working in | •Proper care should be taken while handling the chemicals. | • Immediately treat the persons as guided in the | **3** | **2** | **6** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | breakage, causes burns and damage to respiratory systems due to inhalation. | the lab. | • First aid box should be available at site with all the necessary and required medicines.<br>• Fire-fighting equipment like fire extinguishers, sand buckets should be always available.<br>• Instruction Boards to be displayed for knowledge of other workers to care of the situation in the event of occurrence. | MSDS.<br>• Hospitalize the effected persons if deemed necessary. | | | |
| **7** | Cooling Tower- Burns from returning hot water. | Persons working with cooling tower. | • All workers are not permitted near the tank and hot water line. Railing is provided all around the tank.<br>• Always precautionary measures should be taken and adopted. | • Victims are first aided by the trained persons and then referred to doctor/hospital.<br>• If any worker gets hurt, then immediate first aid should be provided to him and he should be referred to the hospital /doctor for further treatment. | **2** | **3** | **6** |
| **8** | Charging of scrap and other material in furnace and moving parts like fly wheel, roller stand and other accessories. Cut/burn and fire hazards may be | Persons working in the raw material handling yard and in the furnace floor. | • Workers are provided with gloves and proper equipment to handle and feed the scrap.<br>• Workers charging the materials in the furnace are equipped with fire proof dress and proper equipment to handle the scrap and material.<br>• Fire proof system made | • Immediate first aid should be given to the victim by trained person and refer to the doctor/hospital for further treatment. | **3** | **3** | **9** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | possible. | | available and fire-fighting equipment like extinguisher and water with sufficient number of points easily available.<br>• Only trained and qualified people will operate the furnace. | | | | |
| **9** | Furnace transformer-Fire Hazard | Persons working in Furnace area and in the electrical sections. | •Furnace will be operated with prescribed load.<br>•Carefully changing of tap on load.<br>•Temperature of furnace/transformer should be mentioned.<br>•Unauthorized persons will be restricted and No-Entry Boards will be put up. | • Power line should be immediately put off.<br>• Fire-fighting steps should be taken to stop fire.<br>• Further processing must be stopped till repairing is over. | **2** | **3** | **6** |
| **10** | Water Tank-Drowning of Personnel | Persons near the water tank. | • Water tank will be fenced/ covered.<br>• The tank will not be permitted for general utility.<br>• | Drowned person should immediately be given the first aid. | **2** | **2** | **4** |
| **11** | Control Rooms-Electrical Shocks | Persons working in the control room | Earth leakage circuit-breaker installed. | Main supply will be immediately shut off. | **2** | **2** | **4** |

**Table: Site Specific HIRA for M/s. SVIAIL**

| S. No. | Activity | Hazard | Risk | Hazard Potential | Proposed Safety system |
|---|---|---|---|---|---|
| **1** | **Raw material Handling** | | | | 1. Preparation of SOP and SMP and Training manuals<br>2. Provide adequate training to operators<br>3. Conduct regular safety audits and rectify safety issue and monitor safety compliance reports<br>4. Ensure use of PPE |
| 1.1 | Unloading of material from trucks | Dust, collision of trucks | Respiratory problems and injury to personnel | Moderate | |
| 1.2 | Shifting of material by mobile equipment's | Dust , collision, overloading | Injury to personnel | Moderate | |
| 1.3 | Transportation of material in conveyors | Dust, overloading, | Respiratory problem and injury to personnel | Light | |
| **2** | **Induction furnace** | | | | 1. Hot protection suit to be worn by personnel working with hot metal<br>2. Follow work permit, SOP and SMP.<br>3. On line gas monitoring system for gas leakage.<br>4. Wear gas masks during working in gas line<br>5. Firefighting system in operation<br>6. Reliable and selective digital or microprocessor based electromagnetic protective relays would be incorporated in the electrical system |
| 2.1 | Tapping of hot metal | Spillage of hot metal | Burn injury | High | |
| 2.2 | Working in gas pipeline | Gas leakage | Gas poison , gas explosion | Moderate | |
| 2.3 | Operation Area | Electrical Hazard | Body injury | High | |
| **3.** | **Steel Melt shop** | | | | |
| 3.1 | Charging of hot metal in furnace | Spillage of hot metal | Burn injury | High | 1. Preparation of SOP and SMP and Training manuals<br>2. Provide adequate training to operators<br>3. Conduct regular safety audits and rectify safety issue and monitor safety compliance reports<br>4. Ensure personnel wear PPE and wear hot metal protection suit.<br>5. Fire fighting system in operation |
| 3.2 | Smelting operation in furnace | Electric shock | Burn injury, | Moderate | |
| 3.3 | Tapping of hot metal | Spillage of hot metal | Burn injury, | High | |

| S. No. | Activity | Hazard | Risk | Hazard Potential | Proposed Safety system |
|---|---|---|---|---|---|
| | | | | | 6. Vital connections e.g. water, gas, compressed air, oxygen etc., would be cut off or regulated as per requirement |
| **4.** | **Captive Power Plant (CPP)** | | | | |
| 4.1 | Boiler Area | Exposure to High temperatures & Blast overpressure | Burn injury, Body injury | Moderate | 1. Insulating clothing, body suits, aprons etc. of appropriate materials<br>2. Preparation of SOP and SMP and Training manuals<br>3. Fire fighting system in operation<br>4. For high dust levels, wear: a Full-face Class P3 (Particulate) or an Air-line respirator.<br>5. For inhalation risk exists, wear: a Class P1 (Particulate) respirator.<br>6. Provide Onsite rescue equipment |
| 4.2 | Ash Handling Area | Dust Exposure/ Dust fumes | Respiratory problem and injury to personnel | Moderate | |

**MITIGATION MEASURES**

Risk Mitigation measures for the proposed Expansion and new Installation activities require adoption of best safety practice at the respective construction zones as well as operational phase within the works boundary. In addition, the design and engineering of the proposed facilities will take into consideration of the proposed protection measures for air and water environmental as outlined in earlier Chapter.

**Coal Handling Plant**

- Coal handling unit shall be minimum 500 meters away from the residential area, school/colleges, Historical Monuments, Religious Places, Ecological sensitive area as well as forests area. Also from Railway line, Express ways, National Highways, State ways and District Roads and from water bodies like River, Nala, Canal, Pond etc.
- Coal storage unit shall provide paved approach with adequate traffic carrying capacity.
- Compound wall with adequate height should be constructed around the coal storage area
- The unit should have adequate water supply through pipe/ surface water before selection of the site.
- Coal storage unit should ensure that stacking of coal in heaps does not get higher than the compound wall of premises of unit
- Adequate dust suppression measures should be provided to prevent fugitive emission and also risk of fire. Similar measures should be adopted for loading/unloading

operations. Coal ash should be transported in tankers, which are covered and closed and there is no chance of spillage during transportation.

- Firefighting measures should be provided to avoid any fire and ensure that there is no explosive or chemical reaction in storage yard.
- Coal unit should take measures to control the air pollution while loading/handling coal. Specific measures should be under-taken to avoid fugitive emission at the time of loading/unloading of coal by individual coal yard unit.

**Induction Furnace**

- Gas safety man would accompany the team and would test the atmosphere for the presence of CO, before starting the work. If CO, concentration is found exceeding the sage limit, the job would be undertaken using necessary safety appliances viz., Oxygen Breathing Apparatus/Blower type Gas mask.
- Any gas cutting /welding job would be undertaken with the clearance from Gas safety man.

**Control Rooms**

- Control rooms shall be blast proof and shock proof
- The building shall be located upwind of the process storage and handling facilities. The building shall not be at a lower level than the tank farm.
- Adequate number of doors shall be provided in the control room for safe exit
- Smoke detectors system shall be provided for control rooms at suitable locations
- One hydrant (minimum) for every 45m per wall of the building shall be positioned all around the building

**Gas Explosion, Prevention & Preventive Measure**

The following actions would be taken to prevent any gas explosions in case of gas leakage.

- For works on gas lines/equipment, non-sparkling copper tools will used. If such tools are not available, grease coated steel tools would be used.
- Electrical drill & other electrical equipment will not be used as these can give rise to sparks.
- The gas line would be thoroughly purged with steam before undertaking the job on the same.
- Naked lights will not be used near any de-pressurized gas main or equipment unless the same has been thoroughly purged.
- In case of profuse leakage of gas, action would be taken for water sealing and isolating that portion.
- The approach road to the gas line complex would be kept free from any obstructions.

- If gas catches fire due to some leakage, it will be extinguished with plastic clay, steam or water.
- The portion of gas main affected would be cooled down with water. The valve will not be closed when fire is still there and the pressure in the main will be maintained at minimum 100mm (WC).
- Gas tapping points of flow or pressure measurement will be cleaned with wooden stick or grease coated wire.
- If lighting is necessary near gas line, portable spark, proof electrical lamps of low voltage or explosion proof torchlight will be used for enclosed areas.

**Mitigation measure for Metal spillage**

Any accumulation of water will be prevented in such vulnerable areas.

- In case of minor leakages, the flow of molten metal will be controlled.
- If there is major breakout, the area would be cut off and cordoned.
- Vital connections e.g. water, gas, compressed air, oxygen etc., would be cut off or regulated as per requirement.

**Electrical safety**

- Adequately rated and quick response circuit breakers, aided by reliable and selective digital or microprocessor based electromagnetic protective relays would be incorporated in the electrical system design for the proposed activities.
- The metering and instruments would be of proper accuracy class and scale dimensions. Fire Fighting Facilities

**Fire Fighting Facilities**

All the fire extinguisher system will be controlled by the Security Department. Safety department will consist of qualified safety manager, safety officer and supporting staff.

- Portable fire extinguishers
- Fire Hydrant system
- Sprinkler system employed near fire prone areas
- Fire Buckets

**Table: Details of Fire Fighting Facilities onsite**

| S. No. | Name of site | Type of Extinguisher |
|---|---|---|
| 1 | Cable galleries | $CO_2$& Foam type, Dry chemical powder |
| 2 | High voltage panel | $CO_2$& Foam type, Dry chemical powder |
| 3 | Control rooms | $CO_2$& Foam type, Dry chemical powder |
| 4 | MCC rooms | $CO_2$& Foam type, Dry chemical powder |

| | | |
|---|---|---|
| 5 | Pump Houses | $CO_2$& Foam type, Dry chemical powder |
| 6 | Guest houses and offices | Dry chemical powder, foam type |
| 7 | Godowns | Foam type |
| 8 | Bunkers, Silo, enclosed dust collector | $CO_2$ type, $N_2$ type, automatic sprinkler, fixed spray nozzle(unless water reactive) |

**Personal Protective Equipment (PPE)**

Personal Protective equipment kept onsite are made readily available to plant personnel. **Table** shows the lists of recommended Personal Protective equipment (PPE) onsite.

**Table: Summary of Recommended Personal Protective Equipment According to Hazard**

| | Workplace Hazards | Suggested PPE |
|---|---|---|
| Eye and face protection | Flying particles, molten metal, gases or vapors, light radiation | Safety glasses with side-shields, protective shades, etc. |
| Head protection | Falling objects, inadequate height clearance, and overhead power cords | Plastic helmets for top and side impact protection |
| Hearing protection | Noisy Areas | Hearing protectors (ear plugs or ear muffs) |
| Foot protection | Failing or rolling objects, points objects. Corrosive or hot liquids | Safety shoes and boots for protection against moving and failing objects, liquids and chemicals |
| Hand protection | Hazardous materials, cuts or lacerations, vibrations, extreme temperatures | Gloves made of rubber or synthetic material (Neoprene), leather, steel, insulation materials, etc. |
| Respiratory protection | Dust, fogs, fumes, mists, gases, smokes, vapors | • Facemasks with appropriate filters for dust removal and air purification (chemical, mists, vapors and gases).<br>• Single or multi-gas personal monitors, if available |
| | Oxygen deficiency | Portable or supplied air (fixed lines). Onsite rescue equipment |
| Body / leg protection | Extreme temperatures, hazardous materials, biological agents, cutting and laceration | Insulating clothing, body suits, aprons etc. of appropriate materials |
| Fly Ash | Fly ash handling and storage | • For handling, dust-proof goggles and rubber or PVC gloves.<br>• For large quantities or where heavy |

| | Workplace Hazards | Suggested PPE |
|---|---|---|
| | | contamination is likely, wear: coveralls.<br>• For high dust levels, wear: a Full-face Class P3 (Particulate) or an Air-line respirator.<br>• For inhalation risk exists, wear: a Class P1 (Particulate) respirator. |