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Occupational Health and Safety Requirements for Foundry and Construction Workers in India

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"Nothing in this world is more precious than a Human life, Please work safely"
"All accidents are preventable"
"Safety Ever – Accidents Never"
"Work safely all the while – Go home with a joyful Smile"

INTRODUCTION

These are some of the very famous quotes prevalent in the industrial sectors all over the world which you can see displayed at the entrance of any Construction Site, manufacturing unit or nearby the office of any RCM i.e. Resident Construction Manager / Safety Officer in any factory.

The Purpose of displaying such a motivational slogan is to make every person aware that Safety is most important for them in their routine as well as non-routine work.

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At present, both construction work, as well as foundry related work activities, are the second-largest activities, next to agriculture work in India which give a tremendous boost to our country's economy. Construction, as well as Foundry segments, are **labour – intensive** which employs around 60 million people of unorganised and organised sectors in India.

The OH&S (Occupational Health and Safety) management in Foundry divisions and Construction sites is quite a herculean task due to its nature of work, ever-changing locations of construction sites and adverse work environments.

Foundry Work and Major OH&S Risks to its workers

The history of the foundry is thousands of years old and it is evident in ancient metallic objects like coins, arrows, swords and household articles found from the excavations of Harappa and Mohanjodaro. In the history of mankind, there are many proofs of foundry practices like melting ore and pouring it into suitable moulds are observed in many Egyptian, Roman and Indian historical scriptures.

Some major Occupational Health and Safety hazards and environmental risks in the foundry industry are as follow :

1. Emission of heat rays, toxic fumes, dust, noise, vibration and gases during foundry operation and its exposure to working people and causing ill-health.
2. Exposure to hazardous chemicals which also incorporate some hazardous substances and dangerous goods which are sometimes ozone depleting substances(ODS) and globally banned chemicals which result in the significant environmental impact
3. Risk of burn injury due to hot liquid splash from molten metal during melting, handling and pouring operations
4. Risk of flying objects during knock-out operations of moulds, grinding and chipping work etc.
5. Risk of Physical injuries due to Manual tasks like material handling.
6. Mechanical and electrical risk while using plant equipment and machinery
7. Radioactive rays hazards during Radiographic Test of Metal using X-ray Machines and isotopes
8. Explosion and Fire Hazards during poured metal casting, heating and hot works.
9. Generation of hazardous sludge, effluent water during hot metal quenching activities
10. Slip, trip and fall due to poor housekeeping etc.
11. Heat stress due to High temperatures and its direct infrared radiation to foundry workers

Required Safety Compliances for Foundry workers

Following are some key Safety statutes (with latest amendments) which are applicable to a factory running foundry and casting operations:

- The Factories Act, 1948 with applicable state factory rules
- Petroleum Act, 1934 with applicable State Petroleum Rules.
- Explosives Act, 1884 with applicable state Explosives Rules.
- Gas Cylinder Rules, 1981
- Static & Mobile Pressure Vessels (Unfired) Rules, 1981
- Electricity Act, 2003/ Indian Electricity Rules, 1956
- Motor Vehicles Act, 1988 /Central Motor Vehicles Rules, 1989
- Acts and rules of related to social security, i.e. the Employees' Provident Fund and Miscellaneous Provisions Act, the Employees' State Insurance Corporation Act, the Employees' Compensation Act and the Maternity Benefits Act etc.
- Any other rules, i.e. local laws and rules, Safety expectations applicable to them

Note: Several industrial safety and welfare laws i.e. The Factories Act, 1948, The Dock Workers (Safety, Health and Welfare) Act, 1986, The Mines Act, 1952, The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996, The Contract Labour (Regulation and Abolition) Act, 1970 etc. shall be amalgamated by **The Labour Code on Occupational Safety, Health and Working Conditions**.

Though there are many other acts, International Standards and regulations which are applicable over foundry related industries and emphasis over health and safety compliances of foundry workers but in this article, the specific provisions of the Factories Act, 1948 as laid down in its Section 11 to 49 are being mentioned on macro-level which is mentioned as follow:

Required Health Measures	**Required Safety Measures**	**Required Welfare Measures**
• Cleanliness • Disposal of	• Fencing of Machinery • Safety during Work on near	• Adequate drinking water facility, Washing and lightening facilities,

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waste and effluents • Adequate Ventilation of Heat, dust and fumes • Adequate lighting • Drinking water • No overcrowding • Artificial humidification	machinery in motion – Only trained person with tight clothing shall be allowed • Detailed Health and Safety Policy to be established • Pre-employment Health and Medical examination by a certified Medical surgeon including pulmonary function tests and chest X-ray • Employment of Safety Officer 1000 or more workers • Young person (Apprentice) should be forbidden to work on dangerous machines • Screens and suitable goggles to be provided for protection of eyes. • First-Aid facilities to be provided. First Aid box to be maintained (contents of the box shall be provided as per the prescribed State Factories Rules) • Adequate number of fire extinguishers to be provided • Maintenance of machines to be done periodically along with examination report i.e. Hoist and lifts (Yearly) / Pressure plants (Half Yearly)/ Lifting machines, Wire Ropes, Chain Pulley blocks (Yearly) / Plant and Machinery (Yearly) etc. • Protection against dangerous fumes, gases etc • Safety of building and machinery • Maintenance of building **Safety Measures related to Hazardous Processes** • Constitution of Site Appraisal Committee • Compulsory disclosure of information by occupier • Specific responsibility of occupier related to hazardous process operations • Emergency Preparedness Standards • Permissible limits of exposure of chemical and toxic substances • Workers participation in safety management • Right of workers to warn about imminent danger	adequate ventilation etc. to be provided • Re-examined by a Certifying Medical Surgeon at the frequency of at least once in every twelve months and to keep a record in the form of the medical history of every worker engaged in hazardous operations • Rest Room to be provided – more than 150 workers • Employment of Welfare Officer – 500 or more workers • Notice of appointment/change of occupier should be filed in prescribed Form number -Within 15 days of appointment/change • Notice of appointment/change of manager should be filed in a prescribed form within 07 days of appointment/change • Facility of Crèche, If more than 30 women are employed • Canteen – On employment of more than 250 workers

Section 7 A of the Factories Act, 1948 imposes a specific duty on the **Occupier** to ensure health, safety and welfare of all workers while they are at work in the factory

History of Construction Work

The History of Construction work is far older than foundry. In fact, it is as old as civilization itself. Construction Industry has developed through the ages and created the fine monuments such as the exquisite ancient temples, the massive Pyramids of

Egypt, the Taj Mahal and the modern wonders of complex and tall structures like Unity of Statue, beautiful dams and robust bridges which are shining marvels of Civil engineering and glory of Construction industries.

But all this glory of Construction and shining marvels of Civil engineering based upon the hard toil of our all those civil workers who have contributed their days and nights in construction activities facing its associated safety risks and hazards.

Why the accident rates at any construction site are always high?

The accident rate in construction Site is high due to one major factual reason and that reason is – the Migrant labourers especially the labour workers coming from rural areas with no educational background or a very low education level, their NIL or very less experience to forecast the unknown construction related dangers and very important – **No safety awareness to use PPEs** (Personal Protective Equipment like Hard hat helmet), Full Body Safety Belt, Use of Safety net, Safety Goggles, Hand gloves, safety shoes etc.). No use of PPEs makes them prone to risks. At present, the construction labour is readily available at every corner of cities and most construction companies hire them through middleman (contractor) without measuring their competency to perform specific construction work activities. Such construction workers usually **join construction site with their family including women workers and children** which further aggravate the safety risks.

Common Major OH&S Hazards and Risks to Construction workers

Following are some major occupational health and safety hazards and environmental risks in the construction industries and their causes:

- Risk of falling from height/weak scaffolding structures, falling of objects, cave-ins and Mechanical Hazards

Falling from height, fall from ground to ground or ground to deep pits are most common Safety risks at construction sites. Any person may fall into the manually dug out pits/ deep foundations or into excavated pit due to its weak shoring. In such cases, most of the workers have risk of entanglement or engulfment due to nearby soil of earth may fall on the workers working in the construction pits.

Maximum mishaps occur during working at height by construction workers with no use of Safety belts. While working on height, maximum chances of accidents are due to broken ladders, incorrect scaffolding, improper use of ladders etc.

A site where poor housekeeping is there and work area is not clean or tidy, there some unwanted material objects like sharp objects, tools, construction waste are lying around which further create safety risk or aggravate the safety, health and environmental hazards.

- Risks of electrostatic discharges and Electrical Shock

Such accidents may be occurring if electrical equipment are used in wet/waterlogged or any moist /damp areas. Risks of electrical shocks are also increased if electrical connections are overloaded or left free on the ground.

Burns, shocks, fire and electrocution can be resulted due to Short circuit, electrical flash and loose electrical connections /electrical bare wire etc at any construction site.

- OH&S Hazards and Risks during Lifting or Rigging

When Heavy loads are to be lifted and to shift this load by means of Lifting Equipment i.e. Mobile cranes and sometimes the cranes get overturned due to unsafe lift plan. At Construction sites, Overturning of Mobile Cranes can result in a big financial loss and most dangerous loss i.e. loss to human life.

- OH&S Hazards and Risks in Confined Space

Whereas working into the confined spaces especially those spaces which are having a very limited ingress or exit can become dangerous to life due to deficiency of oxygen, availability of any toxic and flammable gas /substances inside confined space.

- Other OH& S Hazards and Risks at construction Sites

1. Thermal Hazards (Immense heat, fire or Use of Cryogenic substances etc.)
2. Chemical hazards (toxic dust of sand or cement etc / chemical particle's fumes, gases and vapours etc.)
3. Radiation Hazards (i.e. ultraviolet radiation, ionizing hazards due to use of Radioactive test Equipment)
4. High Noise
5. Biological hazards (Bacterial development, Insect (Snake/ mongoose /wasp etc) Bite, storage of pathogenic material, Development of fungus and further skin diseases, etc.)
6. Low or High humidity, low visibility, ergonomic hazards like back / neck/ body pain due to awkward work positions, etc.)

Most Common Reasons of High trends in Construction related Accidents

1. No Fulfilment of associates Statutory and Safety Compliance at Construction Sites
2. Negligence of Contractors and Site In charges

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3. Unskilled Construction Labour and no Safety awareness to them
4. Defected Construction Machinery
5. No periodical examination of equipment. Use of Jugad (temporary provision)
6. Psychological stress in speedy Project Execution which generate safety gaps
7. No barricading
8. No warning signs
9. Unsafe behaviour to work
10. Drug addiction

Required Safety Compliances for Construction workers

In India, The construction labour workers establish a major portion of unorganized sector and are categorized by their temporary, short/prolonged/uncertain working hours, casual nature of employment, a temporary relationship with their contractor or employer, inadequacy of basic welfare facilities and amenities and lack of safety and health measures etc.

There are many legislature sections and provisions providing safeguards for contract workers in India. In addition to the other safety related acts applicable over industrial workers except provisions of the Factories Act, 1948 and the Mines Act, 1952 in major construction areas and where there is a construction of residential houses for private purposes with a cost not exceeding INR 10 lakhs, there are two major pieces of legislation governing health and safety laws. These areas:

1. The Building and Other Construction Workers (Regulation of Employment and Condition of Services) Act, 1996.
2. The Building and Other Construction Workers (Regulation of Employment and Condition of Services) Central Rules, 1998

Who is responsible to ensure safety of the construction workers?

Likewise, Factories Act, an Employer shall be responsible for Safety, health and Welfare provisions for Construction workers. Every employer of an establishment to which the BOCW Act applies is required to register the establishment with the registering officer.

Who is an Employer as per The BOCW Act 1996?

1. The Head of Department or the authority specified (in case of construction work is carried out directly by any department of the Government)
2. The Chief Executive Officer (in case of construction work is carried out directly by local authorities or other establishments), or
3. The Contractor (in case of construction work is carried by or through contractors)

Some Key Compliance Requirements as per the BOCW Act and Rules are as following:

Rule 34 : Protection against harmful effects of excessive noise level
Rule 35: Provision of Fire Extinguishing Equipment
Rule 36: Emergency Action Plan
Rule 37: Fencing of Motors etc
Rule 38: Lifting and carrying of excessive weight
Rule 39: Health and Safety Policy
Rule 45: Eye Protection
Rule 46: Head Protection and other protective apparel
Rule 47: Electrical Hazards
Rule 54: Use of Safety Helmets and Shoes
Rule 56(1): Test of Lifting Appliances
Rule 56(2): Periodical Examination of lifting appliances
Rule 61: Identification and marking of safe working load
Rule 64: Operation of lifting appliances
Rule 208: Safety Committee
Rule 209: Safety Officer over every 500 workers
Rule 213: Precautions during handling of explosives
Rule 223: Medical examination of building workers

At Every Construction Site, there shall be the mandatory Display of:

a) Registration Certificate – A copy of the certificate of registration shall be displayed at the conspicuous places at the work premises
b) Abstract of the BOCW Act- In English/ Hindi (language understood by the majority of workers) at prominent place of construction Site wherever workers get assemble in routine work (i.e. Security Gate / Nearby Attendance Punching machine/canteen etc)
c) Health and safety policy- In English/ Hindi (language understood by the majority of workers)
d) Awareness About Electrical hazards- In English/Hindi (language understood by the majority of workers)
e) Display of Danger/Warning signs, barricades/Marking of Safe Working Load (SWL)/signals etc
f) Marking at outside of Toilets as "Men Only"/"Women Only in a language understood by the majority of people.
Register of Periodical Test, Examination and Certificates thereof: Register in Form number XXVI, Form number V, Form number VI, Form number VI, Form number VII, Form number VIII, Form number IX, Form number XXVI to be maintained by Employer at Construction Site.

Conclusion

All over the world, we, the Indians are famous for our mega construction project and high skill set.

We are the maker of 597 feet high Statue of Unity – the tallest statue in the world.

We over selves have to be vigilant over fulfilling Safety compliances at our workplace by making our hard-working and dedicated workers aware of Safety norms.

Safety means “No harm to anyone” and it is the responsibility of all, all means every person engaged in that work activity from top to bottom level. Safety Culture demands involvement and participation of all.

Everyone must shoulder the responsibilities to identify the potential hazards and hidden risks before start work whether it is any foundry, any workshop, any construction site, a playground or even we work at home. Everyone must apply his best efforts to eliminate these Safety hazards in order to develop a Total Safety Culture at the workplace and then only we can **MAKE EVERY DAY A SAFE DAY.**