

25 Safety Guidelines for Iron & Steel Sector

INDIA, 2019



इस्पात मंत्रालय
MINISTRY OF
STEEL

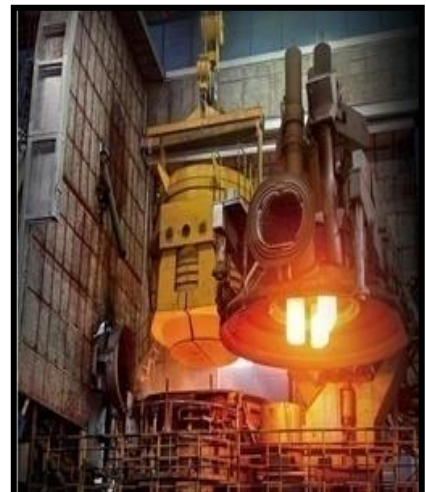


Table of Contents

1.0	Introduction to Iron & Steel sectors in India	-----	
1.1	Industry Background	-----	3
1.2	Industry Structure	-----	3
1.3	Overview of steel sector	-----	4
2.0	Occupational Safety & Working Conditions Management in India- An overview	-----	
2.1	Major laws relating to Occupational Safety & Working Conditions Management	-----	6
2.2	Other related legislations on Safety, Health and Environment	-----	6
2.3	International Labour Standards on Occupational Safety and Health (OSH) standards	-----	7
2.4	Authority or body Responsible for Occupational Safety & Working Conditions Management	-----	7
3.0	Status of Safety in the Steel Industry	-----	8
4.0	Hazards in Steel Industry	-----	
4.1	Hazards in Primary/ Integrated Steel Making	-----	8
4.2	Causes of incidents	-----	12
4.3	Hazards in Mini Steel Plant / Processing Units	-----	13
5.0	Background	-----	14
6.0	Objectives	-----	14
7.0	Scope of Work	-----	14
8.0	Application	-----	15
9.0	Methodology	-----	15
10.0	Safety guidelines for Iron & Steel Sector	-----	16
11.0	References	-----	17

1.0 Introduction to Iron & Steel sectors in India

1.1 Industry Background

Steel is a product of large and technologically complex industry having strong forward and backward linkages in terms of material flows and income generation. It is also one of the most important products of the modern world and of strategic importance to any industrial nation. From construction, industrial machinery to consumer products, steel finds its way into a wide variety of applications. It is also an industry with diverse technologies based on the nature and extent of raw materials used. In India, steel has an output multiplier effect of nearly 1.4X on GDP and employment multiplier factor of 6.8X.

At the time of independence in 1947, India had only three steel plants - the Tata Iron & Steel Company, the Indian Iron and Steel Company and Visveswaraya Iron & Steel Ltd and a few electric arc furnace based plants. The period till 1947 thus witnessed a small but viable steel industry in the country, which operated with a capacity of about 1 million tonne and was completely in the private sector. From the fledgling one million tonne capacity status at the time of independence, India has now risen to be the 2nd largest crude steel producer in the world and the largest producer of sponge iron. As per official estimates, the Iron and Steel Industry contributes around 2 per cent of the Gross Domestic Product (GDP) and employs about 25 lakh people directly or indirectly. From a negligible global presence, the Indian steel industry is now globally acknowledged for its product quality. As it traversed its long history since independence, the Indian steel industry has responded to the challenges of the highs and lows of business cycles.

1.2 Industry Structure

The industry in India is classified based on the nature of the manufacturing companies into Integrated Steel Producers (ISP) and Secondary Producers.

Integrated Steel Producers are companies that are present throughout the steel value chain - starting from the extraction of Iron Ore to the manufacturing and marketing of finished steel. The Integrated Steel Producers account for around 55.0 % of finished steel production in India. The integrated steel players in India include Steel Authority of India, Rashtriya Ispat Nigam Limited (Vizag Steel), Tata Steel, JSPL, JSW Steel and Essar Steel.

The Mini Steel Plant/ Processing Units in the iron and steel industry which accounts for about 45 % total finished steel production, is composed of production units which are a diverse lot with widely varying product range, technology and scale of operation and include major product/industry segments such as pig iron produced by mini blast furnaces (MBFs), sponge iron, steel produced in electric arc (EAFs) or Induction Furnaces (IFs),

standalone cold rolled steel sheets and coils producers, re-rollers producing hot rolled long products such as rebars, wire rods and structurals, standalone GP/GC and color coated steel sheets/coil producers, wire drawing units, standalone tinplate producers etc. The units covered under the Secondary Sector produce either a product that serves a basic raw material to steel making such as pig iron or sponge iron or they use a semi finished or intermediate steel product to convert the same to another product of higher value. The sector also includes crude steel (semi finished products such as ingots, billets and blooms) produced using electric arc or induction furnaces using scrap or DRI in capacities less than one million tonne a year. These units are generally small in size compared to the integrated steel

1.3 Over view of steel sector

1.3.1 Global Scenario

- In Jan-May 2019, the world crude steel production reached 764.072 million tonnes (mt) and showed a growth of 5.03% over Jan-May 2018.
- China remained world's largest crude steel producer in same period (404.879 mt) followed by India (45.314 mt), Japan (42.294 mt) and the USA (37.169 mt).
- World Steel Association has projected Indian steel demand to grow by 7.1% in 2019 while globally, steel demand has been projected to grow by 1.3% in 2019. Chinese steel use is projected to show 1.0% growth in 2019.
- Per capita finished steel consumption in 2018 was 224.5 kg for world and 590.1 kg for China (Source: World Steel Association). The same for India was 70.9 kg in 2018.

1.3.2 Domestic Scenario

- The Indian steel industry has entered into a new development stage, post de-regulation, riding high on the resurgent economy and rising demand for steel. Rapid rise in production has resulted in India becoming the 2nd largest producer of crude steel during 2018, from its 3rd largest status in 2017.
- The country is also the largest producer of Sponge Iron or DRI in the world and the 3rd largest finished steel consumer in the world after China & USA.
- In 2018-19, production of total finished steel (alloy + non alloy) was 131.572 mt, a growth of 3.7% over last year.

1.3.3 National Steel Policy-2017

With passage of time and continued growth in the domestic steel industry, it was felt that the NSP 2005 needs to be in sync with changing times.

Accordingly, after a detailed review, the Government has released the National Steel Policy 2017, which has laid down the broad roadmap for encouraging long term growth for the Indian steel industry, both on demand and supply sides, by 2030- 31, with a vision to create a technologically advanced and globally competitive steel industry that promotes economic growth.

The National Steel Policy aims at building a globally competitive industry with a crude steel capacity of 300 MT by 2030-31 from present level of 125 million tons per annum (MTPA) and increase per Capita Steel Consumption to 160 Kgs. by 2030-31 amongst other objectives.

The creation of additional capacity for fulfilling the anticipated demand will require significant capital investment of about Rs. 10 lakh Crore by 2030-31 and will also increase employment in the range of 6 36 Lakhs by 2030-31 from the current level of 25 Lakhs i.e. around 1 million additional work-forces through direct & indirect opportunities. Hence ensuring safety of the people going to be deployed in executing the new projects along with that of existing manpower would be a crucial factor amongst others in achieving the policy objectives and sustainable growth of industry as well.

2.0 Occupational Safety & Working Conditions Management in India- An overview

Under the Constitution of India, labour is a subject in the concurrent list (under 7th schedule) where both the Central and the State Governments are competent to enact legislation subject to certain matters reserved for the Central Government. The Constitution of India provides detailed provisions for the rights of the citizens and also lays down the principles in the governance of the country called as “Directive Principles of State Policy”. These Directive Principles provide for securing the safety and health and strength of employees, men and women, that the tender age of children are not abused, that citizens are not forced by economic necessity to enter avocations unsuited to their age or strength (Article 39), just and humane conditions of work and maternity relief are provided (Article 42), that the Government shall take steps, by suitable legislation or in any other way, to secure the participation of employee in the management of enterprises, establishments or other organizations engaged in any industry (Article 43A), for ensuring that no child below the age of 14 is employed to work in any factory or mine or engaged in any other hazardous employment (Article 24).

On the basis of Directive Principles as well as international instruments, the Government of India, Ministry of Labour & Employment, had declared the

National Policy on Safety, Health and Environment at Workplace (NPSHEW) on 20th February, 2009. The purpose of this National Policy is to establish a preventive safety and health culture in the country through elimination of the incidents of work related injuries, diseases, fatalities, disasters and to enhance the well being of employees in all the sectors of economic activity in the country.

2.1 Major Laws relating to Occupational Safety & Working Conditions Management

There are four main legislations that cover Occupational Safety & Working Conditions Management at workplace.

- (i) The Factories Act, 1948 , covering factories wherein the enforcement of safety at workplace is by the Chief Inspector of Factories in the respective states,
- (ii) The Mines Act, 1952 and Mines Rules, 1955 for mining industry where the enforcement is by the Directorate General of Mines Safety (DGMS) under Ministry of Labour & Employment , Government of India,
- (iii) The Dock Workers (Safety, Health and Welfare) Act, 1986 followed by notification of the Dock Workers (Safety, Health and Welfare) Regulations, 1990 dealing with the major ports of India and the enforcement is by the Directorate General of Factory Advice Service & Labour Institutes (DGFASLI), under Ministry of Labour & Employment , Government of India, and
- (iv) The Building & Other Construction Workers (Regulations of Employment and Conditions of Service) Act, 1996 , covering construction workers at construction sites wherein the enforcement is by the Directorate General Labour Welfare in the central sphere and by the Labour Commissioners/Factory Inspectorates in the States/UTs

2.2 Other related legislations on Safety, Health and Environment

Apart from the four main legislations mentioned above, there are legislations relating to certain substances, machinery, environment which also addresses certain issue of Occupational Safety & Working Conditions. These statutes are applicable to all sectors including the unorganized sectors:

- a) The Indian Boilers Act, 1923 (amended 2007)
- b) The Dangerous Machines (Regulation) Act, 1983
- c) The Motor Transport Workers Act, 1961 (amended 1986)
- d) The Shops and Commercial Establishments Acts
- e) The Explosives Act, 1884 (amended 1983)
- f) The Petroleum Act, 1934
- g) The Inflammable Substances Act, 1952
- h) The Insecticides Act, 1968 (amended 2000)
- i) The Oil Fields (Regulation and Development) Act, 1948
- j) The Petroleum and Natural Gas Regulation Board Act, 2006
- k) The Environment (Protection) Act, 1986 (amended 1991)
- l) The Water (Preventions Control of Pollution) Act, (Amended 1988)
- m) The Water (Prevention & Control of Pollution) Cess Act, 1977 (Amended 2003)
- n) The Air (Prevention & Control of Pollution) Act, 1981 (Amended 1987)
- o) The Public Liability Insurance Act, 1991 (Amended 1992)
- p) The Motor Vehicles Act, 1988 (Amended 2013)
- q) The Atomic Energy Act, 1962 (Amended 1987)
- r) The Electricity Act, 2003 (Amended 2007)
- s) The Disaster Management Act, 2005
- t) Employees' Compensation Act of 1923
- u) The Employee's State Insurance Act, 1948

2.3 International Labour Standards on Occupational Safety and Health (OSH) standards

The following Conventions related to Occupational Safety and Health are ratified by India.

- a) C032 -Protection against Accidents (Dockers) Convention (Revised), 1932 (No.32)
- b) C 045- Underground work (Women) convention, 1935
- c) C127 - Maximum Weight Convention, 1967 (No. 127)
- d) C136 - Benzene Convention, 1971 (No. 136)
- e) C174 - Prevention of Major Industrial Accidents Convention, 1993 (No. 174)
- f) C No. 115- Radiation Protection Convention, 1960

2.4 Authority or body Responsible for Occupational Safety & Working Conditions Management

The occupational safety and health is one of the subjects allotted to Ministry of Labour & Employment (MoL&E), under the Government of India, allocation of Business Rules. To deal with the subject relating to Occupational Safety & Working Conditions Management in the case of Factories, the same is implemented by the State Governments under the Chief Inspector of Factories. In case of Mining, the implementation is under the Directorate General of Mine Safety (DGMS). As for Port Sector (i.e. twelve major ports) the implementation is under the Directorate General of Factory Advisory Services (DGFASLI). A separate division on industrial safety and health exists in the MoL&E. The Industrial Safety and Health division of the Ministry discharges the overall functions relating to policy decisions and laying down guidelines for countrywide adoption in the above sectors.

The Ministry also carries out liaison with the International Labour Organisation (ILO) and other countries. The Ministry undertakes co-ordination at the national level by periodically convening the State Labour Ministers Conference and State Labour Secretaries Conference, in which policy matters and issues on uniformity in labour laws are discussed. Directorate General Factory Advice Service & Labour Institutes (DGFASLI) and Directorate General of Mine Safety (DGMS) assist the Ministry in the technical aspects of occupational safety and health in the above sectors.

Chief Inspector of Factories (CIFs)/ Directorate of Industrial Safety and Health (DISH) of respective State Governments/UTs are dealing with enforcement of the Factories Act, 1948 and the State Factories Rules framed there under for the factories registered under the said Act in the aspect of occupational safety and health in the manufacturing sector.

Director General Labour Welfare (DGLW) (Labour welfare organization) is dealing the matters concerning policy and legislation related to workers in the un organized sector and administration of welfare funds for specified categories of workers through nine regions headed by welfare commissioner who implement the welfare schemes made under the welfare funds.

DGLW also deals with Rashtriya Swasthya Bima Yojana (RSBY). DGLW enforces the various Labour laws and rules made there under in the central sphere including the Building and other Workers (Conditions of Service and Regulation of Employment) Act, 1996 for the workers working in the construction sector.

3.0 Status of Safety in the Steel Industry

Occupational Safety & Working Conditions is relatively neglected area by Indian industry and because of this while India has approximately 3% share of global manufacturing, India has almost 30% share of the industrial fatalities globally. Even Steel industry in India lags its global peers on this parameter and has patchy safety performance with many major incidents involving multiple fatalities. Most of the companies actually do not even have a proper safety management system comparable to global best practices. Though most of large ISPs are OHSAS- 18001 certified, never the less their contribution in workplace fatalities is not insignificant. Contractor workers which accounts for nearly half of the manpower deployed in steel industry are more susceptible to incidents as they are unskilled, not so educated and unaware of the hazardous work environment. However, in spite of all efforts, their share in fatalities continues to be higher on year to year basis. Safety is still being managed in isolation and not as an essential / integral part of overall business decisions, culture & performance in most of the organizations. Efforts for benchmarking by taking lessons from past failures & good practices from peer industry are limited to few organizations only.

4.0 Hazards in Steel Industry

4.1 Hazards in Primary/ Integrated Steel Making

Integrated Iron and Steel Industry inherently has many potential hazards which need to be mitigated properly. The Industry has been classified as hazardous process industry as per Chapter 1 Sec-2 (cb) of Factories Act 1948 (Amended in 1987). The hazards mainly emanate from extremely high temperature process involving liquid metal, generation of by-product gases which have toxic and explosive constituents, large amount of material handling/ transporting and manpower intensive multi-unit operations. The hazardous chemicals, electricity, steam, working at height, working in confined space etc. in addition to project activities add to the risks, especially when they are carried out besides the existing operating units.

The various hazards along with the areas of their presence are enumerated in the table below-

Type of Hazard/Risk	Major areas where Hazard is faced
Toxic gases (rich in Carbon monoxide)	All over the plant
Explosive Gases (Rich in Hydrogen and Methane)	All over the plant
Harmful Chemicals	Coal Chemicals plant, CRM
Liquid metal/ slag (burn,	Blast Furnace, SMS, Continuous casting,

explosions)	Foundries
Extreme Temperature (-180 °C to 1700 °C)	Coke Ovens, Blast Furnace, SMS, Continuous casting, Foundries, Rolling Mills and Cryogenic Oxygen Plant
Fire	All over the plant
Electric Shock, Electrocution, Flash over	All over the plant and project sites
Rail/ Road Traffic Movement	All over the plant and project sites
Moving/ Rotating machines (Hit, Caught, pressed etc.)	All over the plant and project sites
Working at Height	All over the plant and project sites
Dust, noise, heat and Vibration	All over the plant
Material Handling	All over the plant and project sites
Confined Space (suffocation/ gas poisoning)	Furnaces, Tanks, Gas Pipelines, Gas holders, Sumps, Pits, Oil cellar, Conveyor/ cable galleries, Silos, etc.
High pressure Steam, Water & industrial gases	All over the plant

The above safety hazards are associated with varying levels of risks which may lead to injuries as given in the table below-

Sl. No.	Type of hazards
A	Physical Hazards
Sub type	Hazard description / Risk
Noise	Exposure to noise levels exceeding those set by the competent authorities may result in noise-induced hearing loss. Exposure to high noise levels may also interfere with communication and may result in nervous fatigue with an increased risk of occupational injury.
Vibration	Exposure of workers to hazardous vibration is mainly known as: (a) whole-body vibration, when the body is supported on a surface that is vibrating, which occurs in all forms of transport and when working near vibrating industrial machinery; or (b) Hand-transmitted vibration, which enters the body through the hands and is caused by various processes in which vibrating tools or work pieces are grasped or pushed by the hands or fingers.
Heat and cold stress	Risks arise in special conditions: (a) temperature and/or humidity are unusually high; (b) workers are exposed to high radiant heat; (c) high temperatures and/or humidity occur in combination with heavy protective clothing or a high work rate; (d) temperature is unusually low;

Lack of proper illumination	Poor lighting affects the Occupational Safety & Working Conditions of people at work causing symptoms like eyestrain, migraine and headaches. Symptoms of this include headaches, lethargy, irritability and poor concentration.
Work equipment and machinery guarding	The use of work equipment, including machinery and hand and portable power tools, may result in incidents, many of which are serious and some fatal. Lack of guards or inadequate guards, interlocks, safety devices, improper maintenance, no adherence to SMPs etc. can lead to incidents caused by entanglement, sheering, crushing, trapping, cutting, etc.
Cranes and hoists	All machinery used to lift and/or transport equipment, materials, molten metal or slag should be designed, constructed and erected, inspected, maintained and operated as specified by the manufacturer/ site specific SOPs/ SMPs which otherwise would lead to crane failure / overturning , failure of tools & tackles like slings etc. leading to material slippage, hitting nearby structures/ overhead line etc.
Control of hazardous energy	The iron and steel industry regularly uses different sources of energy (electric, mechanical, hydraulic, pneumatic, etc.). The safe control of energy should be addressed by procedure and carried out by appropriately trained personnel in accordance with the nature of the energy source and the characteristics of the facilities.
Falling objects	Failure to properly secure loose materials at height, maintaining proper stack heights, preventing unauthorized entry etc. leading to fall of objects and hitting a nearby person
Slips, trips and falls	Inadequate housekeeping, improper covers on opening, unsuitable platforms or walkways equipped with handrails and protective barriers etc. may lead slip & trip injuries. Fall from height may occur due to non -usage of fall arrest equipment.
Rail & road transport	Internal transport, such as road and rail vehicles, transfer cars etc. used in the transport of raw materials, intermediates, products, waste etc. has the potential to cause injuries to workers and other people. The hazards can be caused by interaction between vehicles, vehicles and other objects and personnel, or by loads falling off or from the vehicle.
Fire & explosion	Steel Plants stores & handles number of flammable chemicals like tar, naptha, benzol, fuel gases, oils, LPG, Propane, Oxygen etc. which possess potential fire & explosion hazards. Hot metal/ slag sparks, welding sparks, electrical short circuiting etc. can also lead to fire in surrounding areas if combustible materials are present.
Confined spaces	Bin, silos, tunnels, ESPs, manholes, etc. are examples of confined spaces where entry of persons & carrying out jobs requires special precautions. Toxic or flammable gases, oxygen displacement and engulfment are the principal

	hazards.
B	Chemical Hazards
Sub type	Hazard description / Risk
Chemicals in the workplace	<p>These substances may present a hazard as the result of contact with the body or absorption into the body. Absorption can occur through the skin, by ingestion or by inhalation.</p> <ul style="list-style-type: none"> • Chemicals can have acute (short-term) and/or chronic (long-term) Health effects. • Chemicals may present a safety hazard as a result of their chemical and physical properties.
Inhalable agents (gases, vapours, dusts and fumes)	<p>The production of iron and steel involves the consumption and generation of a variety of inhalable agents including, but not limited to, gases, vapours, dusts, fumes, smokes and aerosols. These agents comprise a variety of toxicological hazards including irritants, chemical asphyxiants, fibrogens, allergens, carcinogens and systemic toxicants. The pulmonary system (lungs) can be affected by exposure to harmful agents through acute (short-term) injury to lung tissue, the development of pneumoconiosis, pulmonary dysfunction and the development of lung cancer. Silica dust is most harmful to lungs and causes silicosis. Certain harmful agents that are inhaled through the lungs can cause target organ damage and/or systemic toxic effects. Certain asphyxiants can cause death in a matter of seconds at high concentrations by displacing oxygen. Specific agents that may be found in the iron and steel industry include heavy metals (e.g. lead, chromium, zinc, nickel and manganese) in the form of fumes, particulates and adsorbates on inert dust particles. Acid mists from pickling areas can cause skin, eye and respiratory irritation.</p>
C	Radiation Hazards
Sub type	Hazard description / Risk
Ionizing radiation	<p>All exposure to ionizing radiation should be kept as low as possible, as there is evidence that damage caused by radiation may be permanent, and that there is a significant increase in the incidence of cancer and some types of malignancies, as a consequence of even low doses of ionizing radiation. Radiation levels to be periodically measured through installation of Radiation Detection Equipments as per amended 2nd Schedule of Factories Act.</p>
Non-ionizing radiation	<p>Non-ionizing radiation is usually referred to as ultraviolet (UV), visible and infrared (IR) radiation. Absorption in the UV and visible portions of the spectrum produces photochemical reactions. In the IR region, all of the absorbed radiant energy is converted into heat. Exposure to some radio-frequency and microwave radiation can result in the formation of cataracts of the eye. Exposure of the eyes to visible and IR radiation can cause thermal injury to the retina and damage to the lens, which may result in the formation of cataracts. Exposure of the eyes to UV radiation can result in</p>

	inflammation of the conjunctiva and cornea.
D	Ergonomic Hazards
	Hazard description / Risk
	These hazards are due to tool design, equipment design, job and task design, work station design, and manual handling etc.
E	Psychological Hazards
	Hazard description / Risk
	These hazards are due to shift work, work load, harassment, discrimination, bullying, and stress etc

4.2 Cause of Incidents

As per ILO Code of practice on Safety & Health in the Steel Industry, 2005 Below are the most common causes of injury in the iron and steel industry:

- (i) Slips, trips and falls on the same level;
- (ii) Falls from height;
- (iii) Unguarded machinery;
- (iv) Falling objects;
- (v) Engulfment;
- (vi) Working in confined spaces;
- (vii) Moving machinery, on-site transport, forklifts and cranes;
- (viii) Exposure to controlled and uncontrolled energy sources;
- (ix) Inhalable agents (gases, vapours, dusts and fumes);
- (x) Contact with hot metal, Reactive substances, hazardous chemicals;
- (xi) Fire and explosion;
- (xii) Extreme temperatures;
- (xiii) Radiation (non-ionizing, ionizing);
- (xiv) Noise and vibration;
- (xv) Electrical burn, Electrical Flash and electric shock;
- (xvi) Manual handling and repetitive work etc.

As per World Steel Association (WSA), the five most common causes of safety incidents in Steel Industry worldwide and preventative measures have been identified as follows:

1. **Moving machinery** – Isolate, lock or pin all energy sources before any machinery is accessed.
2. **Working at heights** – Provide regular training, appropriate harnessing equipment and ensure checks are in place when working at height.

3. **Falling objects** – Ensure regular checks are in place to remove or secure objects in risk areas.
4. **On-site traffic** – Ensure all traffic on the site is operated safely, including road, rail and pedestrians, and remove all unnecessary traffic.
5. **Process safety incidents** – Identify potential process safety hazards that could cause explosions or fires and take adequate precautions.

4.3 Hazards in Mini Steel Plant / Processing Units

In most of the Mini Steel Plant / Processing Units, use of old equipment/ technology, abysmal level of safety awareness, lack of proper maintenance, non availability of SOPs/ SMPs, inadequate infrastructure facilities for training & skill development, improper housekeeping, non availability / usage of PPEs., dearth of technical man power, high production targets, duty over stay etc. coupled with lack of management commitment towards safety has been a area of concern. The salient safety hazards in this sector are more or less similar to integrated steel plants as shown below:

Sl. No	Type of hazards	Source of hazards
A	Physical Hazards	<ul style="list-style-type: none"> • Moving equipment like charging crane, conveyors, Moving ladles, tilting furnace etc. • Fugitive Dust at Raw Material Handling section, Crusher, DRI Kiln • Excessive Dust during Loading/unloading operation, • Failure of high pressure steam ,water or oil lines, • Working in confined space like cleaning of silos/ cyclones etc. • Falling of personal from working platform / from height • Noise, heat & vibration
B	Electrocution/ Electrical Hazards	<ul style="list-style-type: none"> • Faulty equipment / Faulty connections/ failure to adhere to SOPs
C	Fire & Explosion	<ul style="list-style-type: none"> • Oil and Lubricant Room (spillage) • Fine Coal Hoppers • Coal Gasifier • Coal Storage area, • Electrical Short circuit • Boiler malfunctioning • ESP malfunctioning • Spilled liquid metal coming in contact with water, • Pool fire may occur in case of direct contact of FO/LDO with flame

Nothing is more important than Occupational Safety & Working Conditions of the people at work. Ensuring safety of the workforce is a fundamental duty for any company management, so a proper management system for addressing safety issues is of paramount importance. After all, excellence in health also produces superior business performance. The most successful steel companies are also the safest.

For this, it is important that Steel Industry should have common safety standards which will serve as reference document for use by all concerned.

5.0 Way Forward

Safety, Health, and improved Working Conditions are pre-requisite for well being of the worker and also for economic growth of the country as healthy workforce would be more productive and occurrence of less accidents and unforeseen incidents would be economically beneficial to the employers also.

Ministry of Steel, GOI has taken the initiative by recognizing the need for formulating the safety guidelines for effective management of risk in the iron & steel sector.

As a way forward, MOS has constituted a Working Group to develop safety guidelines for both large & small producers/ processors in the iron & steel sector.

6.0 Objectives

The Safety guidelines aim to contribute towards:

- i. Protecting workers in the iron and steel industry from workplace hazards;
- ii. Preventing work-related injuries and incidents;
- iii. Assisting and facilitating the improved management of occupational safety issues at the workplace;
- iv. Improving knowledge and competence;
- v. Promoting the implementation and integration of consistent Safety Management Systems with a view to improving working conditions.

7.0 Scope of Work

The scope of work covers Safety guidelines in Iron and Steel sector which includes:

- a) Integrated steel plant (Plants having all range of activities from receiving of Raw material to dispatch of finished product including auxiliary facilities like power plant, oxygen plant, etc).
- b) Mini Steel Plant / Processing Units (Mini Blast Furnaces, Electric Arc Furnace, Induction furnace, Sponge iron plant, Re-rollers, independent hot & cold rolling, galvanizing and coating units etc.)

- c) Project /Construction activities in steel industry.

These guidelines shall not be applicable to Mining industry which are governed by Mines Act, 1952 and Mines Rules, 1955 and safety rules in mining industry are being enforced by DGMS (Directorate General of Mines Safety) under Ministry of Labour & Employment , GOI.

8.0 Application

These Safety guidelines should provide guidance, in accordance with the provisions of national laws and regulations, to:

- a) All the government authorities, workers' and employers' organizations and industry associations, whether legislative or advisory, whose activities influence the Occupational Safety & Working Conditions and welfare of workers in the Iron and Steel industry.
- b) All those individuals at the level of the iron and steel-making facilities, i.e. employers, persons in control of premises, and workers and contractors, as appropriate to their duties and responsibilities for safety and working condition.
- c) All operations in the iron and steel industry.

The provisions of the Safety guidelines may be considered as minimum guidelines. They are not intended to replace applicable laws, regulations. More stringent applicable requirements should have priority over the provisions of the Safety guidelines.

All these guidelines are generic in nature which provides the basic framework; however specific safe practices may be evolved according to process requirements and site conditions by the users.

9.0 Methodology

The following methodology was adopted by the working group constituted by clause no. 5.0.

- a) Study of various safety practices followed across India in Iron & Steel Industry (Primary/ Integrated & Mini Steel Plant / Processing Units/ International Standards).
- b) Enlisting of the mostly applicable & Common Safety guidelines in Iron & Steel Sector.
- c) Compilation of Safety Guidelines and sharing for horizontal deployment
- d) Inputs from Mini Steel Plants / Processing Units incorporated
- e) Stakeholder consultation

10.0 Safety guidelines for Iron & Steel Sector

Sl. No	Description	Annexure
1.	Glossary of terms related to Safety & Abbreviations	I
Safety guidelines for Iron & Steel sector		
1.	Storage, handling & use of gas cylinders	SG/01
2.	Working at Height	SG/02
3.	Working in a Confined Space	SG/03
4.	Permit to Work(Operation & Maintenance)	SG/04
5.	Illumination at workplace	SG/05
6.	Lance cutting	SG/06
7.	Gas cutting & Gas Welding	SG/07
8.	Arc Welding & Arc Cutting	SG/08
9.	Equipment and Machinery guarding	SG/09
10.	Hydraulic System safety	SG/10
11.	Barricading	SG/11
12.	Demolition of Building and Structure	SG/12
13.	Material handling (manual and mechanized) & storage	SG/13
14.	Work on Electric Overhead Travelling (EOT) Crane	SG/14
15.	Electrical safety	SG/15
16.	Fire Safety	SG/16
17.	Excavation	SG/17
18.	Personal Protective Equipment (PPE) Management	SG/18
19.	Operation and Maintenance of Conveyor Belts	SG/19
20.	Oxygen & Nitrogen Gas line	SG/20
21.	Handling of Fuel Gases	SG/21
22.	Energy isolation	SG/22
23.	Safe handling of Liquid Metal	SG/23
24.	Transportation in steel industry	SG/24
25.	Loco Operation	SG/25

11.0 References

- a) Inter Plant Standardization in Steel Industry (IPSS) 1-11 Standards on Personal safety appliances & Procedures
- b) Tata Steel Workplace Safety Standards
- c) SAIL Plants Safety Manual
- d) BIS Standards on Safety
- e) ILO Code of Practice on Safety &Health in Steel Industry
- f) National Steel Policy, 2017
- g) National Occupational Safety and Health (OSH) Profile, Prepared by DGFASLI in collaboration with ILO.