

OCCUPATIONAL HAZARD

“Source or situation with a potential for harm in terms of injury or ill health, damage to property, damage to the workplace environment, or a combination of these” is hazard.

The modern definition of Occupational health is *“The promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations – total health of all at work”*.

Occupational health is concerned with physical, mental and social well-being in humans in relation to his work and work environment, their adjustment to work and adjustment of work to humans

ILOs’ Occupational health services recommendation, 1959 (No. 112) aims with following:

- Protecting workers against any health hazard, which may arise out of work or condition in which it is carried on;
- Contributing towards workers’ physical and mental adjustment, in particular by adaptation of work to workers and assignment to jobs in which they are suitable and;
- Contributing to establishment and maintenance of highest possible degree of physical and mental social wellbeing of workers.

1972 ILO/WHO Conference Recommendations:

Occupational health is a wide field, and during last decade relative importance of its component parts has changed. This changing concept has been linked with scientific progress in relation to occupational health and safety and also with changes in evolution of work and work environment on part of individuals. In past emphasis was on safety, now it is more on health and job satisfaction.

In 1976, 29th session of World Health Assembly directed Director General to promote planning and implementation of comprehensive health programmes for workers, as an integral part of National Health Programmes.

Legal Provisions

The Indian Constitution has shown notable concern to workmen in factories and industries as envisaged in its preamble as Directive Principles of State Policy.

- For securing the health and strength of workers, men and women
- That the tender age of children is not abused
- That citizens are not forced by economic necessity to enter avocations unsuited to their age or strength
- Just and humane conditions of work and maternity relief are provided and,

- That the Government shall take steps, by suitable legislation or in any other way, to secure the participation of workers in the management of undertakings, establishments or other organizations engaged in any industry

The Factories Act, 1948, the Mines Act, 1952, the Dock Workers (Safety, Health & Welfare) Act, 1986 are some of the laws, which contain provisions regulating the health of workers in an establishment. Whereas the Employees State Insurance Act, 1948 and the Workmen's Compensation Act, 1923 are compensatory in nature. These various legal provisions to protect health and safety of the workers are given in Chapter 8. It may be sufficient to indicate at this stage that metallurgical industries are classified as hazardous industry and legal provisions must be adhered to avoid any harm to work force and local residents in the vicinity of the industry.

Occupational health hazard in an integrated steel plants are of two types. One occupational health hazard 1) common to all shops including Raw material/Product handling & 2) Hazards specific to individual Major Shop.

ToR 8 (i) Details of existing occupational and Safety hazards. What are the exposure level of above mentioned hazards and whether they are within permissible exposure level (PEL). if these are not within PEL, what measures the company has adopted to keep them within PEL so that health of workers can be preserved.

A) Common Health hazards in an Integrated Steel Plant are due to dust in eye contact, skin contact, inhalation and ingestion.

Dust

The iron ore and coal are stored in raw material yard. The main health hazard in the storage yard is uncontrolled dust during loading/un loading and transportation of material in the stock yard.

Eye Contact:

Airborne dust may cause immediate or delayed irritation or inflammation. Eye contact with large amounts of dust particles can cause moderate eye irritation, chemical burns and blindness.. Eye exposures require immediate first aid and medical attention to prevent significant damage to the eye.

Skin Contact:

Dust of coal, Iron ore and silicon may cause dry skin, discomfort, irritation, severe burns and dermatitis. These dusts are capable of causing dermatitis by irritation. Skin affected by dermatitis may include symptoms such as, redness, itching, rash, scaling and cracking. Iron ore dust including Benign Pneumoconiosis (siderosis).

Inhalation (acute):

Breathing dust may cause nose, throat or lung irritation, including choking, depending on the degree of exposure. Inhalation of high levels of dust can cause chemical burns to the nose, throat and lungs.

Inhalation (chronic):

Risk of injury depends on duration and level of exposure. This product contains crystalline silica. Prolonged or repeated inhalation of respirable crystalline silica from this product can cause silicosis, a seriously disabling and fatal lung disease. Some studies show that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis may be associated with the increased incidence of several auto immune disorders such as scleroderma (thickening of the skin), systemic lupus erythematosus, rheumatoid arthritis and diseases affecting the kidneys. Silicosis increases the risk of tuberculosis.

Ingestion:

Internal discomfort or ill effects are possible if large quantities are swallowed.

B) Common safety hazards in an Integrated Steel Plant are - Posture, Excess Load, Harmful Contact By Cranes : Defective Tackles, Slings, Excess Load, Wrong Signaling, Working Under Load, Unskilled Operator, Defects in Crane, Improper / Unauthorized Handling and most important is stress

EXPOSURE LIMITS

The exposure limits for Manganese, Crystalline, silica, Coal Dust are as given in the following table.

Airborne concentrations of chemical substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, over a working lifetime, without adverse health effects are threshold limit values.

Exposure Limits of various chemicals used in SSL and diseases caused.

SR. NO.	Raw materials	Chemical Name	*NIOSH TLVTWA (mg/m ³)	Factory Act TLV (mg/m ³)	Target Organs	Symptoms
1	Manganese	Manganese oxide (Mn ₃ O ₄)	1mg/m ³	C*05mg/m ³	Resp. System, CNS, Blood, Kidneys,	Asthenia, insomnia, mental, confusion, low back pain, vomit; maliase, blassitude, kidney damage; pneumonitis

2	Silicon	Si	- 10mg/m ³ (total)	10600/(%	Eyes, Skin,	Irritation eyes, skin, upper
	(a) Crystalline			Quartz+10 mg/m 10/(%respi rable	Resp sys.	respiratory; cough
	(b) Quartz		-5mg/m ³			
	(1) In terms of dust count & (2) In terms of respirable dust.		(respiratory)	Quartz+2) mg/mt. 10/(%respi rable		
3	Coal(Dust)		<5%SiO ₂)2mg/ m ³ as the respirable dust fraction)	Not available	Respiratory system	Chronic bronchitis, decreased pulm function, emphysema
			0.1mg/m ³ (as the respirable quartz fraction)			
4	Iron ore	Iron oxide dust & fume(as Fe) (Fe ₂ O ₃),Iron(III) Oxide	5mg/m ³	5mg/m ³	Respiratory system	Benign pneumoconiosis (siderosis)

*NIOSH-National Institute of Occupational Safety & Health *TWA-Time Weighted Average

*TLV-Threshold limit values *C-Ceiling Limit

6.13 FIRST AID MEASURES

Following first aid measures shall be taken.

Eye Contact:

Rinse eyes thoroughly with water for at least 15 minutes, including under lids, to remove all particles. Seek medical attention for abrasions and burns.

Skin Contact:

Wash with cool water and a pH neutral soap or a milk skin detergent. Seek medical attention for rash, burns, irritation and dermatitis.

Inhalation:

Move person to fresh air. Seek medical attention for discomfort or if coughing or other symptoms.

Falling from height

Proper scaffolding to withstand the load, use of safety belt and other PPEs can protect from injuries.

Ingestion:

Vomiting not to be induced. If conscious, have person drink plenty of water. Seek medical attention.

EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Controls:

- Control of dust through implementation of good housekeeping and maintenance;
- The bag filters will be installed to control dust emission.
- Use of PPE, as appropriate (e.g. masks and respirators)
- Use of mobile vacuum cleaning systems to prevent dust build up on paved areas;

Personal Protective Equipment (PPE):

- Respiratory Protection: When the dust level is beyond exposure limits or when dust causes irritation or discomfort use Respirator.
- Eye Protection: Wear Safety goggles to avoid dust contact with the eyes. Contact lenses should not be worn when handling the materials.
- Skin Protection: Wear impervious abrasion and alkali resistant gloves, boots, long sleeved shirt, long pants or other protective clothing to prevent skin contact.

Preventive Measures

- The storage yards are constructed and maintained as per the guidelines.
- Regular weekly inspections of storage yards will be carried out with regard to proper earthling, adequate fire fighting facilities, any combustible materials, prevention of growth of wild vegetation etc.
- No naked fires will be allowed in and around coal storage areas and height of coal/ coke heap should not be high to prevent auto ignition.

STRESS

The process by which we perceive and respond to certain events, called stressors, that we appraise as threatening or challenging.

Uncertainty at work place cause high level of stress. The cause of uncertainty can be 1) lack of information or instruction what exactly to do or lack of job knowledge. 2) No job satisfaction i.e. boss is not happy with or what boss & colleagues think about his/her ability or 3) receiving vague inconsistent instruction. 4) some times that work place is not safe and catastrophe anticipated due to wrong operation.

With increased stress, blood pressure increases, productivity thoughts decrease and destructive thoughts increase and there is likelihood of taking risky alternatives due to poor judgment and there may be greater tendency of escape behaviors.

Alcohol & stress in combination are deadly and smoking is not the solution considering its long term harmfulness.

Communicating problems at work place to seniors, colleagues; asking in a positive way and executing their guide lines and giving much importance to each & every job that comes on the way can remove stress at work place.

Health Hazard in Major Shops:

Sl. No.	Group	Item	Potential Health hazard	Preventive measures
I	Raw materials and products handling	Iron ore, Mn ore, Coke,	Eye/skin irritation	Water sprinkling’
		Coal , lime stone/Dolo	Respiratory track diseases	Dry fogging in conveyors, ID fan
		Other fluxing minerals	due to Dust, burning due to	bag filter, PPE like safety shoes,
		Product steel	local fire	dust mask and safety goggles.
		Acids/Alkalis		Water jet for eye washing
II Major shops				
	DRI kiln	flue gas CO, dust, heat		
	Sinter/Pellet Plant	Dust, heat,	Respiratory track diseases,	Well ventilation of work place,
		Hot products, noise	heat stress, burning	PPE like gloves, dust mask,
				Cold water supply at work place
	Blast Furnace/IF	Hot BF gas, O/H cranes	CO poisoning, burn & injuries	Use of breathing apparatus
	Billet caster	Hot molten metal	due to falling from height & explosion	Keeping area dry so that hot Metal does not come in water Contact, wearing PPE

	Captive power plant	Fly ash, explosion, noise, vibration, HT,electric equipments, Acid and alkali	Electric shock, injury due to chemicals, burn/ eye injury	Use of PPE, barricading high voltage area.
	Rolling mills	Heat, Splinters, Cobbles, Hydraulics, Cranes, trapping between the rolls, edge of thin steel sheets	Eye injury due to red hot mill scale, hot metal glare, injury, Due to shearing, cropping, trimming and guillotine machines,	Use of PPE like goggles, hand,gloves & Guarding, Dangerous areas
	Oxygen Plant	Cryogenic liquid	Frost bite and blisters	PPE like face shield, safety shoes
	Lime Plant	Hot gas	Eye/ burn injury	Use of PPE
		Dust		
III	Utilities			
	Fuel gas	Gas leaks	Fire and gas	Use of PPE
	Distribution		Poisoning	
	Electric power	Short circuit	Electric shock	Use of PPE
	Supply			
IV	All shops			
	Falling from height	Collapse of scaffoldings	Injury, breaking of bone	Proper scaffolding to withstand
		Breaking of slings		Load and use of safety belt
				Tested from time to time.
	Falling of heavy	People working over	Head injury	Use of helmet and safety shoes
	Objects from height	Head, next floor		

Following format has been designed to be filled up after medical examination of all employees at the employment to the project.

CONFIDENTIAL	ENTRY MEDICAL EXAMINATION		
I hereby authorize any of the doctors, hospitals or clinics mentioned in this form to provide the Medical Service with copies of all my medical records so that the organization can take action upon			

my application for employment.

I certify that the statements made by me in answer to the questions below are to the best of my knowledge, true, complete and correct. I realize that any incorrect statement or material omission in the medical information form or in any other document required by the organization renders a staff member liable to termination or dismissal.

Date(dd/mm/yy)

Signature

Pages 1 and 2 are to be completed by the candidate.

FAMILY NAME (IN BLOCK CAPITALS)		GIVEN NAMES	MAIDEN NAME (FOR WOMEN ONLY)	SEX M <input type="checkbox"/> <input type="checkbox"/>
ADDRESS (STREET, TOWN, DISTRICT OR PROVINCE,COUNTRY) AND TELEPHONE			DATE OF BIRTH (day/month/year)	
			NATIONALITY	
POSITION APPLIED FOR (DESCRIBE NATURE OF WORK)	TELEPHONE		BIRTHPLACE	
DUTY STATION	PRESENT MARITAL STATUS			
	Single <input type="checkbox"/>			
	Married <input type="checkbox"/> DATE (dd/mm/yy).....Div <input type="checkbox"/> ced DATE: (dd/mm/yy).....			
DUTY STATION	Separated <input type="checkbox"/> DATE (dd/mm/yy).....Wi <input type="checkbox"/> wed DATE: (dd/mm/yy).....			
Have you ever undergone a medical examination for any other agency? ----- -----				
Have you ever been employed by this company or any other agency? ----- -----				
If so, please state when, where and for which organization ----- -----				

FAMILY HISTORY							
Relative	Age (If still alive)	State of Health (If still alive, present state: If deceased, cause of death)	Age at death	Have members of your family had the following illnesses or disorders?	Yes	No	Who?
Father				High Blood Pressure			
Mother				Heart Disease			
Brothers				Diabetes			
Sisters				Tuberculosis			
Spouse				Asthma			
Children				Cancer			
				Epilepsy			
				Mental Disorders			
				Paralysis			

Each question requires a specific answer (yes, no, date etc); to leave a blank or draw a line is not sufficient. If the questionnaire is not fully completed and enquires are therefore needed, time may be lost.

1. Have you suffered from any of the following diseases or disorders? Check yes or no. if yes, state the year.

	YES Date	NO		YES Date	NO		YES Date	NO		YES Date	NO
Frequent sore throats			Heart and blood vessel disease			Urinary disorder			Fainting spells		
Hay fever			Pains in the			Kidney			Epilepsy		

			heart region			trouble					
Asthma			Varicose veins			Kidney stones			Diabetes		
Tuberculosis			Frequent indigestion			Back pain			Gonorrhea		
Pneumonia			Ulcer of stomach or duodenum			Joint problem			Any other sexually transmitted disease		
Pleurisy			Jaundice			Skin disease			Tropical diseases		
Repeated bronchitis			Gall stones			Sleeplessness			Amoebic dysentery		
Rheumatic fever			Hernia			Any nervous or mental disorder			Malaria		
High blood pressure			Haemorrhoids			Frequent headaches					

2. Are you being treated for any condition now?-----Describe-----

3. Have you ever coughed up blood? -----

4. Have you ever noticed blood in your stools? -----In your urine?-----Give details:-----

5. Have you ever been hospitalized (hospital, clinic, etc.)? -----

6. Have you ever been absent from work for longer than one month through illness? -----If so, when? -----

7. Have you had any accidents as a result of which you are partially disabled? -----

8. Have you ever consulted a neurologist a psychiatrist or a psychoanalyst? -----

9. Are you taking any medicine regularly? ----- If so, when? -----

10. Have you gained or lost weight during the last three years? -----If so, state reason:-----

11. Have you ever been refused life insurance? ----- If so, state reason:-----

12. Have you ever been refused employment in health grounds? ----- If so, state reason:-----

13. Have you ever received or applied for a pension or compensation for any permanent disability? ----
Degree? -----

14. Have you ever stayed in any other country? -----If so, for how long? -----

15. Have you in the past suffered from any condition which prevented travel by air? -----

16. Do you consider yourself to be in good health? -----Do you have full work
capacity? -----

17. Do you smoke regularly ☐ Yes ☐ No -----If so, what do you smoke ☐ ci ☐rettes
pipe cigars

For now many years have you smoked? -----How much per day? -----

18. Daily consumption of alcoholic beverages: -----

19. Has any doctor or dentist advised you to undergo medical or surgical treatment in the foreseeable
future? -----Give details -----

20. Give any other significant information concerning your health: -----

21. What is your occupation? -----Indicate at least three posts you have occupied:-----

22. List any occupational or other hazards to which you have been exposed -----

23. Have you ever been rejected for military service for medical reasons? -----



24. **FOR WOMEN** Are your periods regular? Yes ☐ No ☐ you take contraceptive pills? Yes
No If so, for how many years have

Are they painful? Yes ☐ No ☐ You been doing so?-----Have you
ever been treated for a gynecological

Do you have to stay in bed when they come? Yes ☐ No ☐ Compliant? Yes ☐ No ☐

If so for how long? -----Date of your last period ----- If so, which? -----

TO BE COMPLETED BY THE EXAMING PHYSICIAN				
GENERAL APPEARANCE		Height: cm.		Weight: kg
Skin:		Scalp :		
SIGHT. MEASURED VISUAL ACUITY				
Gross vision	Right	Left	Pupils: Equal? Regular?	
Vision with spectacles	Right	Left	Fundi (if necessary):	
Near vision	Right	Left	Colour vision:	
With correction	Right	Left		
Hearing (test by whisperin g)	Right	Normal:	Sufficient :	Insufficient :
	Left	Normal:	Sufficient:	Insufficient :
	Ear drum	Right:	Left :	
NOSE-MOUTH-NECK	Nose :		Pharynx :	Teeth :
	Tongue :		Tonsils :	Thyroid:
CARDIOVASCULAR SYSTEM				Peripheral arteries
Pulse rate:		Auscultation:		-carotid:

Rhythm:	Blood pressure:	-posterior tibial:
Apex beat:	Varicose veins:	-dorsalis pedis:
Electrocardiogram-Please attach tracing.		
RESPIRATORY SYSTEM		Breast s
Thorax		<div style="display: flex; justify-content: space-around;"> <div> Right Left —  </div> <div>  </div> </div>
DIGESTIVE SYSTEM		Spleen:
Abdomen		Hernia :
Liver		Rectal examination:
NERVOUS SYSTEM		Plantar reflexes
Papillary reflexes	-To light:	Motor functions:
	-On accommodation:	Sensory functions:
Papillary reflexes:		Muscular tonus:
Achilles reflexes:		Romberg's sign:
MENTAL STATE		
Appearance:		Behavior :
GENITO-URINARY SYSTEM		
Kidneys :		Genitals :
SKELETAL SYSTEM		
Skull :		Upper extremities:
Spine :		Lower extremities :
LYMPHATIC SYSTEM		
CHEST X-RAY (Full size film- Please send the radiologist's report.)		

LABORATORY			
The results of <u>all</u> the following investigations must be included except where marked "if indicated".			
Urine	Albumin	Sugar	Microscopic
Blood	Hemoglobin %	grams/I	Leucocytes:
	Haematocrit %		Differential count(if indicated):
	Erythrocytes		Blood sedimentation rate:
Blood chemistry:			
	Sugar	Urea or creatinine	
	Cholesterol	Uric acid	
Serological test for syphilis : Please attach laboratory report			
Stool examination			
COMMENTS (please comment on all the positive answers given by the staff member and summarize the abnormal findings.			
CONCLUSIONS (Please state your option on the physical and mental health of the candidate and fitness for the proposed post):			
The examining doctor is requested before sending this report to verify that the questionnaire, pages 1 and 2 or this form, has been fully completed by the candidate and that all the results of the investigations required are given on the report. Incomplete reports are a major source of delay in recruitment.			
Name of the examining physician (in block capitals):		Signature	

Address	Date: (dd/mm/yy)
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