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OCCUPATIONAL SAFETY AND HEALTH IN SHIP-BREAKING INDUSTRY

Occupational safety, health and welfare aspect of the workers employed in ship-breaking yards are far from satisfactory and has been a main concern for the Ministry of Labour, Government of India. Several cases appeared in various sections of press about the poor state of working environment in the ship-breaking yards. On the initiatives taken by the Secretary to the Government of India, Ministry of Labour, DGFASLI constituted a Task Force to investigate into the facts of the cases. The status of occupational safety and health as brought out by the study has been presented in this article.

BACKGROUND

Alang and Sosiya, the two important centers for ship-breaking are situated on the coast of Arabian Sea in the district of Bhavnagar in Gujarat. These are situated at about 55 km. from Bhavnagar and are well connected by road with Bhavnagar. The industry employs about 25,000 workers. Besides this direct employment, a number of economic activities including rolling mills depend on this industry. As such the industry is very important for the state economy.

Ship-breaking activity, which is a major source of re-rollable and melting scrap, was recognised as a manufacturing industry way back in 1979. The ship-breaking operations at Alang started in the year 1983. During the last 15 years, the ship-breaking operations at Alang and Sosiya have developed in leaps and bounds. The growth of the industry during the past one and a half decades was phenomenal. From five ships in 1983, Alang received 348 ships in 1996-97 and 347 in 1997-98 for breaking. Alang receives ships from all over the world for breaking.

SHIP BREAKING OPERATIONS

The responsibility of the ship-breakers starts from the point when the ship is anchored.Guidelines for safety and precautions during the cutting operations in the ship-breaking yard have been laid down by the Gujarat Maritime board and Gujarat Ship-breakers' Association. It covers various initiatives to be taken by the ship-breakers on safety as covered under various statutes, for e.g. the Factories Act, the Explosives Act, the Gas Cylinder Rules, the Static and Mobile Pressure Vessels Rules, etc. and monitoring is to be done by GMB.

After the vessel is anchored, the Officials of the Gujarat Maritime Board, the Customs Department and the Explosives Department board the vessel and examine it. An Official of the Explosives Department issues the Gas Free Certificate, in pursuance of Rule 43(c) of the Petroleum Rules, 1976, that the vessel is fit to enter a dry or wet dock or beach immediately. After obtaining the necessary certificates from the Officials of these three Departments, the ship is permitted to beach in the ship-breaking yard concerned.

The ship's wire ropes and the horizontal and vertical winches, located on the ship-breaking yard are used to haul the ship to the beach and subsequently to keep the ship in position after beaching. The gas cutting operation starts after obtaining the naked light certificate from a competent person subsequent to his inspection and examination of the ship.

The ship is beached keeping facing towards the ship-breaking yard. The ship-breaking is started from the forward (bow) side and preceded to the stern side. The ship's bow accommodates anchor chains and as such it does not pose any risk of fire/explosion during gas cutting. Hence, the bow portion of the ship is gas cut first and then adequate number of openings in the ship's hull and structures are made facilitating natural ventilation and ballasting by water during high tides. This process provides further relief from accumulation of dangerous gases in the ship tanks and holds. The ballasting also keeps the ship in a stable state.

Before starting the cutting operation, all out-fittings and equipment such as furniture, refrigerators, cables, communication system, fire-extinguishers, lifting tackles, etc. are taken out from the ship. Subsequently, the fuel pipelines are deflanged, remaining fuel drained off and taken out of the ship. Other types of pipes are cut and stacked on the shore depending upon the metal eg. brass, copper, steel, etc. Thereafter, the bare ship structure is tentatively lined for cutting in a three-tier system by keeping three separate gangs of Mukaddams, gas cutters and helpers. The unit thus, earmarked is almost gas cut leaving behind small attachments with the ship structure, is lased appropriately through holes by wire ropes and connected to the shore-based winches/capstans. This unit is then felled during low tides by operating the winches. This is one of the risky activities.
The felled unit is then hauled by means of cranes to the shore and cut further into

reasonable smaller pieces and sold for re-rolling. Shipborne machinery and equipment like compressors, D.G. sets, evaporation pumps, etc. are progressively detached from the ship's structure, lowered down and brought to the shore. The aft part of the ship structure containing propulsion engines is hauled to the shore and sold separately. As a last activity of ship-breaking operation, the propeller shaft is cut and detached from its propeller.

OCCUPATIONAL HAZARDS IN THE SHIP-BREAKING INDUSTRY

The Occupational hazards in the ship-breaking industry can be broadly classified as :

- Working in confined space
- Gas cutting
- Cutting of tanks, holds and pipelines which contain hazardous material
- Working at height
- Manual handling of material including sharp edged objects
- Stowing and stacking of material by cranes and winches
- Working at two or more levels simultaneously

A number of gangs operate inside the ship and no audio and/or visual communication system is employed for communicating with the several group of workers engaged inside the ship as well as with those working on shore. There are no appropriate ramps and ladders for free and rapid access to and egress from the ship.

Crawler-mounted mobile cranes are used to lift and transport the felled steel units and other materials. The cranes and the lifting tackles are not tested and examined by competent persons periodically as per the statutory provisions under the factories Act, 1948. Also, the drivers are not adequately trained in safe operation of the cranes.

LPG and oxygen cylinders are extensively used for gas cutting operations because of which there is always a potential hazards of asphyxiation fire and explosion inside the ship. Also a wide variety of materials are stacked or kept in the yards in a haphazard manner without living adequate aisles space thereby hindering easy access in case of fire or any emergency. There are no water or foam fire fighting systems installed and workers are not trained in fire fighting. Though there is large potential of risk and injuries, there is no system and infrastructure for rescue and evacuation of entrapped workers in the ship. Also very few workers have been given first-aid training. The workers working in this industry are exposed to toxic gases and vapors emanating from ship hull paints. However, no periodical examinations are conducted and records maintained.

The main problem in the ship-breaking industry is that the entire operations are looked after by a few mukaddams. Though experienced in the trade, they are not competent enough to supervise the workers and provide guidance on occupational safety and health matters.

IMPROVEMENTS MADE DURING RECENT PAST

On the basis of a number of Public Interest Litigations, the Hon'ble High Court of Gujarat on 6th May, 1998 issued directions on matters, among others, supply of potable water, medical treatment of workers, enforcement of labour laws including the Factories Act, sanitation and fire safety.

The Inspectorate of Factories started filing prosecutions against the ship-breakers for violations of safety and health related provisions.

The State Government covered ship-breaking yards under the Factories Act, 1948 and notified welding/cutting operation with the use of LPG/Acetylene/Argon from 2nd February, 1987. A special Schedule on this operation was introduced in the Rules. Further, the State Government notified the Rule 68-H on ship-building, ship-repairing and ship-breaking under the Factories Act, 1948 on 19th February, 1995. It is an elaborate Rule with 23 sub-Rules covering almost all aspects of safety in the ship-breaking operations.

The State Government also notified on 4th December, 1997 that all the ship-breaking factories at Alang and Sosiya shall employ qualified Safety Officers as required under the Factories Act.

The State Government constituted an Expert Committee to study the safety regulations related to ship-breaking operations. The State Chief Secretary reviews its performance every month.

The Fire Officer, Ship-breaking yard, Gujarat Maritime Board, Alang issues a certificate to

the effect that he had inspected the plot concerned and the party had complied with all the primary safety precautions as required under the MOU and maintained the safety measures in light of the provisions of the safety notification issued under Sec.144 of the CR.P.C.1973 issued by the Addl. District Magistrate, Bhavnagar. Based on this certificate, the Addl. Port Officer, Alang grants permission to break the ship/vessel.

GMB set up a Fire Service Station at Alang and has deployed about 100 Gujarat Industrial Security Force personnel at Alang for a round the clock vigil in the area.

A Red Cross Hospital has come up recently at Alang.

By and large, workers wear personal protective equipment such as helmets, welding goggles, gloves and gum boots.

RECOMMENDATIONS FOR IMPROVEMENT OF OCCUPATIONAL SAFETY AND HEALTH OF THE WORKERS

The ship-breaking operation should only start after the occupier of the yard obtains the necessary naked light certificate from a recognised competent person.

All the Mukaddams should be trained in occupational safety and health.

Good housekeeping principles should be followed by the occupiers.

Suitable ramps and ladders may be provided in adequate number for easy access to and egress from the ship. This will facilitate safer and faster means of evacuation of injured workers as well as better means of transporting tools and equipment into the ship.

GMB may give permission to the occupiers to build sheds for storing compressed gas cylinders. Without appropriate sheds, the Department of Explosives does not give license to store gas cylinders.

All the LPG and Oxygen gas cylinders should be periodically tested as per the requirements. They should be fitted with the necessary regulators and all the tubes must also be maintained properly.

Occupier should establish a system of reporting, recording and investigation of all fatal accidents and reportable lost-time injuries as well as all dangerous occurrences.
GMB should install a fixed fire protection system i.e. fire hydrant service system at Alang. Fire-ring main service with dedicated diesel engine driven pumps and over-head tanks should also be installed.

The occupier should explore the possibility of installing fire monitors with foam system.

As the workers are semi-literate, education and training on occupational safety and health aspects is very essential to create awareness and sustain it on a continued basis.

Adequate number of first aid boxes with all the necessary equipment should be kept in the yards. In addition, training in first aid may be arranged for the ship-breaking yard employees.

GMB may set up an Emergency Response Centre at Alang to meet any type of emergency

Every lifting machine and lifting tackle used in the ship-breaking yards should be tested, examined and certified by a competent person as per the statutory requirements. Further, records thereof should also be maintained. Further, the crane operators should be given appropriate training so that they operate the cranes safely.

All the workers should be subjected to periodical medical examination as the ship-breaking operation is covered under 'hazardous process'

Safe Operating Procedures (SOPs) on various operations of ship-breaking including cleaning and decontamination of hazardous vessels in Gujarati and Hindi for the benefit of the workers may be developed.
Safe work methods for all the operations are available in standard publications on safety. The Ship-breakers' Association should set up a reference library of these publications and then prepare the SOPs taking help from these. The entire ship-breaking operations are carried out under the supervision of Mukaddams, who don't possess any technical qualifications. Persons possessing qualifications and experience in handling hazardous substances and are competent to supervise such handling in the factory should be appointed as supervisors as required

under Section 41-C(b) of the Factories Act, 1948.

Training courses on occupational safety and health in ship-breaking operations for Mukaddams, supervisors and workers should be arranged.

GMB should install a Diesel Generating set of adequate capacity to cater to the emergent needs of hospital, shipyards and street lighting.

As a statutory obligation every occupier should constitute a safety committee. A few workers may be identified, trained and entrusted with the responsibility of representing the workers to promote safety at work

Safety Audit should be done in these units periodically. Monitoring of implementation of the recommendations of these reports should be done on regular basis.

It is strongly felt that the occupiers through their Association should take action for improving the job health and welfare aspects also. These include proper housing, adequate medical care, provision of drinking water, etc.

ACCIDENTS DUE TO CORROSION FAILURE OF PIPE LINES

S.S. Gautam & Dr. Brij Mohan

INTRODUCTION

A large nitrogenous fertilizer plant in Uttar Pradesh was shut down some years back following a pipeline rupture leading to death of an executive and injuries to several others. The event raised a question mark about the integrity of the complete plant, hence a decision was taken to restart the plant only after ensuring the integrity of complete piping network. The task of testing of total piping network and its replacement was so gigantic that the management decided to shut down the plant altogether. This is, but only one among the series of accidents taking place because of weakening of pipelines due to corrosion and errosion.

Pipeline failures account for maximum number of accidents involving toxic releases and vapour cloud explosions in chemical industries. Kletz (1988)[1] has summarised 57 accident cases involving vapour cloud explosions, out of which 34 were due to failure of pipelines. The problems involved with the pipelines are many, yet, one leading cause is corrosion of pipelines. An attempt has been done in the present paper to review some cases relating to corrosion failure of pipelines and discuss the safety problems and their remedies concerned with them.

CORROSION OF PIPELINES

Corrosion of pipelines can lead to several problems such as:

- Sudden failure of pipelines
- Leakage from pin holes on pipelines
- Failure of instrument components fitted in pipeline
- Collection of solid corrosion products interfering flow and operation of valves
- Catalytic effects of the corrosion products on process materials leading to undesirable reactions, etc.

Selection of proper material

It is needless to emphasis that the material of construction of a pipeline should be resistant to the substances which are to be handled. Generally care is taken by the designers to select compatible material of construction of pipelines, yet, sometimes compromises are done either at installation stage or during plant modification and maintenance. The incident cited below is an example of a bulk fire leading to heavy property loss in an Indian refinery which was a result of negligence committed at the time of erection of the plant (Gautam, Saxena & Kapoor-1993)[2].

In fludised catalytic cracking (FCC) plant of a refinery, the recommended material of construction was special alloy steel. Due to some reason, a small piece of pipe in recirculation loop of the fractionating column of slurry was made up of carbon steel. This fact was not in the knowledge of process inspection and maintenance personnel. The annual thickness monitoring which was being done at the most vulnerable points did not cover this piece of pipe. The minimum required thickness for the pipeline was 7 mm and the test result indicated that the average thickness of the pipeline was 15 mm even after 7 years. The line was carrying heavy oil at an elevated pressure and at a temperature which was above its ignition temperature. The line ruptured one morning leading to bulk fire involving heavy loss of property. No human injury occured probably because general shift had not yet started. The post accident findings revealed that the thickness of the carbon steel part of the pipe was just 2 mm.

One more case of pipeline failure due negligence in using proper material of construction has been described by Kletz(1988) which is summarised below:

The exit pipe from a high pressure ammonia converter was constructed out of carbon steel instead of special steel recommended for the material concerned (1.25% Chromium, 0.5% Molybdenum).

The pipeline was affected soon by Hydrogen attack leading to a hole at the bend. The hydrogen leaked out and the reaction forces pushed the converter quite away.

A large number of metallic and non-metallic materials have been developed for use with different substances. Some such piping materials along with the substances for which they are suitable are being presented in the following table (Perry 1963)[3] .

Table

Suitable construction materials for pipings for some substances

Sl.No.	Material of pipeline	Medium (Substance)
1	Cast iron	Low pressure service, where loss material is more due to corrosion.
2	High silicon iron (a) Durion	Resistant to most chemicals; such as sulphuric acid & acetic acid at all concentrations and temperatures.
	(b) Durichlor(High Silicon and 3% Mo)	Hydrochloric acid at all concentrations and temperatures.
3	Aluminium % alloys	Hydrogen peroxide, high purity chemicals. Attracted by alkalies and galvanic corrosion when coupled with copper.
4	Copper & alloys	High pressure refrigerant and other gases.
5	Lead & Lead lined steel	Sulphuric acid at moderate temperature. Lead lined steel for greater pressure.
6	Magnesium	Most alkalies and many organic chemicals including aldehydes, alcohols, phenols. etc.
7	Nickel	Halogen acids at high temperature, sodium chloride solution, fused caustic soda.
8	Nickel, Molybdenum & Iron alloys (30%,5% & 60%)	Wet HCL gas and boiling Hcl acid.
9	Titanium	Nitric acid, Chromic acid, Aqua regia
10	Zircoium	Dilute & concentrated nitric acid at 212^{o}F.

11	Asbestos cement	Underground water, sewerage and industrial wastes.
12	Stoneware	Acids, alkalies and other corrosives except hydrofluoric acid.
13	Vitreous clay	Sewers, Industrial wastes
14	Glass pipes & tubes	Acids & alkalies below pH 8.(attacked by HF & H3 PO4)
15	Glass lined steel pipe	Acids (except HF) & alkaline soln.(upto pH 12 and 450^{o}F temp.)
16	Porcelain	All acids except HF
17	Fused silica/quartz	All chemicals upto 1500C temp.
	Plastics & fibre plastics	
	(a) Acrylonitrile butadiene styrene (ABS)	Sulphuric & Hydrochloric acid at room temperature,salts.
	(b) Cellulose acetate butyrate	Chloride salts.
	(c) Glass fibre epoxy resin	Non oxidising acids, alkalies, salt water and corrosive gases.
	(d) Asbestos phenolic resin	Most acids including Hcl.
	(e) Polyethylene	Salts, sodium & ammonium hydroxide, mineral acids.
	(f) Polyvinyl chloride	Salts, alcohols, gasoline, acids upto 150^{o}C.
	(g) Rubber	Fluides containing chlorides.

CORROSION OF PIPELINES

Corrosion of pipelines is either in the form of pitting or there is general reduction of thickness. In the former case, the problem starts as leakage in the line whereas in the latter case, the rupture takes place. A case of leakage of flammable substance from the hole caused by corrosion illustrates the severity of the accidents that may result even from miner leakages of hazardous substances (Vervalin 1985)[(4)].

A vapour cloud explosion of isobutane vapour occurred in a refinery killing seven people and causing injuries to thirteen. A pipeline between two spherical tanks and alkylation unit was provided with a valve housed in an open pit. Some rain water contaminated with acid accumulated in the pit causing corrosion and leakage of the substance from the bonut of the valve. The leakage was noticed due to bubbling of the gas from the pit. The operator tried to flush the line with the water. But suddenly the bonut ruptured first giving rise to warer spray. The inlet valve of one of the spheres was in open position which subsequently lead to heavy release of isobutane. The vapour was subsequently ignited causing extensive damage in an area of five acres. The intensity of explosion was equivalent to 10-12 ton of TNT.

The above incident teaches that housing of valves in the pits should be avoided and wherever it is unavoidable the covers and the risers around the pits should be provided so that water is not allowed to enter the pits.

Corrosion of bonnet of the valve can prove more disastrous if it happens to be the first isolation valve. A massive release of chlorine gas leading to evacuation of large number of inhabitants of the surrounding locality occurred in Durgapur in corrosion failure of the bonnet of a valve provided closest to the tank in the liquefied chlorine delivery line. A brief description of he

incident as revealed by S.K.Sen committee report (Sen-1989)(5):

A leakage of chlorine gas was observed from the valve on the pipeline carrying liquid chlorine from the storage tank in Durgapur Chemicals Ltd, Durgapur. In the early morning of 10th June, 1987, the operator tried to tighten the bonnet but the stud got broken. After some time tightening of the second bonnet was attempted which also got broken and massive release of the liquified chlorine gas started. The release lasted for 72 hours. About 70 persons were affected out of which 9 were hospitalised. No person died. The investigations revealed that the valve had got badly corroded and no inspection had been done for a long time.

Stagnation of liquids in some part of pipeline enhances the rate of corrosion. This often happens in the dead ends of piping and in bypass lines. Reducers in the pipelines also provide the chance of accumulation of liquids. It is, therefore, advisable that dead ends should be avoided in the pipelines. The bypass lines, priming lines etc. should be provided so that there is no chance for the liquids to remain trapped in them when these lines are not in use. In order to avoid trapping of liquids in the larger diameter pipes at the reducers, it is suggested that eccentric reducers should be fitted so that no liquid may remain trapped when the line is not in use. Provision of valves in the vertical lines may be avoided. The blow down valves may be sloped towards the blow down tanks. A few cases of accidents which have occurred due to corrosion of dead ends of the pipelines are presented here to further clarify the problem (Kletz-1988)[1].

1. A three meter long dead end in the pipeline of 12 inches diameter failed giving way to a liquified flammable gas. The gas cloud was ignited at once killing three men who were deputed for finding the leak. The cause of accident was found to be the corrosion of the dead end of the line where the water and the impurities remain trapped.

2. An interesting case of pipeline failure occurred in a liquified flammable gas system. A 2 inches dia pipeline was welded on to a process line to provide support to an instrument. The other end of the pipeline was open through

which rain water had collected at the bottom of the support pipe. This caused corrosion of the external surface of the line on which this piece was welded which broke and released the gas through the support pipe.

STRESS CORROSION

Stress corrosion is also a leading cause of accidents in chemical industries and deteriorations are caused due to combined effects of chemical action and physical are stresses like pressure and temperature. In Flixborough factory, the reactor and the 20 inches pipeline had been replaced only because of stress corrosion failure due to flushing of water into the system in order to dilute the cyclohexane which had entered.

The stress corrosion cracking may occur in the parent metal of the vessels, pipes, welds and in nozzle connections. The stress corrosion properties of the material of construction and the substances involved should be understood well before designing a system. The operators should be well informed about the precautions they are supposed to take for it.

CORROSION PREVENTION

Corrosion of pipelines is controlled to a large extent by suitable coatings on the pipelines. For certain materials of construction, specific coating materials are used. When specific coatings are not required, general coating materials such as coal tar, glass fibre wrappings, epoxy, etc. are used. Inspite of coatings, corrosions

take place due damage of coatings, improper coatings etc. Hence cathodic protection which prevents dissolution of iron into the flowing liquids should be provided. Inhibitors are also mixed in the flowing liquids to reduce the rate of dissolution. These are specific to the substance being handled and the material of construction.

CORROSION MONITORING

Corrosion should be constantly monitored to ensure the integrity of the systems. The

techniques available for this are many such as radiography, ultrasonic thickness monitoring, magnetic particle testing, dye penetration test, water testing etc. The most common method used among these is ultrasonic test. The most important steps in thickness monitoring are proper sele ction of points of measurement and correlation of results with the earlier readings and with the minimum required thickness. The following case of rupture of a pipelines in a fertilizer factory illustrates as to how a lack of proper interpretation of the thickness readings resulted in a disaster (Gautam & Singh - 1990)[6].

A pipeline of about 8 inches diameter carrying mixture of CO,CO_2, Hydrogen and Hydrocarbon gases from carbon catcher provided after naptha gassifier to the shift convertor in an ammonia plant ruptured violently leading to death of one person and causing serious injury to another. The provided thickness of the pipeline was 8.11mm. The calculated minimum thickness was 4.26 mm when periodic monitoring of the thickness was done about two and half year before the accident and the thickness observed at the point of rupture was 4.4 mm. Another survey done six months before the incident indicated the minimum thickness of 4.6 mm. With all this, no extrapolation was done to assess the likely thickness at the time of next monitoring (on the basis of past rate of thickness reduction). When the thickness of the pieces detached during the rupture was made, it was found to be 2.2 mm. This clearly indicated that if thickness results are not properly interpreted in the light of previous results, serious consequences may occur.

CONCLUSION

The accidents cited in this paper and the suggestions given indicate that the selection of proper material of construction of pipelines for different substances is of foremost importance. In addition, ongoing care is required to minimise the rate of corrosion by various techniques. Proper corrosion monitoring by testing and inspections for timely rejection of corroded pipeline is also very important to avoid the releases and Villages.

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SAFETY AUDIT IN A TYRE PRODUCTION PLANT

A safety audit was conducted in a tyre production plant by Regional Labour Institute, Kanpur. The Tyre plant has the production capacity of 5.7 lakhs automobile tyres per annum and total number of employees of the plant is 1431.

BRIEF OF THE MANUFACTURING PROCESS:

The natural rubber and synthetic rubber, fabrics and different chemicals are the raw material for the tyre process. Compounds for the tyre are prepared in the Banbury mixture. The 'Dip process' consists of preparation of Dip solutions, Dipping, heat stretching and normalising. Calendering is a process of cutting of rubber on Dipped fabrics. Extrusion is a process of shaping rubber compounds continuously by passing it out through a die of the desired opening. "Stock preparation" consist of Bias cutter, Two-roll calender, slitting and Band building. Tyre building is a process of assembling all the individual compounds of the tyre to get a green tyre. "Vulcanization" or "Curing" is a process by which plastic rubber compound is converted into elastic material.

FINDINGS:

Observations on Safety & Health were made in Raw Material Storage area, Bulk storage of Flammable Liquids, Civil department Banbury section, Dip-Unit, Calendering section, Tyre Building section, Radial section and Utility section. Safety & Health management system of the factory was also reviewed. Some deviations from standard safety norms were identified in the various
departments and in the Safety Management system of factory.

RECOMMENDATIONS:

Suggestions were made to improve the safety performance wherever the deviations were observed, e.g. improvement in Naptha storage system, chemical storage, colour coding of pipe lines, labelling of valves, improvement in ventilation system, provision of interlock guards in the banbury mixture, and the tripping system for calendering rollers, Maintenance of good house keeping was also suggested. In addition to the above, various preventive measures were also suggested on fire prevention and protection, lifting machines and tackles, work environment monitoring etc. Suggestions were also made on Safety Management System like Safety Policy, Safety Organisation, Safety Committee, Education and Training, P.P.E, Safety Inspections, Occupational Health and Medical services, On-site eemergency plan etc.

SAFETY AUDIT IN A GLASS BOTTLE MANUFACTURING PLANT

Safety audit was carried out in a glass bottle manufacturing plant by the Regional Labour Institute, Kanpur.

OBJECTIVE;

The objectives of the audit was to identify hazards arising due to deviations in the plant conditions or practices from the applicable codes of practices, standards and the statutes.

FINDINGS :

The audit revealed that the silica sand and soda glass were mixed and shifted to the glass melting furnace with the help of bucket elevator/belt conveyor/skip trolly arrangement which provided many chances for dust generation and exposure of the employees to the dust. Instruments to ensure safety in use of natural gas and LPG were out of order. Workers were sorting out and handling the broken glass cullets without proper protective devices. Safety policy had been prepared but had not been circulated among the employees. A HAZOP study in LPG storage system had been conducted earlier but the recommendations had not yet been implemented.

RECOMMENDATIONS:

It was suggested that enclosure and local exhaust systems should be provided at the inlets, outlets and transfer points. A scientific study was recommended for the heat exposure appeared in excess in glass machines. Suggestions were also given to institute the system of safety training for various level of employees.

SAFETY AUDIT IN PORTLAND CEMENT MANUFACTURING INDUSTRY

This safety audit was carried out by Regional Labour Institute,Kanpur in a factory manufacturing portland cement with a production capacity of 1 million tonnes per year.

OBJECTIVE:

The safety audit was carried out to identify hazards through systematic and critical appraisal of plant prsocessess/operations,to find out deviations in the plant operation and maintenance etc. from designated and standard codes of practices and statutes etc., to review safety and health system of the factory and to recommend preventive and control measures wherever required to improve overall safety performance of the factory.

METHODOLOGY:

In order to carry out the safety audit, preliminary survey of the plant was made by the audit team to familiarize with the manufacturing process and the existing system of safety and health etc. in the factory. On the basis of the preliminary survey, a. questionnaire was prepared which was used at the time of field work for collecting information on various aspects of safety audit. Safety management aspects and technical aspects like conveyors and stackers, lifting appliances and loose gears, pressure vessels, piping system, storage of HSD, environmental hazards and their control etc. were covered during the safety audit.

RECOMMENDATIONS:

Some of the main recommendations were review of safety& health policy emphasizing intentions and commitment of the management for compliance of statutory requirement etc, strengthening the functioning of safety committee, preparation of internal rules for safety and health, reviewing of accident reporting and investigation system, introduction of work permit system for entry into confined spaces, periodic monitoring of work environment, establishment of occupational health centre with facilities and infrastructure as prescribed in the Factories rules, inclusion of lung function test and X-rays in periodic medical examination for the employees exposed to dust and audiometric examination for the employees of noisy areas, enforcement of personal protective equipment at the time of work by the employees working on dusty & noisy areas,

suitable dust respirators for protection against dust maintenance of fire extinguishers as per IS:2190, smoke detection system for electrical load centres & CCR, strengthening the system of contractor's safety, marking on storage tanks, provision of dip hatch on HFO tanks, periodic inspection of wire ropes, close condition monitoring of instruments for process safety, proper maintenance of pressure vessels, periodic evaluation of the efficiency of dust control system, elevation of vent pipes of bag filters at sufficient height and hearing conservation programme for noisy areas.

TRAINING PROGRAMME ON EVALUATION AND CONTROL OF HAZARDS IN DRUG AND PHARMACEUTICAL INDUSTRY

Drug and Pharmaceutical industry may cause exposure to workers during the handling of various toxic chemicals and synthesis of large variety of drugs. The manufacturing processes entail the use of hazardous chemicals such as acids, alkalis, hydrocarbons and their derivatives, organic solvents etc.

Occupational health hazards prevailing in production plants are noise, warm and moist micro-climate, use of antiseptics (formaldehyde) and allergies from organic dusts containing sensitizing agents. Health impairment due to pharmaceuticals has been observed mainly in hormone and antibiotics production workers.

OBJECTIVE:

The programme is designed to achieve the following objectives:

* to highlight the importance of amended Factories Act,1987;

* to generate an awareness among the participants for various chemical hazards in work environment;

* To understand the need and role of industrial hygiene in minimising health hazards through recognition, evaluation and control of various toxic chemicals involved in Drug and Pharmaceutical industry.

CONTENTS:

- Occupational health hazards;
- Threshold Limit Values for Chemical Substances in the Workroom Environment ;
- Chemical Process Safety;
- Biological Monitoring in Drug and
- Pharmaceutical industry;
- Detection, Sampling and Analysis of Toxic Substance;
- Fire Explosion Prevention;
- Storage, Handling and Transportation of Hazardous Chemicals in Drug and Pharmaceutical Industry;
- Control of the occupational Environment;
- Environmental Management System-ISO 14000;
- Respiratory and Non-respiratory PPEs;
- Medical Surveillance in Drug and Pharmaceutical Industry;
- Motivation for effective use of PPE

PARTICIPANTS:

Middle management personnel such as Supervisors, Analytical Chemists, Technical Officers and Safety Officers.

DURATION: 5 days
Conducted by Industrial Hygiene Division. CLI, Mumbai.

INTERNATIONAL OCCUPATIONAL SAFETY AND HEALTH INFORMATION CENTRE (CIS)

CIS (from the French name, Centre international d'Information de securite et d'hygiene du travail) i.e. International Occupational Safety and Health Information Centre, is a part of the International Labour Office, Geneva, Switzerland. The mission of CIS is to collect world literature that can contribute to the prevention of occupational hazards and to disseminate this information at an international level. CIS imparts to its users the most comprehensive and up-to-date information in the field of Occupational safety and health. The work of CIS is supported by a worldwide Safety and Health information exchange network which includes over 91 affiliated National Centres and 38 CIS collaborating Centres. Central Labour Institute, Mumbai has been designated as the CIS National Centre of India.

CIS can offer you rapid access to comprehensive information on occupational safety and health through:

- Microfiches on original documents abstracted in CIS DOC (CISILO)
- ILO CIS Bulletin "Safety and Health at Work"
- Annual and 5-year indexes
- The CIS Thesaurus
- The list of periodicals abstracted by CIS

EXCERPT FROM CIS DOC

Title: Airway responses in naive subjects to exposure in poultry houses: Comparison between cage rearing system and alternative rearing system for laying hens.

CIS ACCESSION NUMBER :
CIS 99-1275

ABSTRACT :

34 previously non-exposed subjects were exposed for 3h in confined poultry houses in three groups:one in a building with a cage rearing system and two in buildings with a cage-less system with either young hens and fresh bedding material or with older hens and old bedding material. Inhalable dust levels were approximately 4mg/m^3 in the buildings with the cage-less system and 2 mg/m^3 in the building with cage rearing system; the endotoxin concentration was approximately 100ng/^{m3} in both systems. Bronchial responsiveness to methacholine increased approximately fivefold in all groups following exposure. The concentration of the proinflammatory cytokine interleukin-6 increased in nasal lavage fluid and in peripheral blood as a result of exposure. The number of leukocytes in peripheral blood increased only in the groups exposed among loose laying hens. Results indicate that among previously non-exposed subjects, that 3h exposure in confined buildings for egg production induces an acute inflammatory reaction in the upper airways and increased bronchial responsiveness. Topics: airborne dust; bacterial toxins; bronchial diseases; confined spaces; epidemiologic study; exposure evaluation;inflammations; interleukins; organic dust; poultry farming; pulmonary function; upper respiratory diseases .

Note: For details write to CIS National Centre for India, Central Labour Institute, Sion, Mumbai 400 022.

PRODUCT NAME (S): Activated Carbon

PRODUCT INFORMATION

Chemical name : Activated carbon powder
Synonyms(s) : Carbon, charcoal.
Chemical family : Carbon
Shipping name : carbon, activated, powdered or carbon, activated, granular
Molecular formula: C
Whmis classification: Class b.4
Pin - un/na number(s): un 1362, cl. not regulated., pg. iii
Product use: Water purification.

HAZARDOUS INGREDIENTS

Ingredients:
Carbon, powdered carbon is classified as a nuisance particulate.

PHYSICAL DATA

Physical state: Solid
Odour and appearance: No odor. black solid; granular or powder.
Odour threshold: Odorless.
Vapor pressure: Not applicable.
Vapor density: Not applicable.
Evaporation rate: Not applicable.
Boiling point: 2150 deg c (8271 deg f)
Melting point: Not applicable.
Ph: Not applicable.
Specific gravity: Approx. 0.22 - 0.32g/cm3 @ 20 deg C
Molecular weight: 12
Bulk Density: Not applicable.
Solubility in water: Insoluble.
% volatiles by volume: Not applicable.
Coefficient of water/oil distribution: Not available

FIRE AND EXPLOSION DATA

Conditions of flammability:
Contact with strong oxidizers such as ozone or liquid oxygen cause removal of oxygen from the air to the point of rapid combustion.
Means of extinction: Water.
Flash point and method of determination: Not applicable.
Auto ignition temperature: 287-315 deg C (550-700 deg F)
Upper flammable limit: Not applicable.
Lower flammable limit: Not applicable.
Special fire fighting procedures:

Use water. Remove all carbon from the building. Firefighters should wear full protective gear and use self-contained breathing apparatus with a full facepiece. Avoid contact with strong oxidizers such as permanganate, perchloric acid, sodium chlorite and hydrocarbons.

Explosion hazards: tightly closed containers may explode.

REACTIVITY DATA

Stability: stable.
Hazardous polymerization: Will not occur.
Incompatibility:
Avoid; Strong oxidizers such as permanganate, perchloric acid, sodium chlorite and hydrocarbons.
Hazardous reactions/decompositions: Toxic gases.
Conditions to avoid: Extreme heat.

HEALTH HAZARD DATA

Effects of overexposure:
Activated carbon is a nuisance particulate, there are no known health effects from exposure.
Inhalation: Non-irritant.
Eye contact: Dust may cause irritation.
Skin contact: Non-irritant.
Ingestion: Pure carbon is non-toxic.
Chronic and acute effects on route of entry: None.
Exposure limits (TLV) 3.5 mg/cu. (Nuisance Particulate.)
Osha pel: 15 mg/m3 total dust
Acgih TLV: 10 mg/m3 total dust.
Irritancy: Not applicable.

Sensitization to product: Not applicable.
Animal toxicity data: ld50 (oral, rat) - not available.(mg/kg)
Carcinogenicity: ntp: iarc ochai
Reproductive toxicity: Not applicable.
Mutagenicity: Not applicable.
Name of toxicologically synergistic products: Not applicable.

FIRST AID MEASURES

Inhalation: Remove to fresh air. Get medical help if irritation persists.
Eye contact: Promptly flush eyes with plenty of running water for 15 minutes or more, including water under eyelids. consult a physician if irritation persists.
Skin contact: Wash affected area well with soap and water. Get medical help if irritation persists.
Ingestion: No known health effects. See a physician if there is irritation.

PREVENTATIVE MEASURES

Respiratory protection: A dust/mist filter is recommended when in extremely dusty areas.

Eye/face protection: Wear safety glasses recommended when in extremely dusty areas.

Skin protection: None.

Engineering controls: Local exhaust.

Additional protective equipment: Eyewash and shower. Personal cleanliness and cleanliness in the work area.

Special handling procedures: Follow good handling and housekeeping procedures, avoiding spills, accumulation of dust, and generation of airborne dust. Wash thoroughly after handling.

Storage requirements: Store in a sealed container in a clean, dry, well-ventilated area away from oxidizers, nitric acid, hydrogen peroxide and metals.

Special shipping requirements: Not regulated under the tdg. un 1362, cl.n/r, pg.III

ENVIRONMENTAL PROTECTION DATA

Procedures to be followed in case of a leak or spill:

Spilled substance can be shoveled up and recovered for use unless the carbon itself is contaminated. Product shoveled into drums can be disposed of in any Government landfill, using normal cleanup procedures, if in compliance with all federal, provincial and local regulations.

Waste disposal: Incinerate or landfill. product shoveled into drums can be disposed of in any Government landfill, using normal cleanup procedures, if in compliance with all federal, provincial and local regulations.
Environmental effects: Not available.

NOTE: The above details constitute part information of MSDS taken from Canadian Centre for Occupational Health and Safety. For complete MSDS write to MIS division, Central Labour Institute, Sion, Mumbai.400022. MSDS on about 1,00,000 chemicals/materials are available with Central Labour Institute. Computer printout will be supplied on nominal charge basis.

LIBRARY AND INFORMATION CENTRE

The Library-cum-Information Centre of Central Labour Institute has unique and rare collection of different kind of publications in the field of Occupational Safety, Health, Management and allied subjects. It also has a good collection of different standards, codes, regulations on these matters. In the current year the centre is subscribing to 28 Indian & foreign journals, besides receiving complimentary copies of different periodicals from all over the world. The centre provides facilities for study and research and at the same time supplies authentic and up-to-date information on Occupational Safety, Health and Management. It also extends reading facilities to students & scholars attending different training programmes & courses conducted by CLI. From January 2000 till date a number of publications in the field of OS&H have been added to Library. Some of them are :

ERGONOMICS
HOW TO DESIGN FOR EASE & EFFICIENCY

Authors: K.H.E.Kroemer, H.B.Kroemer & K.E.Kroemer Elbert.

Publisher:Prentice Hall Englewood Cliffs

Ergonomics is the application of scientific principles, methods, and data drawn from a variety of disciplines to the development of engineering systems in which people play a significant role. This book discusses the human interaction with work task and technology. This book has three major parts:

Part One, "The Ergonomics Knowledge Base," includes Chapters 1 through 6 which explore the properties of the human body and mind, as manifested in people's interactions with the environment. The focus is on human dimensions, capabilities, and limitations the human factors to be considered in E & E designing.

Part Two, "Design Applications," includes Chapters 7 through 12. It discusses the design of task, equipment and environment in the light of the obtained knowledge about human size, strengths and weaknesses-the knowledge base developed in Part One.

Part three, "Further Information," includes a listing of References, an extensive Glossary with concise descriptions and definitions, and a detailed Index which refers the reader to specific pages.

TEXTBOOK OF OCCUPATIONAL MEDICINE PRACTICE

Editors: J.Jayaratnam & David Koh

Publisher:World Scientific

This book aims to provide a link between occupational health and clinical practice. It is suitable for medical undergraduates, general practitioners, postgraduate students and clinicians with an interest in occupational medicine. Other occupational health professionals, in particular, occupational health nurses, will also find this book useful.

The main approach of most chapters is to examine Occupational health issues and concerns from the standpoint of clinical presentations of the different organ systems. This book also contains chapters on screening and routine medical examinations, health promotion at the workplace, assessment of disability for compensation, medical planning and management of industrial disasters and the prevention of occupational diseases.

ILO TO HELP IN TRAINING RETRENCHED EMPLOYEES

The International Labour Organisation (ILO) will assist the State in conducting training programmes for retrenched employees and those who have availed themselves of Voluntary Retirement Scheme, Ms. Mary Johnson, Director, ILO Area Office, New Delhi, has said. She was responding to a request for equipping such employees with skills that could get them jobs, by Mr. C. Valliappan, President, Employers' Federation of Southern India. Ms. Johnson also assured the State's Labour Minister, Mr. A. Rehman Khan, that she would speak to the Italian Ambassador regarding his interest to initiate an ILO assisted novel child labour eradication programme at Vellore.

The Minister, Mr. Rehman Khan, detailed the efforts taken by the State in eradication of child labour. He said the State proposed to ask the Centre to accord priority to the families of former child labourers in rural welfare schemes. In the liberalised scenairo, employment in the traditional employment was shrinking and opportunities were available in service and IT sectors, Mr. Valliappan said. The change warranted a highly educated and trained work force and it was obligatory on the part of both the industry and the government to retrain their labour force to match the requirements.

Source : The Hindu

DISASTER MANAGEMENT SCHEME FOR CHEMICAL INDUSTRIES IN STATE

The Maharashtra State Chief Secretary today said the Maharashtra Government has meticulously planned and implemented a special disaster management scheme for dangerous chemical industries functioning in the State. The scheme, he said, would promote the vital chemical industry in Maharashtra and at the same time, would ensure safety of Industrial workers as well as citizens residing in areas surrounding any major chemical plant. He was addressing a gathering of officials of Union Ministry of Environment and Forest, State Directorate of Industrial Safety and Health, the Confederation of Indian Industries, senior police, fire brigade and civil defence officials as well as senior functionaries from about 100 hazardous chemical factories operational in Maharashtra. The delegates also participated in a day-long workshop on Industrial safety and Chemical emergency Preparedness jointly organised by the Union and State Government. Speaking as the chief guest, he further said, "The State Government has implemented the disaster management scheme for all 335 hazardous chemical plants operational in different parts of Maharashtra.The Government is keen on maintaining a fine control over pollution, care for the environment and avoid serious disasters. The State will ensure safe growth of the important chemical industry. The industrialists should cooperate with the State and respond to various safety norms being enforced here. It is a mutual relationship between the two, with the thrust on safety." Special Secretary to Union Environment and Forest Ministry, praised the State for its standing so far as industrial set-up and infrastructure is concerned. "Maharashtra is an industrially developed State which also adheres to strict safety and environment norms. The Union Government is implementing various schemes for Maharashtra with a special thrust on chemical industries for the very reason," he said. Principal Secretary to the State Labour Department responsible for industrial safety, maintained that the Government and industrialists should work in unison to ensure welfare of industrial workers and protection of industries. Others present on the occasion were Joint Secretary to Union Environment and Forest Ministry, various industrial experts and senior officials.

Source: The Indian Express

44TH CONFERENCE OF CHIEF INSPECTORS OF FACTORIES

The 44th Conference of Chief Inspectors of Factories was organised from 11th to 14th February, 2000 at Conference Hall of the Chief Secretariat, Pondicherry. The Conference was inaugurated by Her Excellency Dr.(Smt.) Rajani Rai, Lt.Governor of Pondicherry. Shri Arun Goyal, I.A.S., Secretary, Government of Pondicherry, Ministry of Labour delivered welcome address while Shri T.T.Joseph, I.A.S.,Chief Secretary, Government of Pondicherry delivered special address and extended welcome address to all the delegates/dignitaries, Chief Inspectors of Factories and Officers of Directorate General Factory Advice Service & Labour Institutes (DGFASLI), Mumbai.

Dr.L.Mishra, I.A.S., Secretary to the Government of India, Ministry of Labour delivered the key note address. Shri S.K.Saxena, Director General, DGFASLI, Mumbai delivered special address and briefed the delegates about the importance of the conference. Shri Theva Neet Dhas, Labour Commissioner-cum-Chief Inspector of Factories, Pondicherry proposed vote of thanks .

Some of the decisions taken at the conference were:

1. The definition of Child to be modified so as to be in line with Child Labour (Prohibition and Regulation) Act 1986.

2. Poultry breeding/farming to be a manufacture process as per the provisions under Section 2 k of the Factories Act, 1948.

3. Simplification and rationalization of forms/returns under the Factories Act, 1948.

4. Amendment to the provisions under the Factories Act, 1948 relating to the insecticides and pesticides factories for use of Personal Protective Equipment so that the amended provisions be in conformity with relevant BIS standard.

TRAINING WORKSHOP FOR THE ENTREPRENEURS OF SMALL & MEDIUM SCALE UNITS

An intenstive training workshop for the Entrepreneurs of Small & Medium Scale units was organised at Chandigarh from 18th to 20th January, 2000. The workshop was jointly organised by the Regional Labour Institute, Faridabad, Labour Commissioner Office, Union Territory of Chandigarh and the Industrial Association, Chandigarh. It was attended by 30 owners from different units.

The workshop was inaugurated by the Officer in Charge of RLI, Faridabad. During the workshop, technical presentation on various topics e.g. material staging and handling, workstation design, machine safety, control of hazardous substances etc. were made. Further a visit was made to one manufacturing unit by the participants for the purpose of the check list exercise.

TRAINING PROGRAMMES
APRIL-JUNE 2000
CENTRAL LABOUR INSTITUTE , SION, MUMBAI - 400 022

Programme Title	Period	Contact Person
Associate Fellowship of Industrial Health	1-7 April, 2000	Director(Medicine) & Incharge Indl.Medicine Division
Total Safety Management	4-5 April, 2000	Director (Safety)& Incharge Indl.Safety Division
Wage & Salary Aministration	24-28 April, 2000	Director(Productivity) & Incharge Productivity Division
Industrial Fatigue - its evaluation & control	24-28 April, 2000	Director(Physiology) & Incharge Indl Physiology Division
Effective Supervision for Results(ESR)	24-28 April,2000	Director(Staff Trg..)& Incharge Staff Training Division
Safety in Material Handling	9-11 May, 2000	Director (Safety)& Incharge Indl.Safety Division
Evaluation and Control of Hazards in Drugs & Pharmaceutical Industry	22-26 May, 2000	Director(Indl.Hygiene) & Incharge Indl.Hygiene Division
Work & Working Environment for Safety, Health and Productivity at Work	22-26 May, 2000	Director(Ergonomics) & Incharge Indl.Ergonomics Division
Diploma in Industrial Safety	15-30 June, 2000	Director (Safety)& Incharge Indl.Safety Division
Workshop on Safety System	6-7 June, 2000	Director (Safety)& Incharge Indl.Safety Division
Productivity Improvement through Effective Employee Participation	19-23 June, 2000	Director (Productivity) & Incharge Productivity Division

Programme Title	Period	Contact Person
Safety & Health Management in Thermal Power Plant	20-22 June, 2000	Director(Indl.Hygiene)& Incharge Indl.Hygiene Division
Emergency Planning & Preparedness	26-27 June, 2000	Director(MAHCA) & Incharge MAHCA Division
Occupational Physiology Application in Industries	26-30 June, 2000	Director(Physiology) & Incharge Indl.Physiology Division

TRAINING PROGRAMMES
APRIL - JUNE 2000

REGIONAL LABOUR INSTITUTE, SARVODAYA NAGAR, KANPUR - 208 005

Programme Title	Period	Contact Person
Training programme on Prevention & Control of Fire in Industry	10-14 April, 2000	Director Incharge
Training programme on Safety Audit	3-5 May, 2000	Director Incharge
Training programme on Testing & Examination of Lifting Machines,Tackles & Pressure Vessels.	22-26 May, 2000	Director Incharge
Training programme on Safety & Health in Sugar Industries	19-23 June, 2000	Director Incharge

INDOSHNET

Ministry of Labour, Government of India, is developing a National Network on Occupational Safety and Health information system known as INDOSHNET. Directorate General Factory Advice Service & Labour Institutes (DGFASLI), an attached office of the Ministry of Labour will act as a facilitator of the network system. The objective of the network is reinforcement and sharing of national occupational safety and health (OS &H) information on no-profit no-loss basis with a view to pooling our information resources for mutual benefit. The sharing of information will not only confine to the national level but also includes international sources. The communication of information will be through E-mail as well as postal/courier service. DGFASLI invites industrial organisations, institutions, industry associations, trade unions, professional bodies and non-governmental organisations having information on OS&H and willing to share the same with others at the national and international level to participate as members in the network. Interested agencies may please write for proforma of organisational profile to Director General, DGFASLI, Central Labour Institute Bldg., N.S. Mankikar Marg, Sion, Mumbai 400 022.

Note: Those who have responded to our earlier communication and sent organisation profile in the prescribed format need not write again.

NATIONAL REFERRAL DIAGNOSTIC CENTRE

Early detection and diagnosis of occupational health disorders and occupational diseases is one of the most important factors in the prevention and control of adverse health effects on workers due to various factors - physical, chemical, biological and psycho-social. The Industrial Medicine Division of Central Labour Institute, Mumbai runs a National Referral Diagnostic Centre (N.R.D.C.) for early detection and diagnosis of occupational diseases and recommends necessary measures for prevention/control of occupational health problems/occupational diseases. The diagnostic centre is well equipped for medical examination of the exposed workers and facilities are available for carrying out special investigation, e.g. Pulmonary function tests, Audiometry, ECG, Titmus vision test, Biological monitoring, etc. Medical professionals including Factory Medical Officers, ESI Doctors, Medical Inspectors of Factories and Certifying Surgeons, Doctors from Medical Colleges and Hospitals can refer suspected cases of occupational diseases to N.R.D.C. for diagnosis and advice. The communication should be addressed to the Director General, DGFASLI, Central Labour Institute Bldg., N.S. Mankikar Marg, Sion, Mumbai 400 022 for further details.

GOVERNMENT OF INDIA, MINISTRY OF LABOUR
DIRECTORATE GENERAL FACTORY ADVICE SERVICE & LABOUR INSTITUTES

The Directorate General Factory Advice Service & Labour Institutes (DGFASLI) is an attached office of the Ministry of Labour, Government of India. DGFASLI organisation was set up in 1945 under the Ministry of Labour, Government of India to serve as a technical arm to assist the Ministry in formulating national policies on occupational safety and health in factories and docks and to advise State Governments and factories on matters concerning safety, health, efficiency and well-being of the persons at workplace. It also enforces safety and health statutes in major ports of the country.

The Directorate General Factory Advice Service & Labour Institutes (DGFASLI) comprises:

* Headquarters situated in Mumbai
* Central Labour Institute in Mumbai
* Regional Labour Institutes in Calcutta, Chennai, Faridabad and Kanpur

The Central Labour Institute in Mumbai functions as a socio-economic laboratory and is a national institute dealing with the scientific study of all aspects of industrial development relating to the human factors.

Over the past 33 years the Central Labour Institute has constantly grown not only in size but also in stature and has earned national and international recognition. It has been recognised by the International Labour Organisation as a Centre of Excellence in training on Occupational Safety and Health in the Asian and Pacific Region. It also functions as a National Centre for CIS (International Occupational Safety and Health Information Centre) and the Centre for National Safety and Health Hazard Alert System. At the national level, apart from providing research and training support to the Government and functioning as a technical arm of the Ministry of Labour, the institute provides comprehensive and multi-disciplinary services to the Industrial Port sector through studies, technical advice, training and dissemination of information. It also runs National Referral Diagnostic Centre for early detection of occupational disorders and thereby controls and prevents them. It has a modern Audio Visual Studio fully equipped with sophisticated video production equipment to produce quality U-matic video films on Safety and Health. The Regional Labour Institutes are a scaled-down version of the Central Labour Institute and cater to the needs of their respective regions.

The organisation is poised to grow further, and meet the increased demands on it. In a developing country with a large number of industries having diverse and complex nature, the task of protecting safety and health of workers is an uphill task. Armed with the technology, good-will of the industrial society and the strength of the dedicated staff, the organisation is well prepared to meet the challenges of tomorrow. It is committed to the goal of making the workplace safer.

Visit us at: http://www.dgfasli.nic.in