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### **FROM THE DESK**

20<sup>th</sup> Century was an era of rapid development of chemical sciences and technology that has given enough goods and money to the people but could not make any impact in the quality of life of the producers of goods. It has also left behind the people with multitude of problems and created enough confusion in the minds of the people.

The 21<sup>st</sup> Century on the other hand is going to be the era of information technology and 2<sup>nd</sup> green revolution with the health technology as the fulcrum of development for the nation.

The cover feature of this issue discusses the safety, health and environmental problems that emerged out of rapid progress and development in sciences and technology.

The future strategy to deal with the SHE problems of the country is also given in detail. Special attention is given to the thrust areas and future plans programmes and practices developed so that the felt needs of the working population could be met with on priority basis.

**S.K.SAXENA**  
**EDITOR-IN-CHIEF**

**PERSPECTIVES ON OCCUPATIONAL SAFETY, HEALTH & ENVIRONMENT  
OF WORKERS AT THE NATIONAL LEVEL  
-CURRENT SCENARIO AND THE PATH AHEAD \***

**S.K.SAXENA**

**1. INTRODUCTION**

At the outset I am happy to be present among this distinguished gathering of medical, safety and environment professionals on the occasion of the 55th National Conference of the Indian Association of Occupational Health (India). I feel privileged at being invited to deliver "Sir Ardeshir Dalal Memorial Oration" to this august gathering. The subject of my presentation today would be "Perspective on occupational safety, health and environment at the National level - Current scenario and path ahead". Details of the presentation have been given in the document and I will present the highlights.

During the last decade, globalization of the Indian economy has intensified and together with it, the developments in the field of information technology have brought about transformation in the society. Occupational safety, health and environment cannot ignore these developments and should adapt to this situation.

One of the most important impact of globalization and liberalization of international trade on occupational safety, health and environment is that of harmonization of standards. The harmonization of standards in the globalized economy will be a powerful tool for self regulation in safety, health and environment by the industries.

**2. WORKFORCE AND THE SAFETY AND HEALTH**

Industries were established in India as early as 1850's. But large scale industrialization started only after India became independent in 1947. Immediately after independence, the country had about, 31,000 factories employing about 2.5 million workmen. During the next two decades, the number of factories almost doubled (81,000) and the number of workers also doubled. By 1981

the country had more than 1 lakh factories employing about 7 million workers. It may be worth mentioning here that today India has around 2.3 lakhs factories employing around 8 million workers.

During the last few years, growth of industries has been relatively faster and is expected to be even faster in the years to come. Today the country has all types of industries both in the organized and unorganized sectors. An idea about the size of unorganised sector and the employment in different sectors is given in this article.

The major chunk of our workforce belongs to the agricultural sector (69%), followed by manufacturing (11%) and then other unorganised sectors.

We have a large workforce who have no access to occupational safety and health services. Consequently the dimensions of the problems of occupational accidents and diseases are also large.

Some of the chemical industries in our country also carry the risk of Major Accident Hazard (MAH). As on date, there are in all 1,539 MAH factories in our country. The total number of chemicals posing risk of MAH potential is 166. This document gives the state-wise list of MAH factories in the country.

The top 5 states having major concentration of hazardous industries are 1. Gujarat, 2. Maharashtra, 3. Andhra Pradesh, 4. Tamil Nadu and 5. Rajasthan.

**3. SAFETY, HEALTH AND ENVIRONMENT (SHE) PROBLEM**

The rapid industrial growth in India especially during the post independence period has not been concurrent with the developments in the socio-economic fronts, because of the problems of food and war and exaggerated defence budgets.

### 3.1 Safety

In India, 50,000 to 60,000 accidents are occurring annually in the manufacturing sector. These accidents result in injuries of varied severity and about 1000 people die every year due to accident. The rate of injuries and the frequency rate have not come down significantly over the years.

Textiles, basic metal & alloys, non-metallic mineral industries, transport equipment and parts, machinery machine tool parts and electrical machinery have the highest rates of accidents.

More than 70% of accidents are caused by factors, such as: Machinery/Material handling/Stepping on objects or striking against /falling bodies/persons falling and hand tools.

We see accidents or injury as a natural consequence of work that must be compensated rather than prevented. There has been little commitment by most employers to ensure safety and health. Workers and trade union leaders did not appreciate the extent of problems and they chose to spend most of their energies fighting for better remuneration, lesser work and other facilities.

The number of accidents in major ports have been declining considerably with concerted efforts.

### 3.2 OCCUPATIONAL HEALTH

Occupational disease data do not reflect the real magnitude of the problem. The published statistics indicate that there were only 103 reported cases of occupational diseases during the year 1979. It was only 32 in 1980 and in the year 1981 it was merely 20. These are the astonishing figures as revealed by our national level data.

This article shows that the number of workmen compensated for the diseases were also much less.

The sample surveys and studies conducted by DGFASLI show considerable prevalence of occupational diseases at the national level

especially among workers employed in hazardous processes factories.

The prevalence of diseases was significantly related to the concentrations of pollutants in air, blood and urine of workers in different work areas. The most common diseases were the coal-mines pneumoconiosis in coal mines, silicosis in industries such as quarries, refractories, pottery, cement and glass. The other diseases are Noise induced hearing loss, Pesticide poisoning, Carbon disulphide poisoning, Chrome dermatitis, Contact Dermatitis, Lead poisoning & Byssinosis.

Prevalence of Asbestosis disease due to exposure to asbestos fiber is not as alarming as the top 10 diseases.

Silicosis is a disease much more common in the unorganized sector where a large quantity of Silica is being used.

In the State of Orissa, 530 cases of Silicosis among workers, when followed during subsequent years, were found disappearing out of the surveillance programme at an average rate of 25 cases/year.

The above data may be representing only the tip of the ice-berg and there are many more cases of occupational health disorders such as cumulative trauma disorders, occupational asthma and poisoning due to variety of chemicals. One of the reasons for lower identification and poor reporting of occupational diseases is that these cases have very diverse and confusing signs and symptoms. Inadequate facilities for early detection and lack of trained manpower are also the contributory factor. Lack of awareness at all levels of employees and the apprehensions and attitude associated with the occupational nature of disorders are the major hurdles in timely detection and notification of occupational diseases.

Small Scale sector employs about 167 lakhs workers distributed over 30 lakh small scale units in the country. The working conditions in these units are far from satisfactory. The dangerous chemical are handled without any safety precautions.

The workers of these sectors have no knowledge of safety.

In a sample study in the small scale units in North Eastern states and Andamans, it was observed that 60\1000 workers had deformities of their fingers. Chronic bronchitis and lead poisoning were found to be common among these workers.

In a similar sample study of dock workers, prevalence of occupational asthma was found to be higher.

### **3.3. ENVIRONMENTAL HEALTH**

The hazards of chemicals in industry are not restricted to industrial workers alone. The chemical contaminants from the industry have a high potential to cause harmful effects on the population around such an industrial complex. The Bhopal Gas Tragedy is a live example to be quoted in this context.

Environmental health problems have long been recognized as a significant cause of morbidity and mortality in affected population world-wide. Hazardous process industries discharge hazardous wastes, effluents and emissions without appropriate treatment and have a profound impact on environmental health.

Environmental air pollution has caused increasing trends of asthmatic disorders.

### **3.4. ERGONOMICS**

It is known from ages that improper man-machine design has been the cause of many musculo-skeletal disorders. It is also accepted that the design of machinery or even work practices should match the man in terms of his anatomical and physiological constitution. However, the problems associated with design defects and improper work methods has been the most underestimated hazard in this country. Adoption of work methods according to ergonomic consideration did not strike many managements and employers. There are very few progressive managements of manufacturing sector who have taken into consideration the human body dimensions to

design their products or develop their work practices.

The DGFASLI organization, a pioneer in the field of ergonomics has a significant contribution to humanize work and work environment. The DGFASLI has conducted various National studies and consultancy studies in various industries.

The outcome of the National Studies are data pack on human body dimensions for designers use, ergonomically designed workstation for computer users and workstation and working tools for beedi workers.

Various sectors in which ergonomic intervention needs to be highlighted are call centers, manufacturing sector, construction work, small scale industries and agricultural sector. The problem of call center should be taken as a priority.

#### **3.4.3 Call centers**

Apart from the physiological stress, call center operation is associated with the psychological stress and the psycho-physiological stress leading to various psycho-somatic symptoms.

Call centers in India generally function during night. It disturbs the bio-rhythm. Call center workers face a lot of stress because of long working hours, heavy workload, monotony, irregular working schedule, always to be alert, and to deal with aggressive customers, etc. This is a newly developed employment sector; hence it is necessary to take up some in-depth studies to prevent such problems.

### **3.5. EMERGING PSYCHO-SOCIAL (EPSP) PROBLEMS AT WORK**

The emerging psychological problems such as work stress, addiction to tobacco, alcohol & drugs, AIDS and violence have serious repercussions on safety, health and environment at workplace.

There is a strong positive relationship among stress, tobacco, alcohol, HIV (Aids) and violence.

These psycho-social factors can result in isolation, stigmatization, injury, illness and even death. For an organization, these factors can result in increased absenteeism, turnover, accidents and reduction in productivity and efficiency.

A study conducted by the DGFASLI on Telephone Operators working in MTNL, Mumbai revealed that stress due to inadequate social support system, shift work and ineffective feedback contribute to depression and psychomotor strain.

A recent study conducted by DGFASLI on the transport equipment operators (727) working in the Ports revealed that psychological stress occurs due to long working hours, insecure jobs, away from family, inadequate basic amenities and poor food habits.

In addition, there are problems of safety and health relating to workers of agriculture and construction sectors.

#### **4. INFRASTRUCTURE**

In accordance with conventions as well as recommendations of ILO, the government has drafted a National safety, health and environment policy for workers of all occupations.

##### **4.1 LEGAL FRAMEWORK AND ITS ENFORCEMENT**

The salient features of the national policy on occupational safety and health are derived from the Constitution of India. Article 24, Article 39 and Article 42 address issues such as child employment, health and strength of workers, just and humane conditions of work, etc.

##### **4.1.1. WORKPLACE SAFETY AND HEALTH STATUTES**

There are numerous legislations to take care of safety and health of workers. Some of these are sector or occupation specific and others are equipment or substance specific.

**The Factories Act, 1948** deals with occupational safety, health and welfare of workers employed in factories. Periodical medical examination, maintenance of levels

of hazardous substances below the prescribed threshold limit values (TLV), periodical *disclosure* of information to workers related to health hazards, health records and a safety committee with equal representation of the workers and management are some of the important requirements.

**The Dock Workers (Safety, Health and Welfare) Act, 1986** aims at providing for safety, health and welfare of workers employed in loading, unloading, movement or storage of cargoes into or from ship, port, dock etc. The Central Government has notified the Dock Workers (Safety, Health and Welfare) Regulations, 1990 applicable to all major ports in India. Salient features of these regulations are given in this article.

**The Mines Act, 1952** aims to regulate the conditions of labour and safety in mines. It contains provisions relating to safety and health such as first-aid boxes, notice of accidents, notice of certain diseases, etc.

##### **The Building and Other Construction Workers (Regulations of Employment and Conditions of Service) Act, 1996**

aims at regulating the employment and conditions of services of building and other construction workers and providing for their safety, health and welfare measures. The Act is applicable to any building or other construction work where 10 or more workers are employed.

##### **4.2 LIMITATIONS OF EXISTING STATUTES AND PROBLEMS OF ENFORCEMENT**

There are numerous units employing less than 10 workers which handle hazardous chemicals and undertake dangerous operations. The workers employed in these units are not protected against hazards.

There are a number of laws relating to occupational safety and health enforced by

different enforcing agencies. Some of them also contain requirements which are not consistent with one another.

The Factories Act 1948 contains requirements which are so detailed and specific that factories, particularly, small factories are not able to comply with these procedural requirements.

At present the Dock Workers (Safety, Health and Welfare) Act 1986 and the Dock Workers (Safety, Health and Welfare) Regulation 1990 are not applicable to minor and intermediate ports as the rules are yet to be notified by the Respective State Governments. The workers employed in these ports are without any protection against work place hazards.

Inland Container Depots and Container Freight Stations are out of the scope of any statute relating to safety and health. As a result, accidents and dangerous occurrences are neither recorded nor reported to any authority.

The Building and Other Constructions Workers (Regulation of Employment and conditions of Service) Rules are notified by 9 States only. As such, the benefit of protection is not extended to construction workers in other States.

There is no legislation which covers the occupational safety and health aspects of workers employed in agricultural operations.

The status of compliance with statutory requirement in factories is not satisfactory due to inadequate inspectors. In major ports, only 10% of the ships called are inspected against the norm of 50%

The infra-structural facilities such as transport, telephones, computer, etc. are not available at factory inspectorates and transport in dock safety inspectorates.

#### **4.3. CASE LAWS**

Statutory Laws are made by the Parliament or Assembly. Case laws form the grounds for amendments of the statutory laws. Few of the case laws relating to safety, health and environment are

#### **4.3.1 HAZARDS OF EXPOSURE TO ASBESTOS**

In a case CERC Vs GOI relating to protection against exposure to asbestos, Hon'ble Supreme Court directed Governments to revise the permissible level of exposure to asbestos; and to ensure health insurance of workers, maintenance of health records, adoption of Membrane Filter Test for fibre detection.

#### **4.3.2 TOXIC RELEASE OF CHEMICALS**

In Shriram Case of Mehta & others Vs Union of India concerning release of toxic chemicals, the Hon'ble Supreme court applied the "Polluter pays principle" and gave a judgement that in case the release of toxic chemicals results in damage to the health of the public, the polluter would be liable to pay the compensation.

#### **4.3.3 HANDLING OF HAZARDOUS WASTES**

A public interest litigation challenging the import of hazardous wastes in to the country was filed in 1995 in the Supreme Court of India by the Research Foundation for Science, Technology and National Resource Policy (New Delhi).

The Hon'ble Supreme Court directed the Ministry of Labour and Ministry of Industry to constitute a special committee to examine the "Impact of Hazardous Wastes on Workers' Health". Specific recommendations of the Committee have been included in this article.

#### **4.3.4 DIRECTOR AS OCCUPIER**

In case of J.K.Industries Vs CIF, the Hon'ble Supreme court has directed that one of the Directors of the company should be declared as occupier to make him conscious of responsibilities and duties for the implementation of the safety and health measures in the factory and to carryout duties prescribed under the Act.

#### **4.4. EXISTING INSTITUTIONS FOR TRAINING & RESEARCH.**

The major hindrance of occupational health development in India is that the subject was not given proper attention.

The Armed Forces Medical College, Pune and the All India Institute of Hygiene and Public Health started a postgraduate Diploma in Industrial Health course from the second half of 1950s.

The DGFASLI started a certificate course in occupational health to train factory medical officers. The 1<sup>st</sup> batch of 60 doctors came out with AFIH qualification from Central Labour Institute in the year 1993. Till 2004, some 506 factory medical officers have qualified from DGFASLI.

At present there are only 5 institutions recognized for conducting of 3-month certificate courses for doctors. These are:-

- 1) Central Labour Institute, Mumbai
- 2) Regional Labour Institute, Kolkata
- 3) National Institute of Occupational Health, Ahmedabad.
- 4) Maulana Azad Medical College, New Delhi.
- 5) Lokmanya Medical Research Centre, Pune.

Apart from this, the Indian Association of Occupational Health as well as its branches have also been undertaking activities like conducting seminars and courses for disseminating information related to the detection of occupational diseases and the measures to be taken for controlling them.

The DGFASLI provides research and training support to the government and comprehensive and multi-disciplinary services to the industry, port and construction sector through studies, technical advice, training and dissemination of information. It also runs National Referral Diagnostic Centre and a modern audio-visual studio.

Out of 34 States and Union Territories, 18 States have been equipped with Industrial Hygiene Laboratories. These laboratories besides the CIL and its 3 RILs and certain

other institutions such as NIOH, ITRC, NEERI constitute an important part of the infrastructure for advising and assisting industries in carrying out the work of environment monitoring.

Occupational Disease (OD) Hospitals of ESIC at its five zonal centers provide medical care for workers covered under ESI.

In the field of Ergonomics, apart from DGFASLI, various other organizations are also involved in training and research.

#### **4.5. PROFESSIONALS AVAILABLE:**

##### **4.5.1. Factory Inspectors and certifying Surgeons**

There are at present more than 500 Factory Inspectors in the country. However, the picture is gloomy in respect of Medical Inspectors of Factories. The total number of medical inspectors in the country is only 28.

As per the information available with DGFASLI, out of 34 States/UT, only 8 states have appointed Certifying Surgeons.

##### **4.5.3 Safety Officers:**

Safety Officer is the key person to coordinate the safety activities of his organization. The sustained efforts to run DIS Courses by DGFASLI and other institutions for the last 3 decades have resulted in meeting the requirement to a great extent.

##### **4.5.4 Factory Medical Officer**

About 1500 medical practitioners are working as Factory Medical Officers. Many of them do not possess requisite qualifications. Some of the reasons for continued shortfall of qualified FMOs are that most of the medical institutions do not offer courses on Occupational Health

##### **4.5.5 Industrial Hygienists**

The industries do not have qualified Industrial Hygienists. This non availability of the

professionals is because no institution is conducting such courses.

## **5. FUTURE PERSPECTIVES**

The existing scenario of occupational health and safety is not very appealing so far as the effectiveness of existing infrastructure is concerned. Apart from the statutory compliance, the infrastructure has to be improved further and that requires proper funding and political will. The solutions for the current problem are the four new paradigm shift namely a resource, academic cooperative & R&D.

We also need to concentrate on the quality of manpower rather than just the quantity for becoming a favourable destination for global R & D.

### **5.1 DEVELOPMENTAL AREA**

#### **5.1.1 EDUCATION**

The crumbling state of medical education is of concern and it is deficient in occupational medicine. There is a need to include significant hours of teaching in occupational medicine and reasonable number of field visits to factories and OSH institutions.

Occupational Health and Industrial Safety should be a compulsory subject in under graduate course of Medicine and Engineering respectively.

The curriculum of education in all disciplines at the graduation level should have a chapter on safety and health highlighting the importance of SH&E at workplace, public place and community level.

Education of general community through modern media of mass communications could effectively spread the message of safety and health around each and every corner of the society.

#### **5.1.2. TRAINING**

Three month specialized training course for managers and supervisors of construction industry, one month specialized course for

Supervisors especially engaged in the hazardous process industries, specialised training programme of 3 months duration in Industrial Hygiene Techniques, training programmes for industrial nurses, and training programmes for medical college teachers are some of the important programmes developed by the DGFASLI.

There is a need to conduct specialized training programmes for enforcement officials, agriculture extension officers, first-aiders, PHC medical officers and OH auditors. Other institutions should also step in to supplement the efforts of the DGFASLI.

Institutions like National Environmental Engineering Research Institute, Nagpur could be harnessed for teaching and training of personnel in Occupational and Environmental Health.

#### **5.1.3 RESEARCH:**

Development of research in OSH is an important component of education. In our country, we have a number of institutions such as ITRC, NIOH, DIPAS carrying out research in many areas related directly or indirectly with the safety and health of industrial workers.

The DGFASLI is involved in applied research in the various areas of OSH such as assessment of occupational safety and health status of workers in all sectors of economy and problem areas requiring our attention such as call centers, VDT etc.; Development of respiratory and non-respiratory personal protective equipment, testing the suitability of PPE of different kinds to Indian work environment and climatic conditions, development of anthropometric data and Standard Data Pack for Design Engineers.

Medical records of industrial workers of all sectors can turn out to be a very useful tool to find out hidden causes of accidents, sickness absenteeism and increased cost of medical care. The industrial research and development trend needs a grass root innovation.

## **5.2 THRUST AREAS**

### **5.2.1 ENFORCEMENT**

Prioritization of inspection, simplification of procedures for compliance with statutory laws, promotion of guidelines, codes of practices and standards; training of inspectors, networking could go a long way in the improvement of the system of enforcement.

### **5.2.2 LABOUR REFORMS**

Many of the labour laws including those connected with occupational Safety and Health were framed even before the independence. The Second National Labour Commission reviewed the system of labour legislations in the country. The Commission recommended formulation of national policy, formation of national board and umbrella legislation on occupational safety and health at work, Institutionalization of Occupational safety and health management system and Simplification and Rationalization of Statutory forms under various labour laws.

### **5.2.3. MANAGEMENT INFORMATION SYSTEM**

Information on safety and health play an important role in deciding future thrust areas. DGFASLI has taken up a task of building up a national inventory on occupational safety and health. Till date, inventory on OSH in respect of 9 States have been developed.

DGFASLI has launched its website on OSH. Safety, health and environment professionals can share information with the DGFASLI so that it can be put it on the website for everyone to have access to the information.

### **5.2.4. LABOUR STANDARDS**

The International Labour Organisation has adopted a declaration on setting fundamental principles and rights at work at its 86th session in 1998. It also committed itself to promote and implement the core ILO conventions. India has ratified 40

conventions including those concerning OSH.

The Government of India is taking steps to incorporate safety and health standards in national statutes as an ongoing measure.

### **5.2.5. OSH SYSTEM AND INSURANCE**

With the opening of the insurance sector, few private organizations have tied up with international insurance companies for introducing new insurance products in the country. The new products would also cover the risk insurance arising out of manufacturing operations including compensation to be paid to the victims of accidents. As a result of this market enlargement, the insurance companies would be computing their insurance premium on the basis of status of safety and health in the customer units.

The insurance companies will also be taking steps to promote occupational safety and health in industry and assist them in reduction of risk arising out of manufacturing operations.

### **5.2.6 ADDRESSING PSYCHO-SOCIAL PROBLEMS AT WORK:**

The ILO model on SOLVE is an innovative model and a new safe-work methodology to address these problems. The Statutory safety & health policy should include SOLVE programme as an essential component. This would bring down psychosocial problems significantly and reduce not only the sufferings of the people but also enhance productivity resulting in the high morale of the work force.

### **5.2.7 NATIONAL REFERRAL DIAGNOSTIC CENTRE (NRDC)/POISON INFORMATION & CONTROL CENTRE (PIC)**

DGFASLI, has set up N.R.D.C. at Central Labour Institute, Mumbai. Efforts are being made to set up similar centres at Chennai, Kolkata, Kanpur and Faridabad

There is a high demand from industries, trade unions and medical professionals for setting up such centres so that the cases could be referred for necessary examination. This will also generate very useful data on occupational diseases and their causes to develop preventive strategies at the policy level.

Proposals are also in line to set up Poison Information & Control Centre at Central Labour Institute, Mumbai first and then extend it to the Regional Labour Institutes. Information regarding toxicological consequences of hazardous chemical exposure on workers and their remedial strategies could be made available to the industry and the affected workmen within the least possible time.

#### **5.2.8 IMPROVEMENT IN LABORATORY FACILITIES**

The rapid development in chemical technology in the country and changing trends of use and production of variety of chemicals in industry has given rise to safety and health problems of workers. In order to be capable of tackling the problems arising out of such development, the Government of India has decided to upgrade the existing laboratory facilities such as Industrial Medicine

Laboratory, Industrial Hygiene Laboratory, Industrial Physiology Laboratory and Respiratory & Non-respiratory PPE testing laboratories under the DGFASLI and the laboratories at NIOH, ITRC and DGMS. These laboratories shall act as Reference Laboratories and carry out the analysis of samples from the units as well as State Factory Inspectorates.

#### **5.2.9. MAJOR COMMITMENT OF THE GOVERNMENT OF INDIA**

In order to boost the progress and development of OSH programmes in the country, major commitments are made by the Govt. of India. Some of the commitments are:

Promotion of public-private partnership, Creation of National SHE at workplace fund, Restructuring scientific and technical

support system, de-bureaucratization to sustain development and to provide freedom to carry out useful and need based research activities in the areas of SHE, setting up national level OSH Model Centre at Regional Labour Institute, Faridabad and conducting specialised training workshops.

#### **5.2.10 COMMON MINIMUM PROGRAMME**

The seven segments of the unorganized sector, namely, construction, home work, shops & establishments, Cigar & Bidi works, Transport, waste management and agriculture will have priority attention in the area of safety and health.

Formulation of a coherent national policy on OSH and framing an umbrella legislation on OSH have been included on priority in the 10<sup>th</sup> Five Year Plan.

### **6. THE PATH AHEAD**

The workforce of near future, unlike that of the past is going to be well-educated and well-informed of their rights for protection of their safety, health and well being. Also the human rights movement invoking article 21 of the constitution for protection against the risk of life is likely to become more intense and long sustained. The employer will no longer be able to continue his business without implementing appropriate technology for ensuring safe and healthy conditions of work for the workers and clean general environment to the public at large.

The judiciary has also been giving clear signals that nobody would be spared for violating the constitutional and environmental norms any further. If the attitude of the employer do not change with fast changing trends of health and safety in the country, the profit of industry is bound to fall sharply and the losses due to litigation and compensation claim payment will break the back bone of employer. The price of goods produced in the future will be decided by the quality and effectiveness of the services provided to safeguard the health and safety of workers. The requirement for ISO Certification or OSHA Standards of safety, health and environment for exporting / importing of goods is the honest beginning made by the international community in this

direction. The market of the future will require more disciplined and environmental friendly business and survival of industry may prove to be more desirable than winning growth shields. Safety and health of the worker and environmental concerns of the industry is going to be the guiding factor not only for survival but also for a good business sense.

## **7 CONCLUSION**

Providing "decent condition of work" to the workers in all occupations for ensuring health protection at work is the recommendation of ILO in current times. This could be achieved only through knowledge of safety and health and its appropriate application. It is also necessary that the applied knowledge is pushed to the politicians, bureaucrats, journalists, employers and trade union leaders for better

and effective results. A total change in the attitude towards occupational safety and health is needed at all levels, from government down to the shop floor workers. The fact that investments in OSH can yield returns with rich dividend in the form of increased productivity and economic development needs to be appreciated by each and every individual of an industrial community. This can be facilitated by promotional activities and advocacy backed by authentic management information system available to all. Empowering the workforce to decide what they need and how that could be worked out best for them may provide the required solutions for many of their OSH problems. What has to be done is to plan and execute awareness arousal plans, programmes and practices for safe and healthy life style from home right down to the work place. As the technology and world of work is changing, the workforce is slowly evolving from darkness of ignorance to the brightness of safety and health consciousness.

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\* The paper was presented by Shri S K Saxena, Director General, DGFASLI, Sion, Mumbai at 'Sir Ardheshir Dalal Oration' held on 4<sup>th</sup> February 2005, of the 55<sup>th</sup> National conference of IAOH at Pune.

## MAINTAINING PRESSURE VESSELS

**P.K.BHATTACHARYA**

The term 'pressure vessel' covers a wide range of equipments from air tanks to reactors. What they have in common is a shell with contents under pressure. Keeping that shell intact and the pressure under control is the task of a skilled preventive - maintenance staff. With a regular inspection programme, costly damage and extensive down time can be avoided. It makes sense to start out with the best and most reliable equipment so that it must be ensured that it is designed in accordance with the ASME boiler and pressure vessel code. This ensures sound construction and an adequate safety factor. The second important factor is never to use pressure vessels for purposes other than which they are intended. Such vessels are potentially dangerous and can fail if abused or neglected. But even assuming proper construction and competent operation, an alert eye is still needed to watch for danger signals.

### **Over pressure**

When a vessel is over pressured there is danger that the design strength of the metal shell will be exceeded and the vessel will burst unless vented. Automatic explosion protection is provided by some form of pressure-relief devices such as safety valves and relief valves. Safety valves are intended for gas, steam or vapour service. These open quickly and fully at the set pressure. Relief valves are intended for liquid service; they generally open only partially, depending on the amount of excess pressure. Safety relief valves can be used for either of the above application.

When means are provided, these devices should be tested at regular intervals by manually opening the valve. Setting of the valve should be no higher than maximum allowable working pressure of the vessel. If a vessel is operated very near to the valve's

pressure setting for long periods of time, some leak may occur resulting in scale deposits that may cause the valve to stick. Valves should periodically be dismantled during shut down, bench tested for any obstructions or damage. The device may be cleaned as and when necessary but repairs should be left to an expert.

Sometimes, additional protection is needed, and this is afforded by rupture disks. These disks are metal inserts, usually installed in the emergency venting pipes, that are designed to break at a specific pressure. When a vessel is shut down for inspection, vent lines should be checked for obstruction and the disks should be examined for corrosion.

### **Over temperature**

Pressurized equipments are generally designed to operate within set temperature limits. If additional heat is applied, not only the pressure within the vessel increases proportionally, but the heat will reduce the tensile strength of the shell, which may bulge and get ruptured. Normally, the pressure-relief devices will be able to avert disaster. However, in the event of a runaway exothermic chemical reaction, the over pressure protection may not be capable of relieving the situation quickly enough, creating a serious explosion. It is desirable to monitor process temperature closely.

Vessels lined with refractory can be checked periodically for hot spots by thermal imaging, a procedure by which heat is sensed through infrared radiation. Cooling water jackets should be examined for leaks and cracks.

Equipment should be in a non-combustible building, and the area should be kept clean and free from ignition sources. Low flash point cleaning solvents should be avoided. Any dirt, dust or excess oil deposits should be removed.

If oil get into a compressed air system, for instance, it may vaporize and ignite, due to heat of compression.

## **Corrosion/erosion**

Metal shells may be gradually attacked by corrosion. Internal corrosion is usually due to chemical reaction with the vessel's contents (vessels that are outdoor or in acidic or caustic atmospheres may also undergo external corrosion). The affected surface may show signs of pitting or scaling and may be rough and uneven in appearance. Minor, isolated incidences of corrosion are not serious; however, when a surface becomes severely pitted, the strength of the shell can be severely diminished and may no longer be able to withstand normal operating pressures.

Smooth, overall wasting or wearing down of the plate may also be due to corrosion, but is more often the effect of erosion. Rather than being the result of chemical reaction, erosion is caused by physical forces, such as constant swirling of liquid contents against a particular area of plate. This gradual thinning of shell wall again exposes the weakened vessel to the possibility of rupture or cracking.

Shri P.K.Bhattacharya  
Assistant Director(Safety)  
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Adyar,Chennai.600113

## ARTICLE ON OCCUPATIONAL DISEASE & ESI SCHEME

**B.K. SAHU**

As a Social Security Scheme of the Government of India, the Employees' State Insurance Scheme was framed under an Act called the ESI Act, 1948. The ESI Scheme is a contributory (contribution from employers and employees) self-financing Social Security Scheme, which provides comprehensive medical cover and cash benefit to the Insured Persons and members of their family. The Scheme is applicable to non-seasonal factories using power and employing 10 or more persons and non-power using factories employing 20 or more persons drawing wage up to Rs.7500/- per month. With a modest beginning in 1952 at Delhi and Kanpur with initial coverage of just about a lakh of employees, the Scheme now covers about 85 lakhs insured persons in about 2.63 lakh factories and establishments with total number of beneficiaries of over 300 lakhs.

Considering the nature of manufacturing process and finished products of factories and establishments, certain Occupational Diseases related are inevitable for employees working in such hazardous industries.

### OCCUPATIONAL DISEASES

A sizeable number of insured persons in a variety of industrial units, factories and establishments are exposed to the risks of employment injury or occupational diseases. Often, such exposure to employment related hazards is irreversible and proves fatal. Occupational diseases are caused by continuous exposure to toxic and hazardous materials or substances used or manufactured in industries. The degree of hazards/exposure may, however, vary from industry to industry. Advanced clinical technology and medical research, in the recent years, have been able to co-relate a number of hitherto lesser-known diseases to a variety of occupations. About 50% of the eight million workers now covered under the ESI Scheme for health insurance and other integrated social security benefits, are exposed to the risks of occupational diseases and other employment hazards. It was in this background and keeping in view the

increasing number of insured population exposed to occupational risks that the Employees' State Insurance Corporation decided to establish four Zonal Occupational-Disease-Cum-Research Centres at Delhi, Mumbai, Kolkata and Chennai. The setting up of these centres has, no doubt, been a conceptual breakthrough and a big step forward in the ESI Scheme. However, preventive measures like environment planning and introduction of basic safety measures will continue to remain pivotal prerequisites for protection of workforce exposed to occupational risk/hazards.

### LOCATIONS OF OCCUPATIONAL DISEASE CENTRES

1. ESI Hospital cum Occupational Diseases Centre Basaidarapur New Delhi – 15	2. ESI Hospital cum Occupational Diseases Centre Thakurpukur, Kolkata
3. ESI Hospital cum Occupational Diseases Centre K.K. Nagar, Chennai	4. Mahatma Gandhi Memorial ESI Hospital cum Occupational Diseases Centre Parel, Mumbai.

### PROCEDURE FOR DIAGNOSING/ REPORTING OCCUPATIONAL DISEASE

Occupational Disease for all practical purposes is treated at par with Employment Injury. Under Sub-Section 8 of Section 2 of ESI Act, 1948, employment injury to an employee caused by Accident or an Occupational Disease (to be read with the 3<sup>rd</sup> Schedule of the Act) arising out of and in the course of his/her employment being an insurable employment, whether the Accident occurs or the Occupational Disease is Contracted within or outside the territorial limits of India. As far as Occupational disease is concerned, the Date of Contraction of the disease is material and if the same is medically diagnosed to have arisen out of employment

while the employee was in the course of insurable employment, the employee is entitled to disablement/dependent's benefits. The insured persons suspected of having Occupational disease are referred to by Insurance Medical Officers, Incharge of Dispensaries and Medical Superintendents of ESI Hospitals to the Local Office of ESI Corporation with proper certification for further necessary action. The Local/Regional Office of ESI Corporation situated in the State in turn will refer the insured person to the respective Occupational Disease Centres for 4 Southern States, namely Kerala, Tamil Nadu, Karnataka and Andhra Pradesh to Occupational Disease Centre at ESI Hospital, K.K. Nagar, Chennai for confirmation of diagnosis and treatment so as to prevent further deterioration of the condition of the Insured Persons. Moreover, such Insured Persons (Employees covered under ESI Act) on confirmation of having inflicted with any of the Occupational Diseases as mentioned in the 3<sup>rd</sup> Schedule of the ESI Act receive

compensation in the form of Permanent Disablement Benefit after duly examined by Occupational Diseases Medical Board as framed from time to time by ESI Corporation.

The list of diseases approved for Occupational Diseases as mentioned in the 3<sup>rd</sup> Schedule of the ESI Act is re-produced in the enclosure.

### **Conclusion**

With pace of industrialization moving fast, the exposure of workers in factories and establishments to Occupational Diseases is definitely a cause of concern. Hence, it is very much essential to create awareness about the Occupational Diseases, their preventive measures and nature of compensation as a safety net for such workers as a part of Social Objective of all concerned.

*(The views expressed are personal)*

List of diseases approved for O.D.

**THE THIRD SCHEDULE**  
(See Section 52 A)

**LIST OF OCCUPATIONAL DISEASES**

**PART – A**

<b>Sl. No.</b>	<b>Occupational Disease</b>	<b>Employment</b>
1.	Infectious and parasitic diseases contracted in an occupation where there is a particular risk of contamination.	(a) All work involving exposure to health or laboratory work; (b) All work involving exposure to veterinary work; (c) Work related to handling animals, animal carcasses, part of such carcasses, or merchandise which may have been contaminated by animal or animal carcasses; (d) Other work carrying a particular risk of contamination.
2.	Diseases caused by work in compressed air.	All work involving exposure to the risk concerned.
3.	Diseases caused by lead or its toxic compounds.	All work involving exposure to the risk concerned.
4.	Poisoning by nitrous fumes.	All work involving exposure to the risk concerned.
5.	Poisoning by organic phosphorus compounds.	All work involving exposure to the risk concerned.

**THE EMPLOYEES STATE INSURANCE ACT, 1948 (Sch.III)**

***PART – B***

<b>Sl. No.</b>	<b>Occupational Disease</b>	<b>Employment</b>
1.	Diseases caused by phosphorus or its toxic compounds.	All work involving exposure to the risk concerned.
2.	Diseases caused mercury or its toxic compounds.	All work involving exposure to the risk concerned.
3.	Diseases caused by benzene or its toxic homologues.	All work involving exposure to the risk concerned.
4.	Diseases caused by nitro and amino toxic derivatives of benzene or its homologues.	All work involving exposure to the risk concerned.
5.	Diseases caused by chromium or its toxic compounds.	All work involving exposure to the risk concerned.
6.	Diseases caused by arsenic or its toxic compounds.	All work involving exposure to the risk concerned.
7.	Diseases caused by radio-active substances and ionizing radiations.	All work involving exposure to the risk concerned.
8.	Primary epithelomatous cancer of the skin caused by tar, pitch, bitumen, mineral oil, anthracene, or the compounds, products or resiudes of these substances.	All work involving exposure to the risk concerned.
9.	Diseases caused by the toxic halogen derivatives of hydrocarbons (of the aliphatic and aromatic series).	All work involving exposure to the risk concerned.
10.	Diseases caused by carbon disulphide.	All work involving exposure to the risk concerned.
11.	Occupational cataract due to infra-red radiations.	All work involving exposure to the risk concerned.
12.	Diseases caused by manganese or its toxic compounds.	All work involving exposure to the risk concerned.
13.	Skin diseases caused by physical, chemical or biological agents not included in other items.	All work involving exposure to the risk concerned.
14.	Hearing impairment caused by noise.	All work involving exposure to the risk concerned.
15.	Poisoning by dinitrophenol or a homologue or by a substituted dinitrophenol or by the salts of such substances.	All work involving exposure to the risk concerned.
16.	Diseases caused by beryllium or its toxic compounds.	All work involving exposure to the risk concerned.
17.	Diseases caused by cadmium or its toxic compounds.	All work involving exposure to the risk concerned.
18.	Occupational asthma caused by recognized sensitizing agents inherent to the work process.	All work involving exposure to the risk concerned.

19.	Diseases caused by fluorine or its toxic compounds.	All work involving exposure to the risk concerned.
20.	Diseases caused by nitroglycerine or other nitro-acid esters.	All work involving exposure to the risk concerned.
21.	Diseases caused by alcohols and ketones.	All work involving exposure to the risk concerned.
22.	Diseases caused by asphyxiants : carbon monoxide and its toxic derivatives, hydrogen sulfide.	All work involving exposure to the risk concerned.
23.	Lung cancer and mesotheliomas caused by asbestos.	All work involving exposure to the risk concerned.
24.	Primary neoplasm of the epithelial lining of the urinary bladder or the kidney or the ureter.	All work involving exposure to the risk concerned.

**THE EMPLOYEES STATE INSURANCE ACT, 1948 (Sch.III)**

***PART - C***

<b>Sl. No.</b>	<b>Occupational Disease</b>	<b>Employment</b>
1.	Pneumoconioses caused by sclerogenic mineral dust (silicosis, anthraosilicosis, asbestosis) and silicotuberculosis provided that silicosis is an essential factor in causing the resultant incapacity or death.	All work involving exposure to the risk concerned.
2.	Bagassosis	All work involving exposure to the risk concerned.
3.	Bronchopulmonary diseases caused by cotton, flax, hemp and sisal dust (Byssinosis).	All work involving exposure to the risk concerned.
4.	Extrinsic allergic alveolitis caused by the inhalation of organic dusts.	All work involving exposure to the risk concerned.
5.	Bronchopulmonary diseases caused by hard metals.	All work involving exposure to the risk concerned.

**Shri B.K. Sahu**  
**Additional Commissioner**  
**ESI Corporation, Hqrs Office**  
**CIG Road, New Delhi**

## **STUDY OF ENVIRONMENTAL CONDITIONS IN A REFINERY**

This study was carried out by Regional Labour Institute, Chennai in a company engaged in the production of various petroleum products by refining the crude oil.

### **OBJECTIVE**

The study was conducted with the objective to assess the airborne dust levels of contaminants such as Hydrogen Sulphide, Sulphur di-oxide, Carbon Monoxide, Ammonia, Hydro Carbons, SPM etc. in work environment and to suggest remedial measures wherever necessary to improve the environmental conditions.

### **FINDINGS & RECOMMENDATIONS**

The samples of various airborne contaminants were collected and analysed using standard methodology.

The results indicated that the concentration of most of the airborne contaminants e.g. Ammonia, Hydrogen Sulphide, Sulphur Di-oxide, Carbon Monoxide, Hydro carbons and SPM in almost all the areas were found well below their respective PLEs. This is, perhaps attributed to the fact that the plant as a whole is well maintained. Further, as most of the units were located in open air, the minor gaseous leakages, if any, are quickly dispersed in air. However, certain remedial measures were suggested to further improve the environmental conditions such as: the process equipment e.g. valves, pumps, glands, joints etc. to be kept well maintained through a proper preventive maintenance programme to minimize the leakages and prevent the gaseous emissions, continuous monitoring system for sulphur dioxide in sulphur recovery unit, for ammonia in ammonia injection area in CDU-I and III as well as nitrogen plant in DHDS-SRU, training and education of operating personnel on health hazards and their control, regular monitoring of work place environment, effective use of PPE among workers, etc.

## **ASSESSMENT OF DUST LEVELS IN A GLASS COMPANY**

This study was carried out by Regional Labour Institute, Chennai in a company engaged in the production of different types of glass containers for industrial and domestic applications.

### **OBJECTIVE**

The study was conducted with an objective to assess the airborne dust levels in work environment and to suggest remedial measures wherever necessary to improve the work environment.

### **FINDINGS & RECOMMENDATIONS**

The average concentration of silica dust near feeding hopper while sand feeding was found as  $0.44 \text{ mg/m}^3$  which is far below the level observed in the previous study but marginally exceeded the PLE i.e.  $0.35 \text{ mg/m}^3$ .

The average concentration of Dolomite dust, Calcite dust and Soda ash dust near feeding hopper while feeding were found as  $3.2 \text{ mg/m}^3$ ,  $1 \text{ mg/m}^3$  and  $0.8 \text{ mg/m}^3$  respectively all of which are well below their PLE. The average concentration of silica dust near sand unloading hopper in sand beneficiation plant was found as  $0.9 \text{ mg/m}^3$  which is exceeding the PLE for silica dust i.e.  $0.35 \text{ mg/m}^3$  but far below the levels observed in the previous study. Remedial measures were suggested to control the dust levels which included the regular and preventive maintenance of sand handling and processing plant to minimise the dust emission. In addition, certain other measures such as dumping of powder from the bucket of the payloader slowly and gently from a minimum possible height in order to avoid the formation of dust cloud, effective use of dust respirators among the workers, etc. were suggested.

On 9.2.04 the work of loading steel billets on to a ship was being carried out at HDC of a Port. One labourer who was working inside the hold was hit by the swinging load and died due to serious injuries.

Investigation of the accident revealed that the accident had occurred due to unsafe handling of the lifting machinery and lack of supervision/training. The Port authority, being the employer, was cautioned/advised for violation of Regulations 53, 91(6) and 117.

On 24.4.04, a trailer was carrying timber logs from a berth to main road at a Port. While taking a turn, the trailer toppled and the cleaner died due to multiple injuries.

Investigation of the accident revealed that the accident occurred due to bad road conditions and lack of training, etc. The Port Authority was advised to maintain roads in good condition. The employer was suitably advised and warned for violation of Regulation 116(1).

On 26.5.04, the work of transporting coal from the berth to the coal stack yard through tipper lorries was being carried out at a Port. At the stackyard while reversing, the cleaner of a truck was crushed to death .

Investigation of the accident revealed that the accident occurred due to the unsafe posture taken by the victim and lack of adequate illumination at the site. The Port Authority was warned for not providing adequate illumination, citing Regulation 16. The employer was advised to provide training to their truck operators/cleaners.

On 7.6.04 ,export containers loaded on to trailers were being moved into a Container Terminal, at a Port for stacking in the stack yard. The trucks were waiting in queue. The driver of one of the trailers who was standing near to the rear wheel of the preceding trailer, was run over when the trailer moved forward, resulting in his death.

Investigation of the accident revealed that the accident had occurred due to lack of supervision, training and negligence on the part of the driver of the truck which killed the victim. The employer was suitably advised. The Principal employer was warned for not providing effective supervision, citing Regulation 117.

On 2.8.04 the work of loading granite stones on to trailers with the help of mobile crane was being carried out at a Port. During the course of working, a stack of granite stones collapsed due to swinging of load. The driver of trailer who was sitting near the stack received serious injuries and succumbed to the injuries.

Investigation of the accident revealed that the accident occurred due to negligence on the part of the victim and lack of training. The employer was suitably advised.

On 29.7.2004, at 0410 hrs loading of iron ore fines was being carried out in a Port. A mazdoor was going to unhook the empty sling from the ships crane. The wire guide arm failed from the welded joint and fell on his head. As a result, he died on the spot.

Investigation of the accident revealed that the accident occurred due to improper maintenance of the ship's cranes. The master of the vessel was warned through the agents for breach of Regulation 4. Further, the employer was warned for the breach of Regulation 117.

## **WORKSHOP ON HAZARD & OPERABILITY (HAZOP) STUDY**

### **PROGRAMME PERSPECTIVE**

Accident in Hazardous Chemical Plants or installations results in injuries, fatalities, property loss within the installation and also surroundings. It may also cause business interruptions and damage to the environment. Typical hazards include Fire, Explosion, Toxic release and other types of loss of containment. The first step in tackling such problem is identification and assessment of these hazards.

Under Rule 4 of Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 under Environmental Protection Act, 1986, an occupier of Major Accident Hazard Installation is required to provide evidence that he has identified the Major Accident Hazards and has taken adequate steps to prevent such hazards. The complexity of modern plants makes this exercise difficult unless systematically designed procedures are adopted.

HAZOP study is one of the techniques widely used world-over to identify hazards associated with various operations in plant or process. It is also used in the design of new plants or processes, plant extensions. The procedure involves finding out meaningful deviation from design intention for each line, vessel, etc. and to find out the consequences of the same and safeguarding against the hazard that are associated.

### **OBJECTIVE**

In recognition of world-wide acceptability of HAZOP techniques used for assessment of hazards associated with operation of a chemical plant, this workshop oriented comprehensive training programme is organized. The course provides knowledge in techniques of HAZOP and also provides information on the prevention and control of hazards. The aim is to train the participants to carry out HAZOP in their units and also to act as HAZOP study team leaders. These leaders in turn act as a trainer who can also train others in their organization.

### **HIGHLIGHTS**

- Principles and benefits of HAZOP studies
- Use of Guide Words
- HAZOP procedure
- Preparation for studies
- The role of study leader
- HAZOP examination using flow-sheet or P & I diagram
- Follow-up action

### **METHODOLOGY**

Beside regular lecture, the participants will be exposed to exercises and case studies selected from the industries involving hazardous chemicals and process. The exercise will develop confidence amongst the participants to conduct such studies in their own organization.

### **PARTICIPANT**

Participant should have knowledge of chemical plant operation and maintenance. They should be familiar with various components of P & I Diagram, Flow-sheets, etc. The course is beneficial for the Plant Manager, Process Engineer, Maintenance Engineer, Instrumentation Engineer, Design Engineer, Chemist, Safety Professionals and Process Operators .

### **MODE OF TRAINING**

Audio Visual ,            Syndicate Exercises,  
Case Studies

### **Conducted by:**

**Major Accident Hazard Control Advisory  
Division  
Central Labour Institute  
N.S. Mankikar Marg  
Sion, Mumbai – 400 022.**

## 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: Radiographic abnormalities among construction workers exposed to quartz containing dust.**

### CIS ACCESSION NUMBER

CIS 03-315

### ABSTRACT

Construction workers are exposed to quartz-containing respirable dust at levels that may cause fibrosis in the lungs. To measure the extent of radiographic abnormalities among construction workers primarily exposed to quartz-containing dust, a cross-sectional study on radiographic abnormalities indicative of pneumoconiosis was conducted among 1339 construction workers mainly involved in grinding, (jack)-hammering, drilling, cutting, sawing and polishing. Radiological abnormalities were determined by median results of the 1980 ILO system of three readers. Questionnaires were used for assessment of occupational history, presence of respiratory diseases and symptoms and smoking habits. An abnormality of ILO profusion category 1/0 and greater was observed on 10.2% of the chest radiographs and profusion category 1/1 or greater on 2.9% of the radiographs. The average duration of exposure of this group was 19 years and the average age was 42. The predominant type of small opacities is presumably indicative of mixed dust pneumoconiosis. The prevalence of early signs of nodular silicosis was low (0.8%). An association between radiographic abnormalities and cumulative exposure to quartz-containing dust from construction sites was observed, after correction for potentially confounding variables.

### Note:

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

The Library & Information Centre of Central Labour Institute has unique collection of Material Safety Data Sheet of about 1,20,000 chemicals/materials taken from Canadian Centre for Occupational Health & Safety. MSDS provides extensive coverage over safety perspective with detailed evaluation of health, fire and reactivity hazards. It also provides precaution as well as recommendation on handling, storage, personal protective equipment, accidental release, etc.

**PRODUCT NAME:  
CHLOROBENZENE**

**HAZARDS IDENTIFICATION**

Emergency Overview

Warning! flammable liquid and vapor. Harmful if swallowed or inhaled. Causes irritation to skin, eyes and respiratory tract. Affects central nervous system and liver.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate

Lab protective equip: Goggles; Lab coat;

Vent hood; Proper gloves; Class B extinguisher.

**POTENTIAL HEALTH EFFECTS**

Inhalation: Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. Affects central nervous system causing dizziness, incoordination and unconsciousness.

Ingestion: Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. Toxic! May cause systemic poisoning with symptoms paralleling those of inhalation.

Skin Contact: Causes irritation to skin. Symptoms include redness, itching, and pain. May be slowly absorbed through the skin with possible systemic effects.

Eye Contact: Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

Chronic Exposure: Prolonged or repeated skin exposure may cause dermatitis or skin burns. Prolonged or repeated exposure may cause liver, kidney, or lung damage.

Aggravation of Pre-existing Conditions: Persons with pre-existing skin, eye or central nervous system disorders, or impaired liver, kidney, or pulmonary function may be more susceptible to the effects of this substance.

**FIRST AID MEASURES**

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion: Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact: Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**FIRE FIGHTING MEASURES**

Fire: Flash point: 28C (82F) CC. Auto ignition temperature: 593C (1099F). Flammable limits in air % by volume: lel: 1.3; uel: 9.6 Flammable Liquid.

Explosion: Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Reactions with incompatibles may pose an explosion hazard. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated. Sensivel a descargas estaticas.

Fire Extinguishing Media: Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

Special Information: In the event of a fire, wear full protective clothing and NIOSH

approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode. This highly flammable liquid must be kept from sparks, open flame, hot surfaces, and all sources of heat and ignition. Combustion by-products include phosgene and hydrogen chloride gases.

## **ACCIDENTAL RELEASE MEASURES**

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802. J. T. Baker SOLUSORB(R) solvent adsorbent is recommended for spills of this product.

## **EXPOSURE CONTROLS/PERSONAL PROTECTION**

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):  
75 ppm (TWA).

-ACGIH Threshold Limit Value (TLV): 10  
ppm (TWA).

Ventilation System: A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices" most recent

edition, for details.

Personal Respirators (NIOSH Approved): If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator.

**WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:** Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:** Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

## **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 1,20,000 chemicals/materials are available with Central Labour Institute. Computer printout will be supplied on nominal charge basis.**

## **OVER A MILLION JOBS LOST IN TSUNAMI, SAYS ILO REPORT**

More than a million jobs were lost in the tsunami disaster, says International Labour Organisation (ILO), pointing out that the unemployment rate in the affected areas has shown a sharp rise.

In its latest report, 'Global Employment trends, February 2005', ILO, however, expresses satisfaction over a decline in unemployment worldwide from 6.3% in 2003 to 6.1% in 2004.

The report also expresses concern over a toll of 28 million workers till date due to HIV/AIDS. If HIV transmission among the labour population is not controlled, the world would lose 74 million workers by 2015, it says. The immediate effects of tsunami disaster on labour markets have been enormous. Since predominantly coastal areas were hit, the three major sectors affected are fisheries, agriculture and, in some areas, tourism.

As many as 4000,000 workers in tsunami affected areas of Sri Lanka and 6000,000 workers in the most affected regions of Indonesia (Aceh Province and the Island of Nias) may have lost their primary source of income, the ILO noted.

Incidentally, ILO's estimate does not include the tsunami-ravaged regions of India like Andaman and Nicobar Islands and the coastal regions of Tamil Nadu, Andhra Pradesh and Kerala, where the toll was estimated to be around 20,000. If India is included, the overall figure of job loss will be more than the one million estimated by ILO.

Another factor brought out in the report is the sharp rise in unemployment as a result of the disaster. The unemployment rate in the affected provinces in Sri Lanka has gone up from 9.2% to 20%. In Indonesia, the unemployment rate in the affected areas has risen dramatically to 30%, from 6.8% prior to the disaster, the report notes.

Nevertheless, ILO was hopeful that if sufficient international aid was "rapidly made available for reconstruction of workplaces, equipment, infrastructure repair and workers' health, about 50 to 60% of the affected people would once again be able to earn a living for themselves and their families by the end of the year 2005".

ILO also took note of the positive development – that of a decline in the number of the unemployed. Global unemployment stood at 184.7 million at the end of 2004, down from a revised 185.2 million in 2003. Though the decline in unemployment is very small in percentage terms, this is a significant development, as it marks only the second time in the past decade that there was a year-over-year decline in total unemployment", the report noted.

**Source: Times of India**

**TRAINING PROGRAMMES**  
**APRIL-JUNE 2005**  
**CENTRAL LABOUR INSTITUTE, SION,**  
**MUMBAI-400 022**

Programme title	Contact person
Associate Fellowship of Industrial Health	Director (Medical) & Incharge Incl. Medicine Division
Selection & Quality Assurance for effective use of PPE.	Director (Incl.Hygiene)&Incharge Incl.Hygiene Division
Occupational back pain - its evaluation & management for Safety, Health & Productivity	Director (Physiology) & Incharge Incl.Physiology Division
Training Programme on Safety Engineering & Loss Control Management	Director (Safety) & Incharge Incl. Safety Division
On the job Counselling Skills	Director (Incl.Psychology) & Incharge Incl.Psychology Division
Risk Management in Process Industries	Director (Incl.Hygiene) & Incharge Major Accident Hazard Advisory Division
Physiological basis of manual material handling for Accident Prevention & Safety, Health &Productivity at Work	Director (Physiology)&Incharge Incl.Physiology Division
Managerial Excellence for Higher Performance	Director (Staff Trg./Productivity) & Incharge Productivity Division
Anthropometry for better work station,design for improving Safety,Health & Productivity	Director (Physiology) & Incharge Incl.Ergonomics Division
Harmful ventilation - Heat Hazard and Control in Industry	Director (Physiology) & Incharge Environmental Engg.Division
Training Programme on Industrial Safety for National Safety Council- Maharashtra Chapter	Director (Safety) & Incharge Incl. Safety Division
Industrial Heat Stress & Heat Disorders– its evaluation & management for ensuring Safety,Health & Productivity at work	Director (Physiology) & Incharge Incl.Ergonomics Division

Programme title	Contact person
Industrial Ergonomics – its application in Industries for promotion of Safety, Health & Increased Productivity at Work	Director (Physiology) & Incharge Incl.Ergonomics Division
Motivation for Safety, Health and Productivity	Director (Incl.Psychology) & Incharge Incl.Psychology Division
Industrial Fatigue- its evaluation & management for ensuring Safety, Health & Productivity at Work.	Director (Physiology) & Incharge Incl. Physiology Division
Storage & Handling and Management of Hazardous Substances in process industries	Director (Incl.Hygiene) & Incharge Major Accident Hazard Control Advisory Division
Workshop for Safety Committee Members	Director (Safety) & Incharge Incl. Safety Division
Total Quality Management	Director (Staff Trg./Productivity) & Incharge Productivity Division
Occupational Physiology - its application in Industry for Safety, Health and Productivity.	Director (Physiology) & Incharge Incl.Physiology Division

**TRAINING PROGRAMMES  
APRIL-JUNE 2005  
REGIONAL LABOUR INSTITUTE , NO.1,SARDAR PATEL ROAD  
ADYAR, CHENNAI-600 113**

Programme title	Contact person
Safety Management in Engineering Industries	Director Incharge
Management of Hazardous Substances	Director Incharge

**TRAINING PROGRAMMES  
APRIL-JUNE 2005  
REGIONAL LABOUR INSTITUTE , LAKE TOWN  
KOLKATA-700 089**

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Programme title	Contact person
Associate Fellowship of Industrial Health	Director Incharge
Prevention and Control of Fire in Industry for Worker Members of Safety Committee	Director Incharge
Workshops on Monitoring of Work Environment	Director Incharge
Safety Engineering and Environment Management	Director Incharge
Techniques of Hazards Identification & Assessment	Director Incharge

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**TRAINING PROGRAMMES  
APRIL-JUNE 2005  
REGIONAL LABOUR INSTITUTE , SECTOR 19  
FARIDABAD**

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Programme title	Contact person
Managing Human Factors in Occupational Safety & Health	Director Incharge

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**TRAINING PROGRAMMES  
APRIL-JUNE 2005  
REGIONAL LABOUR INSTITUTE, SARVODAYA NAGAR  
KANPUR- 208 005**

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Programme title	Contact person
Training programme on Prevention & Control of Fire in Industry	Director Incharge
Training programme on Testing & Examination of Lifting Machines and Pressure Vessels	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.

**INDOSHNEWS is a quarterly newsletter that facilitates exchange of ideas and data developed through research, study and surveys in the areas of occupational safety and health. DGFASLI invites articles from individuals, industry, industrial associations, trade unions, professional bodies etc. having information on OS & H and willing to share the same with others at the national and international level.**

- 1. Manuscripts for publication should be typed in double space within 3 to 4 A4 size sheets only on one side of the paper and sent in duplicate to the Editor-in-Chief. No photographs can be published.**
- 2. Once the manuscripts are accepted for publication, publisher reserves the right to make editorial changes as may be necessary to make the article suitable for publication; and publisher reserves the right not to proceed with publication for whatever reason.**
- 3. Authors should take care to ensure the accuracy of data and reference.**

**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 organization 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 Kolkata, 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 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 organization 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 organization is well prepared to meet the challenges of tomorrow. It is committed to the goal of making the workplace safer.

**Visit us at : [www.dgfasli.nic.in](http://www.dgfasli.nic.in)**