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CONTENTS

ARTICLE: Certification Procedure for Personal Protective Equipment and Training.....	1
ARTICLE: Use Of Asbestos in India - Occupational Health and Safety Issues	6
INSTITUTE NEWS	8
ABSTRACTS	11
MATERIAL SAFETY DATA SHEET.....	12
CIS.....	14
TRAINING CALENDER: DGFASLI	16

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मेरी कलम से

व्यावसायिक खतरे एक गंभीर समस्या है। विशेषतः उन लोगों के लिए जो नीति नियोजन और संबंधित संसाधनों के सृजन के जिम्मेदार हैं तथा उनके लिए जिन्हें देश के बृहत श्रमिक समुदाय के संरक्षण की जिम्मेदारी सौंपी गई है। मानक दिशा निर्देशों की अनुपलब्धता, नीति निर्धारकों के सम्मुख गंभीर समस्याओं में से एक मुख्य समस्या है। प्रबंधकों को वैयक्तिक संरक्षण उपकरण उत्पादकों से खरीदने से पहले उसकी गुणवत्ता भारतीय मानक ब्यूरो (बी. आई. एस.) के दिशा-निर्देशों के अनुरूप सुनिश्चित करना चाहिए। यदि वैयक्तिक संरक्षण उपकरणों के निर्माता मानकों का पालन नहीं करते हैं, तो उनके लिए कारखाना अधिनियम, 1948 के अंतर्गत कोई दण्ड या जुर्माना का प्रावधान नहीं है। अतः कारखाना अधिनियम, 1948 में ऐसे संशोधन लाए जाने चाहिए। कारखाना सलाह सेवा एवं श्रम संस्थान महाविदेशालय (डीजीफासली) इस दिशा में कार्य कर रहा है। इंडोशन्यूज का पहला लेख इसी विषय से संबद्ध है। दूसरा लेख एसबेस्टॉस के प्रयोग से होने वाली स्वास्थ्य समस्याओं के बारे में बताता है। यह लेख, भारतीय दृश्यलेख और कारखाना अधिनियम, 1948 में संवैधानिक प्रावधानों के बारे में भी चर्चा करता है।

आशा करता हूँ कि इंडोशन्यूज के इस अंक में दी गई जानकारी सुरक्षा विशेषज्ञों, कारखाना प्रबंधकों और उन सभी व्यक्तियों के लिए लाभदायक होगी, जो व्यावसायिक सुरक्षा और स्वास्थ्य से संबंधित हैं।

FROM THE DESK

The threat of Occupational hazard is a great concern, specially for the people who are responsible for policy planning and designing of instruments and those who are assigned the responsibilities for protecting the large work force in the country. One of the major problems faced by the policy planners is the non availability of standard guidelines to ensure the quality as per the BIS specifications of the Personal Protective Equipment (PPE) by the management before purchasing from the manufactures. If the PPE manufactures failure to comply the standards, punishments and penalties are not available in the Factories Act, 1948. Such amendments are needed to be brought in the Factories Act, 1948. Directorate General Factory Advice Service & Labour Institutes. (DGFASLI) is working in this direction. The first article in this issue of INDOSHNEWS deals on this subject. The second article talks about the health hazards associated with the use of asbestos. The article also talks about the Indian scenario, statutory provision in the Factory Act, 1948 etc.

I hope the information carried by this issue of INDOSHNEWS will be useful to safety professionals and management personnel, and all those stake holders who are concerned with OS&H.

Dr. M.Rajaram

CERTIFICATION PROCEDURE FOR PERSONAL PROTECTIVE EQUIPMENT AND TRAINING

A.SREERAMULU

ABSTRACT

The Product Certification Scheme of BIS aims at providing Third Party Guarantee of quality, safety and reliability of products to the ultimate customer. Presence of ISI certification mark known as Standard Mark on a product is an assurance of conformity to the specifications. The BIS product certification scheme is essentially voluntary in nature, and is largely based on ISO Guide 28, which provides, determining conformity with product standards through initial testing and assessment of a factory quality management system and its acceptance followed by surveillance that takes into account of the factory Quality management system and the testing of samples from the factory and the open market. The Personal Protective Equipment Regulations 2002 (SI 2002 No 1144) implements into UK law the provisions of the Council Directive 89/686/EEC. It lays down the conditions governing Personal Protective Equipment (PPE) placed on the market. The free movement within the Community and the basic safety requirements which PPE must satisfy should ensure the health, safety and protection of the user. The Bureau of Indian Standards, empowered through a legislative Act of the Indian Parliament, known as the Bureau of Indian Standards Act, 1986, operates a product certification scheme in accordance with Indian Standards, which are amenable to certification, and has till date granted more than 30 000 licenses to manufacturers covering practically every industrial discipline from Agriculture to Textiles to Electronics. The certification allows the licensees to use the popular ISI Mark, which has become synonymous with Quality products for the Indian and neighboring markets over the past 50 years. Before using the PPE we have to explain the importance of PPE and principles of the PPE to the workers. Accordingly worker should be given training under expert guidance.

INTRODUCTION

In industry it may be possible to substitute a dangerous substance with a safer substance, to isolate the process, to make the mechanical handling of the substance automatic or to have controlled ventilation of the process. A specific substance cannot itself be labeled as pollutant, if its concentration is well below TLV. Safe work place environment may be achieved and maintained by engineering control and administrative control, to plan and arrange operations that personal protective equipment are not necessary, but sometimes it may not be possible to introduce such measures or there might be breakdown in the plant or in the control measures. Under such circumstances it will become necessary to use personal protective equipment. These devices are designed to interpose and act as effective barrier between a person and harmful objects, substances or radiations.

The BIS Product certification Scheme operates in an impartial, non discriminatory and transparent manner. The documents stating the powers, rights and responsibilities of BIS and the affected sectors of society are published by the Government of India under the Bureau of Indian Standards Act, 1986, Rules and (Certification) Regulations, 1988. Procedures provide for maintaining a very high degree of confidentiality and integrity among its personnel who perform certification related tasks. A body called the 'Certification Advisory Committee' composed of persons from varied sectors like manufacturers, consumers, Government agencies, industries associations reviews the performance of the scheme and advises on key policy issues. Internally, a senior functionary designated as 'Additional Director General (Marks)' is responsible to ensure that the scheme operates within the framework of rules and procedures established.

AMENDMENT IN THE FACTORIES ACT

First Schedule {Section 2 (c, b)} of the Factories (Amendment) Act, 1987 provides the list of 29 different industries involving hazardous processes. Second Schedule (Section 41-F) lists the permissible levels of 117 toxic chemicals causing various occupational diseases by entering into body through the vital respiratory mode. In view of this, it is of foremost importance to use various respiratory PPE as preventive measures against these toxic chemicals.

Rule 81 of Model Rules under the Factories Act, 1948 (corrected up to 31.3.1987), Government of India, prescribes the use of various PPE. It is also intention of the law that this personal protective equipment shall be of such type and made of such materials that it withstands to such specific hazards for which it is actually being used.

PERSONAL PROTECTIVE EQUIPMENT REGULATIONS

The Personal Protective Equipment Regulations 2002 (SI 2002 No 1144) implements into UK law the provisions of the Personal Protective Equipment Directive (PPE) 89/686/EEC.

For the purposes of the PPE Directive 89/686/EEC, PPE means any device or appliance designed for use in domestic, leisure and sports activities or for professional use. It is to be worn or held by an individual for protection against one or more health and safety hazards in the execution of a specific activity. The scope of the PPE Directive is wide and includes such items for protection such as clothing, footwear and headgear against adverse atmospheric conditions such as dampness, water and

ARTICLE: Certification Procedure for Personal Protective Equipment and Training

heat. PPE also includes respiratory protective equipment and equipment intended for the rescue or protection of persons in falls from heights. The Directive provides for three categories of PPE simple design, complex design, and PPE that is neither simple nor complex, known as intermediate which is often referred as Category one, two and three.

PRODUCT CERTIFICATION

BIS Product Certification Scheme is basically voluntary in nature. Some of the items brought under mandatory certification on consideration of health and safety are milk powder, packaged drinking water, LPG cylinders, oil pressure stoves, clinical thermometers etc. All foreign manufacturers of products who intend to export to India are required to obtain a BIS product certification license. Towards this, BIS launched its Product Certification Scheme for overseas manufacturers in the year 1999. Under the provisions of this scheme, foreign manufacturers can seek certification from BIS for marking their product(s) with BIS Standard Mark.

CERTIFICATION SYSTEM

The BIS product certification scheme is largely based on ISO Guide 28, which provides general rules for third party certification system of determining conformity with product standards through initial testing and assessment of a factory quality management system and its acceptance followed by surveillance that takes into account the factory Quality management system and the testing of samples from the factory and the open market. All BIS certifications are carried out in accordance with Indian Standards, which are amenable to certification. A large number of operational elements of the BIS product certification scheme correspond to the requirements of ISO Guide 65.

TYPES OF LICENSING

Although, the scheme itself is voluntary in nature, the Government of India, on considerations of public health and safety, security, infrastructure requirements and mass consumption has enforced mandatory certification on various products through Orders issued from time to time under various Acts. While BIS continues to grant licenses on application, the enforcement of compulsory certification is done by the notified authorities. For the list of items brought under mandatory certification, together with the corresponding Indian Standard Number, authorities are responsible for enforcing the orders. Overseas applicants and Indian Importers are also granted license for use of ISI mark under separately designed schemes.

PROCEDURE FOR GRANT OF BIS LICENCE FOR DOMESTIC MANUFACTURERS

The applicant has the option to choose any of the following two procedures for grant of BIS License.

NORMAL PROCEDURE: In the normal procedure, the applicant is required to submit the filled in application along with required documents and requisite fee to the nearest BIS branch office. Subsequently, after recording of the application, a preliminary factory evaluation is carried out by BIS officer to ascertain the capability of the

applicant/manufacturer to produce goods according to the relevant Indian Standard and to verify the availability of complete testing facility and competent technical personnel. Samples are tested in the factory and also drawn for independent testing. Grant of license is considered by BIS provided the samples pass during independent testing, preliminary evaluation is satisfactory and the applicant agrees to operate the defined Scheme of Testing & Inspection and pay the prescribed marking fee.

SIMPLIFIED PROCEDURE: The simplified procedure has been introduced with a view to reduce the time taken for grant of license after submission of application. In this procedure, applicant is required to furnish the test report(s) of the sample(s) got tested by them in the BIS approved laboratories, along with the application. If the test report(s) and other documents are found satisfactory, a verification visit is carried out by BIS. The license is granted thereafter, if the verification report is found satisfactory. The applicant also has the option to get the documents and other details as specified in the application, certified by a Chartered Engineer of relevant discipline and submit the same to BIS. The license then shall be granted after scrutiny of the documents and test report submitted by Chartered Engineer.

BRIEF OF CERTIFICATION PROCEDURE FOR FOREIGN MANUFACTURERS

BIS is operating a product certification scheme for foreign manufacturers. In this scheme, a license can be granted for any product against an Indian Standard specifying product characteristics, which is amenable to certification. The scheme operates on self-certification basis, whereby the manufacturer is permitted to apply the Standard Mark on the product after ascertaining its conformity to the Indian Standard. Through its surveillance operations, the Bureau maintains a close vigil on the quality of goods certified.

LABORATORIES

To support the activities of product certification, BIS has a chain of 8 laboratories. These laboratories have established testing facilities for products of chemical, food, electrical and mechanical disciplines. Approximately, 25000 samples are being tested in the BIS laboratories every year. In certain cases where it is economically not feasible to develop test facilities in BIS laboratories and also for other reasons like overloading of samples, equipment being out of order, the services of outside approved laboratories are also being availed. Except for the two labs, all the other labs are NABL (National Accreditation Board for Testing and Calibration Laboratories) accredited.

TEST FACILITIES IN INDIA

Realizing the need and problems faced by the manufacturers in the country, Non-Respiratory and Respiratory testing laboratories have been established in the testing facility in the Central Labour Institute at Mumbai under the Ministry of Labour and Employment. This laboratory undertakes the testing of indigenously manufactured Non-respiratory and Respiratory protective devices under prescribed test conditions as per Bureau of Indian Standards which are received from manufacturers

ARTICLE: Certification Procedure for Personal Protective Equipment and Training

as well as user industries and issue a Performance test report which pertains only to the sample submitted for the test under reference.

The main objectives of PPE Testing Laboratory are:

- To develop testing facilities to assess the performance and efficiency of the various Respiratory/ Non-Respiratory PPE as per BIS Specifications.
- To render technical advice to the manufacturers on the functional efficiency and the quality improvement and guidance to the user industries on selection, use, care and maintenance of the Respiratory/ Non-Respiratory PPE.

Following equipments are tested to ascertain their performance characteristics so as to meet relevant BIS standards.

Respiratory PPE Testing Facilities: This Laboratory is equipped with the facilities to undertake the testing of canister, cartridge type respirators and dust respirators as per the Standard specifications laid down by the BIS. Canister and cartridge type respirators are tested against the following gases and vapour.

- Chlorine
- Ammonia
- Sulphur dioxide
- Hydrogen sulphide and
- Organic vapour.

Non- Respiratory PPE Testing Facilities: This laboratory is equipped to carry out the Performance test for different types of PPE's as per the standards laid down by the BIS. The laboratory is equipped with all the sophisticated equipment that are needed for testing of all Non- Respiratory PPE. At present the laboratory undertakes testing of samples of PPE and issues performance test reports in regard to the quality of protective appliances.

(A) RESPIRATORY EQUIPMENT TESTING LABORATORY (RETL)

Filtering half mask to protect against the particles (Dust Respirators)-IS: 9473-2002 (for classes FFP 1, FFP 2 and FFP 3)

Practical performance test: Breathing Resistance, Face piece Leakage, Exhalation valve leakage, Penetration of filter materials (Filtration efficiency); Clogging test, Flammability test, etc.

Gas Filters and combined filters (Chemical Respirators) IS: 15323-2003

Practical performance test (for classes 1,2,3 and Type A,B,E,K): Weight Test, Mechanical Strength, Breathing Resistance, Protection Capacity test (Life and Efficiency of sorbents against specific gas/vapours)

Quality of breathing Air Purity of compressed air cylinder-IS: 9623-2008: Carbon monoxide content,

Carbon di oxide content, Oil mist content, oxygen content and odour.

(B) NON-RESPIRATORY PERSONAL PROTECTIVE EQUIPMENT

Facilities available for testing of Non – Respiratory Equipment Testing Laboratory (NRETL)

Industrial Safety Helmets-IS: 2925-1984: Electrical Resistance test, Shock Absorption test, Penetration Resistance test, Flammability Resistance test, Water absorption test, Heat Resistance test, Sterilization test and Corrosion Resistance test of metal parts.

Testing of Rubber gloves for Electrical purposes-IS: 4770-1991: Test Potential and Leakage current, Breakdown voltage, Tensile strength, Elongation at break and Ageing properties.

Testing for General purpose Nitrile Rubber/PVC Gloves-IS: 4501-1981: Resistance to Acid & Resistance to Alkali, Reaction with aqueous extract, Breaking strength and Proofing on the cloth shall withstand the bending test

Testing of eye protectors-IS: 5983-1980: Stability at elevated temperatures, Robustness, Resistance to corrosion of metal parts, Resistance to ultra-violet radiation, Suitability for disinfection and Proof against chemical splashes

Testing of Safety shoe-IS:11226-1993 & IS: 15298-2002: Mass, Impact test for steel toe cap, Relative density of sole, Hardness of the sole, Oil resistance, Chemical Resistance, Anti static property, Heat Resistance, Ageing test, Tensile strength and Elongation at break.

Testing of Ear Protectors-IS: 9167-1979: Sound attenuation test.

Testing of Full body harness-IS: 3521-1999: Dynamic test and Static test.

Testing of Leather Hand gloves-IS: 2573-1986 & IS: 6994-1973 (Part-I): Thickness, PH of aqueous extract, Chromium content and Double hole stitch tear strength test.

Testing of Safety Clothing-IS: 4501-1981: Breaking strength, Resistance to acid and alkali, Reaction to aqueous extract and Proofing on the cloth shall withstand the bending test.

Testing of Welding apparatus-IS: 5983-1980 & IS: 1179-1967: Resistance to corrosion of metal parts, Disinfection test, Flammability test, transmittance for UV, Visible & IR test, Robustness test, Stability at elevated temperature, Spherical, cylindrical & Prismatic Power.

Testing of Face shield with plastic visor-IS: 8521-1997 (part-I): Visual and dimensional examination, impact resistance, penetration resistance, visible transmittance and Flammability.

ARTICLE: Certification Procedure for Personal Protective Equipment and Training

TRAINING IN SELECTION, PROPER CARE, MAINTENANCE, USEFUL LIFE AND RECORD MAINTANANCE

Employers should make sure that each employee demonstrates an understanding of the use of PPE as well as the ability to properly wear and use PPE under expert guidance. If an employer believes that a previously trained employee is not demonstrating the proper understanding and skill level in the use of PPE, that employee should receive retraining. Other situations that require additional or retraining of employees is the change in the workplace or in the type of required PPE that make prior training obsolete. The employer must document the training of each employee required to wear or use PPE by preparing a certification containing the name of each employee trained, the date of training and a clear identification of the subject of the certification.

Training should cover how to select and wear PPE, how to adjust for maximum protection and how to care for it. Training can be done on an individual basis or in group meetings. Training programs should emphasize the major goals of the program and reinforce the fact that engineering controls have been considered as the primary prevention strategy. It is not good enough to tell someone to wear a respirator just because management and/or legislation require it. If the respirator is intended to prevent lung disorders, the workers should be informed of the hazards.

Workers and their supervisors will require training in when, where, why, and how to use the equipment to achieve the necessary level of protection. The workers to be trained include those who are exposed on a regular basis and others who might be exposed on an occasional basis, for example, in emergencies or when temporary work is performed in dangerous areas. The training needs and methods for all these workers are essentially the same.

INTERNATIONAL STANDARDS FOR TESTING OF PERSONAL PROTECTIVE EQUIPMENT

American National Standards Institute (ANSI)

This standard ANSI Z87.1-1989(R-1998) for personal eye and face protective devices sets forth criteria related to the description, general requirements, testing, marking, selection, care, and use of protectors to minimize or prevent injuries, from such hazards as impact, non-ionizing radiation and chemical type injuries in occupational and educational environments including, but not limited to, machinery operations, material welding and cutting, chemical handling, and assembly operations. This standard provides minimum requirements for protectors including selection, use, and maintenance of these protectors as devices to minimize or prevent eye and face injuries. An American National Standard is intended as a guide to the manufacturer, the consumer and the general public.

British Standards Institution (BSI)

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter. This British Standard is

the official English language version of EN 166:2001 and EN 812:1997, including amendment A1:2001, published by the European Committee for Standardization (CEN). CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Personal protective equipment Standards of NFPA for fire fighters, hazardous materials response teams and other emergency responders (Underwriters Laboratories)

Every day firefighters, hazardous material response teams and other emergency responders rely on their training and their personal protective equipment (PPE) to guard against the hazards associated with fire hazards. For the last two decades, many of the products they wear have been tested and classified by Underwriters Laboratories (UL). UL offers compliance testing, evaluation and certification for a wide range of personal protective equipment products. UL tests PPE for compliance with the current editions of the applicable ANSI/NFPA, ASTM, CAN/CSA and CAN/CGSB standards. Third party certification is necessary to achieve compliance with NFPA requirements.

SGS Solutions for the certification of PPE

SGS is Notified Body for the certification of all types of PPE. SGS is notified for Article 10 EC Type Approval and for Article 11 Verification of Quality Assurance. Marking of PPE with CE mark indicates compliance with the 'essential requirements' for health and safety. Verification of conformance with essential requirements by way of "Self certification"; "Type Approval"; or "EC Quality Control System". Initially "EC Mark" and replaced by "CE Marking" in the Directive 93/68/EEC in 1993 is a must. CE Marking is NOT a quality-Mark. It is a mandatory conformity marking and refers to Product Safety rather than the quality of a product. It is a declaration that all conformity procedures have been completed. About twenty five directives are required for CE marking. It is obligatory for certain product groups such as: Toys, Personal Protective Equipment, Electrical and Electronic Equipment, Medical Devices, Recreational Craft, etc. Sale without a CE Marking within the EU is not allowed.

CONCLUSION

Before using PPE assure the quality, that the test certificate/BIS marking is essential. Without certification PPE should not be purchased or used.

Right PPE for right job/industrial operation should be selected and training should be given for motivation, use and maintenance of PPE. More Units/Organization having testing facilities need to be approved.

Specific provisions regarding the certification of PPE may be made in the Factories Act, 1948.

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QUOTABLE QUOTES

Protect your hands...Use your head."

"Safe Operators are Smooth Operators"

"Safe today - Alive tomorrow"

"Safety...Takes just a few seconds."

INVITING ARTICLE FOR INDOSHNEWS

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.
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.

FILM ARCHIVE ON OCCUPATIONAL SAFETY, HEALTH & ENVIRONMENT AT CENTRAL LABOUR INSTITUTE, MUMBAI

The Government of India declared the National Policy on Safety, Health and Environment at Workplace on 28th February 2009. One of the goals of the National policy is to build and sustain preventive safety and health culture in the country in order to eliminate the hazards at workplace and to enhance the well being of employees in all the sectors of economic activities in our country. To attain this goal, one of the steps taken by Directorate General Factory Advice Service & Labour Institutes (DGFASLI) is to develop a **Film Archive on Occupational Safety, Health and Environment at Central Labour Institute in Mumbai.**

All the Film Producers, Organisations, Industries, Industrial Association, Trade unions, Professional bodies, Government and Non-Government organisations, Educational Institutes etc. are invited to enlist their films on Occupational Safety, Health & Environment (OSHE) in CD, DVD format etc. with the Film Archive for preparing a directory of OSHE films.

Interested Agencies/Individuals may please fill-up the proforma and send to:

The Director General,
DGFASLI
Central Labour Institute,
N.S.Mankiker Marg, Sion,
Mumbai 400022

Or

E-mail at editorindosh10@gmail.com.
The proforma may be downloaded from DGFASLI website at www.dgfasli.nic.in.

USE OF ASBESTOS IN INDIA- OCCUPATIONAL HEALTH AND SAFETY ISSUES

M.R.RAJPUT

INTRODUCTION

The fibre of asbestos is considered inexpensive and easy to use as compared to other materials in construction industry. During the past century, asbestos has been mined, processed and used in making numerous products. Asbestos products industry has always supported an extensive range of domestic and commercial requirements of the society. Because of its exceptionally effective insulating, excellent fire retardant and reinforcing properties, the asbestos containing materials are widely utilized for electrical resistance, thermal insulation in building construction and equipment and automobiles. White asbestos (chrysotile) is widely used to make asbestos-cement construction materials such as roofing sheet and tiles, pipes and allied accessories, wall panels, and expansion joints are used as fire proofing, lagging, foundry gloves and overalls and brake linings and gaskets for automobiles. A major part of housing requirement in rural segment is fulfilled by using Asbestos Cement Corrugated Sheets.

Persistent demand by various quarters for banning asbestos in the countries still using asbestos including India has been internationally a controversial and burning topic for more than a decade. This topic relates to the need based economic interests of the developing and developed nations. Various International organizations like World Health Organisation, World Trade Organisation, International Programme on Chemical Safety, the European Union, the Collegium Ramazzini, the International Social Security Association, International Commission on Occupational Health, etc. have supported a global ban on asbestos.

ASBESTOS AND ITS HEALTH HAZARDS

The term *Asbestos* is used for the group of naturally occurring fibrous silicate minerals. Asbestos is broadly divided into two categories according to mineralogical classification: serpentines and amphiboles. Chrysotile, which is white asbestos, falls under serpentines class while Amphiboles yield Anthophyllite, Crocidolite (Blue), Amosite (Brown), Actinolite and Tremolite. All six types of asbestos are hydrated silicates of magnesium but differ considerably in their metal content. The difference between the degrees of hazards associated with the various asbestos fibre types is quite significant. Asbestos fibre may become the cause of serious disease when it becomes airborne and inhaled. Because of the size of the fibres, the lungs cannot expel it and this sharp fibre penetrates the tissues. Health problems attributed to asbestos include Diffuse pleural thickening, Asbestosis (a lung disease), Mesothelioma (development of malignant tumor of the mesothelial lining of the lungs and the chest cavity) and Cancer (cancer of the lung, gastrointestinal tract, kidney and larynx due to the exposure to asbestos). Long term inhalation of asbestos leads to irreversible fibrosis of the lungs called asbestosis. It is a chronic and progressive lung disease which is characterized by shortness of breath, restrictive type of lung abnormality. It

takes a long period of time of 5- 20 years to develop which can be detected by a pulmonary function test (PFT), and linear shadows in chest X-ray, and thickening of pleura.

Mesothelioma, is a rare form of diffuse cancer which often occurs in the thin membrane lining (Pleura) and the abdominal wall (peritoneum). It usually takes more than 30 years to develop after asbestos exposure and particularly associated with crocidolite. Risk of Lung cancer is ten times greater in smokers than that in asbestos in non-smokers. The symptoms are persistent cough, weight loss and cough up blood.

INDIAN SCENARIO

Asbestos has been in use for over a century now. The usefulness and versatility of this substance can be gauged from the fact that over 100 products have been developed worldwide. The asbestos-cement industry is by far the largest user of chrysotile fibres, accounting for about 85% of all uses. Asbestos has other industrial uses too in the form of friction products widely used in automobile industries. There are nearly 60 large and medium scale and over 350 small-scale units in the country involved in producing various asbestos-based products.

Asbestos based products find extensive use in domestic, industrial and commercial applications in various sectors such as housing construction, automobile, textile, engineering and chemical industries. Asbestos mining and asbestos products industry in India contribute several thousand crores to the Indian economy, employ a huge workforce directly while supporting millions of other indirectly by various activities or otherwise. Canada and Russia are the major producers and exporters of white asbestos. In 2007, Canada exported almost ninety five percent of the white asbestos it mined and out of it, forty-three percent was shipped to India. In our country, more than 1.2 lakh tons of asbestos is imported every year mostly from Canada, Russia, Brazil and South Africa. About 10,000 workers are working in the Units engaged in manufacture of articles using asbestos located all over India.

Besides the industry manufacturing asbestos products, a large number of workers are employed in a potentially hazardous ship breaking industry which has substantial exposure to asbestos fibres. India, today, is one of the biggest markets for ship breaking all over the world where thousands of workers work in the most unsafe conditions. As reported, a substantial part of the hazardous waste including asbestos containing materials from the developed countries all over the world finds its way to India every year for disposal and recycling. Even a part of debris of the world famous building 'World Trade Centre' after the 9/11 disaster was shipped to India which among other hazardous materials had tons of asbestos containing material.

STATUTORY PROVISIONS/COVERAGE

Manufacture, handling and processing of Asbestos and its products is listed as a hazardous process in the First schedule under section 2(cb) of the Factories Act, 1948 as amended in 1986. As such the provisions notified under Chapter IV -A are applicable. Further, processing of asbestos is also declared as a dangerous process/operation under section 87 wherein a specific schedule incorporating various safety, health, environmental and welfare measures exclusively for the use of asbestos industry has been laid down in the Model Rules framed by DGFASLI.

Indian statutes and regulations have adequate and stringent provisions with regard to safe handling, use and processing of asbestos fibres. Some of these salient provisions are mechanical handling of fibre bags, opening of fibre bags in a closed chamber with automatic bag opening device, mixing, processing and allied operations in a closed system, use of wet operations as far as possible, provision of an effective dust extraction system, handling and processing of asbestos fibres in wet condition, provision of PPEs for the workers, etc. The Factories Act, 1948, as amended in 1986 through a notification in 2003 has laid down a permissible level of exposure of 1 fibre/cc for asbestos fibres in work environment.

In the year 1995, the Hon'ble Supreme Court of India recognizing the hazards of asbestos in the case of Consumer Education and Research Centre (CERC) versus Union of India passed a landmark judgment wherein it issued directives and made it mandatory for the industry to carry out periodic medical surveillance, measure asbestos dust levels in work environment and maintain health records of employees besides directing the Govt. for periodic review of the permissible level of exposure for asbestos fibres.

STUDIES CONDUCTED BY DGFASLI

In the past decade, taking a considered view of the health risk associated with the handling and use of asbestos fibres, DGFASLI, Ministry of Labour & Employment, Govt. of India has carried out a number of studies in various industries manufacturing asbestos products such as asbestos cement products, brake linings, asbestos textiles, etc. These studies suggest that the emission of asbestos fibre levels in most of the operations are within the PLE laid down in the Factories Act, 1948.

Level of asbestos fibres observed in the studies in various units clearly indicates that the concentrations in Asbestos Cement Units where in-built environmental control measures were in place and good work practices were followed were found quite low as compared to those units where such measures were not available. Airborne levels of asbestos fibres in most of the Units barring a few cases particularly small scale were well within the PLE i.e. 1 fibre/cc. However, keeping in view the health hazards posed by asbestos, it becomes imperative that all the units using asbestos must adopt suitable safety and environmental control measures and follow good work practices in order to ensure strictly compliance with the statutory requirements and prevent the exposure of

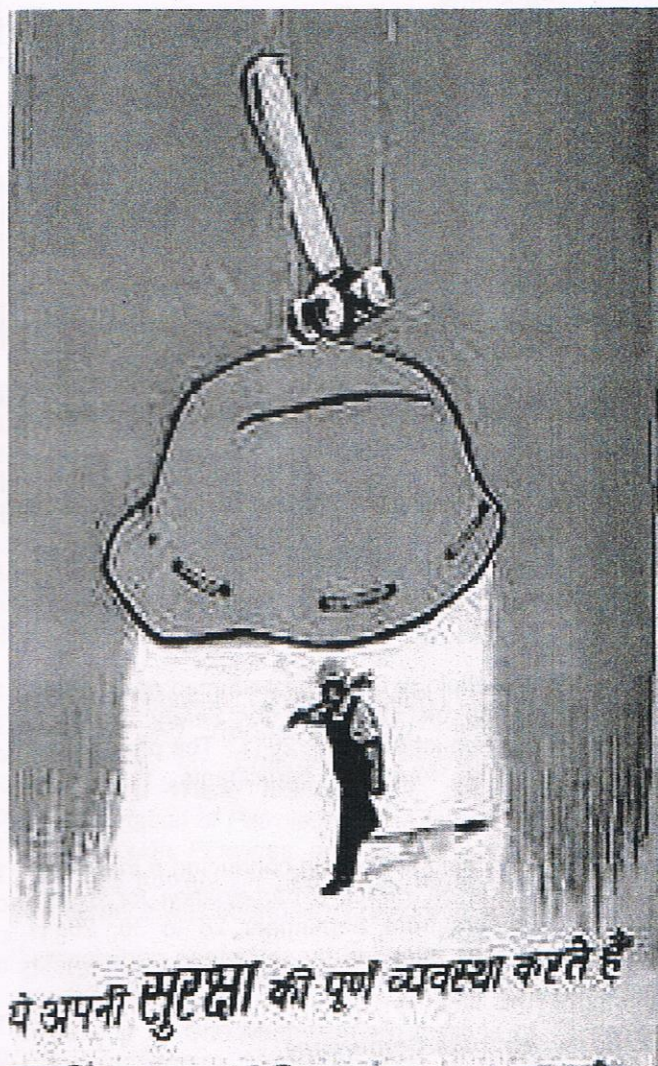
workers within permissible levels and maintain better work environment.

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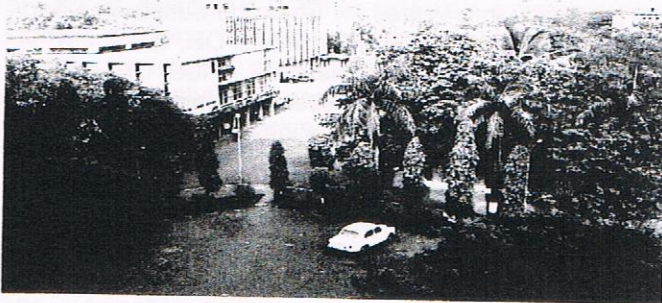
M.R.Rajput
Director (Industrial Hygiene)
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SAFETY POSTER



CENTRAL LABOUR INSTITUTE: MUMBAI

During the quarter from July 2011 to September 2011, Central Labour Institute carried out several activities of which important ones are given below.



Studies

Safety Audit at a Petrochemical Industry in Gujarat (Pal, P.B., Sharma, S.C., Major Hazard & Chemical Safety Division, Central Labour Institute, Mumbai)

Safety Audit at an Irrigation Systems Manufacturing Unit in Gujarat (Laxminarayana, E., Bairwa, B.L., Staff Training & Productivity Division, Central Labour Institute, Mumbai)

Training Programme

The *Advanced Diploma in Industrial Safety* course of the academic year 2011-2012 commenced from July 19, 2011. Twenty eight candidates were selected for the course.

The Safety Division conducted a three-day training programme on *OSH Awareness* in collaboration with NSC Maharashtra Chapter from August 01 to 03, 2011. Twenty six participants attended the programme.

The Major Hazard & Chemical Safety Division conducted a three-day training programme on *Safety & Health Management in Process Industries* from July 20 to 22, 2011. The programme was attended by fifteen participants from six organizations.

The Staff Training division conducted a two-day in-plant training programme on *Employee Productivity Improvement* at National Fertilizers Ltd., Guna, Madhya Pradesh. The programme was attended by seven participants.

The Industrial Psychology Division conducted a three-day training programme on *Motivation for Safety Health & Productivity* from August 03 to 05, 2011. The programme was attended by fourteen participants from five organizations.

The Industrial Psychology Division conducted a three-day training programme on *Effective participation for Safety Committee Members* from September 28 to 30, 2011. The programme was attended by seventeen participants from seven organizations.

Workshops/Seminars/Conference

The Safety Division conducted a one-day workshop on *Safety Report* exclusively for the officers of DISH

Maharashtra on September 16, 2011. The workshop was attended by twenty participants.

The Staff Training division conducted a three-day training workshop on *Training Methodology for Trainers in Safety, Health & Environment in Industries* from August 17 to 19, 2011. Twenty five participants attended the workshop.

The Staff Training division conducted a one-day small scale workshop on *Higher Productivity & Better Place to Work* at Nashik Industrial Estate, NICE, Satpur, Nashik on 26.9.2011. Fifty two participants attended the workshop.

The Industrial Medical Division conducted a five-day training workshop on *Occupational Health Practices for Nurses, Health/Medical Assistants* from September 12 to 16 2011. Thirty-six participants attended the workshop.

The Industrial Medical Division conducted a five-day training workshop on *Occupational Health Practices for Nurses, Health/Medical Assistants* from September 26 to 30, 2011. Sixteen participants attended the workshop.

REGIONAL LABOUR INSTITUTE, KANPUR

During the quarter from July 2011 to September 2011, Regional Labour Institute carried out studies, training programmes etc. which are given here.



Studies

Occupational Health Audit at a Carpet Processing Unit in Uttar Pradesh (Pandey, G.S., Safety Division; Bhattacharya, C., Industrial Medicine Division, Regional Labour Institute, Kanpur)

Monitoring of Work Environment at a Thermal Power Plant in Uttar Pradesh (Brij Mohan, Industrial Hygiene Division, Regional Labour Institute, Kanpur)

Training Programmes

The *Advanced Diploma in Industrial Safety* course of the academic year 2011-2012 commenced from July 19, 2011. Forty seven candidates were selected for the course.

The Institute conducted a three-day training programme on *Safety & Law* from September 06 to 08, 2010. Eight participants representing six organizations participated in this programme.

The Institute conducted a three-day orientation programme on *Occupational Health for Paramedical Staff* from September 13 to 15, 2011. Seventeen participants

INSTITUTE NEWS

representing nine organizations participated in this programme.

The Institute conducted a four-day training programme on *Safety & Health Management* for the students of ISSMI, Banda from September 28 to October 01, 2011. Twenty participants attended the programme.

REGIONAL LABOUR INSTITUTE, CHENNAI

During the quarter from July 2011 to September 2011, Regional Labour Institute carried out following technical activities.



Studies

Safety Audit at a Auto-parts Manufacturing Unit in Karnataka (Elangovan, R.K., Safety Division, Regional Labour Institute, Chennai)

Safety Audit at a Thermal Power Plant in Andhra Pradesh (Balasubramanian, K.; Varadharajan, N., Safety Division; Sreeramulu, A., Industrial Hygiene Division, Regional Labour Institute, Chennai)

Noise/Illumination level study at a Cigarette Factory in Karnataka (Elangovan, R.K., Safety Division; Dhende, K.N., Rengaraj, C., Vasu, G., Industrial Hygiene Division, Regional Labour Institute, Chennai)

Safety Audit at Plastics Machinery Unit in Tamil Nadu (Elangovan, R.K., Safety Division, Regional Labour Institute, Chennai)

Training Programme

The *Advanced Diploma in Industrial Safety* course of the academic year 2011-2012 commenced from July 11, 2011. Fifty candidates were selected for the course.

The Institute conducted a two-day training programme on *Occupational Safety and Health in Construction Industries* on July 26 and 27, 2011. The programme was attended by twenty three participants.

The Institute conducted a two-day training programme on *Ergonomics- A Tool for ensuring Safety, Health and Productivity at Workplace* on August 10 and 11, 2011. The programme was attended by thirty five participants.

The Institute conducted an in-plant training programme on *Material Handling using Fork Lift and Overhead Cranes* on August 09, 2011 at Combat Vehicles Research Development Establishment at Avadi, Chennai. The programme was attended by thirty participants.

The Institute conducted a four-day training programme on *Major Accident Hazards in Industries for Inspectors of Factories* from September 20 to 23, 2011. The programme was attended by twenty three participants.

The Institute conducted a five-day certificate course on *Occupational Safety* in collaboration with Madras Management Association from September 26 to 30, 2011 in Chennai. The course was attended by thirty five participants.

The Institute conducted a half-day appreciation programme for the third year DGNM Nursing Students of Sooriya School of Nursing, Saligramam, Chennai on September 16, 2011. The programme was attended by twelve nursing students.

Workshops/Seminars/Conference

The Institute conducted a one-day national workshop on invitees. *Establishing Risk Observatory System in India* on August 01, 2011. The workshop was attended by twenty nine invitees.

Paper/Presentations/Talks

Dr.R.K.Elangovan, Director (Safety), presented a paper on *Intelligent Information System and Management (IISM, 2011)* on July 14 & 15, 2011, in the international conference held at RVS College of Engineering and Technology, Coimbatore. The conference was attended by three hundred and sixty participants.

Dr.R.K. Elangovan, Director (Safety), delivered a talk on *Safety in Industries* at the Safety Conference – 2011 organized by Institution of Engineers India, Tamilnadu State Centre, Chepauk, on July 29, 2011, The conference was attended by two hundred participants.

Dr.R.K.Elangovan, Director (Safety), delivered a talk on *National Policy on SHE at Workplace* in a meeting of Stevedores Association held at Chennai Port Trust on August 02, 2011.

Dr.R.K.Elangovan, Director (Safety), delivered a lecture on *The Building and other Construction Workers (Regulation of Working Conditions) Act, 1996* in the one-day seminar on *Construction Safety* conducted by the Directorate of Factories & Boilers, Govt. of Karnataka at Bangalore on August 05, 2011. The seminar was attended by three hundred and fifty participants comprising of management executives and supervisors.

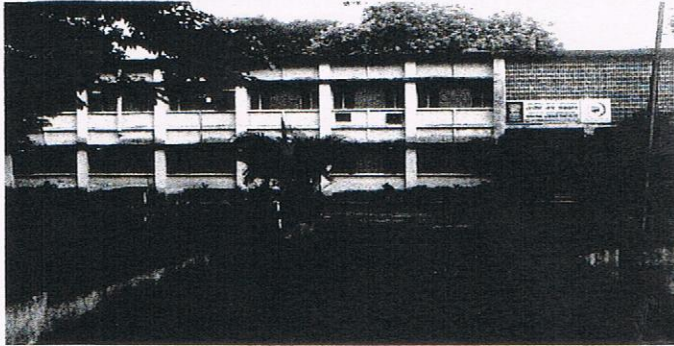
Dr.R.K.Elangovan, Director (Safety), presented a paper on *Emerging Trends in Third Party Audits* at the conference on *Emergency Planning in Industries, Hazardous Waste Management, Safety Storage and Transportation of Petroleum, Petroleum Products, Natural Gas through Pipelines and POL Takers* conducted by FICCI at Kolkata on September 08 and 09, 2011. The Conference was attended by hundred participants.

Dr.R.K.Elangovan, Director (Safety), delivered a talk on *Safety Awareness* in the Orientation Programme organized by Shri Muthukumarn Institute of Technology, Chikkarayapuram, Mangadu, from September 14 to 17,

2011. The programme was attended by four hundred management executives and supervisors.

REGIONAL LABOUR INSTITUTE, KOLKATA

During the quarter from July 2011 to September 2011, Regional Labour Institute carried out studies, training programmes etc. which are given here.



Training programmes

The *Advanced Diploma in Industrial Safety* course of the academic year 2011-2012 commenced from July 25, 2011. Forty two candidates were selected for the course.

The Institute conducted one-day training programme on *Safety & Health Provision under the Building and Other Construction Workers' Act, 1996* at Shillong on July 18, 2011. Twenty six participants consisting of Inspector of Factories and other enforcement officials attended the programme.

The Institute conducted a three-day training programme on *Safety in Material Handling* from July 27 to 29, 2011. Sixteen participants attended the programme.

The Institute conducted a five-day training programme on *Safety, Health & Environment at Workplace* for the Managers, & Supervisors from August 01 to 05, 2011. Sixteen participants attended the programme.

The Institute conducted a five-day training programme on *Identification, Evaluation and Control of Hazards in Industries* for the plant Executives from August 22 to 26, 2011. Eleven participants attended the programme.

The Institute conducted a five-day training programme on *Safety and Health Awareness for the Members of Safety Committee* from September 05 to 09, 2011.

The Institute conducted a five-day training programme on *Safety in Construction Industries* from September 12 to 16, 2011. Eighteen participants attended the programme.

Paper/Presentations/Talks

Dr. S. K. Haldar, Deputy Director (Industrial Medicine) delivered talk on *Occupational Health Hazards & Its prevention in Construction Industry* at State Labour Institute, Govt. of West Bengal, Kolkata on September 30, 2011.

डीजीफासली की एक झलक

कारखाना सलाह सेवा और श्रम संस्थान महानिदेशालय (डीजीफासली) भारत सरकार के श्रम और रोजगार मंत्रालय का एक सम्बद्ध कार्यालय है। कारखानों और गोदियों में व्यावसायिक सुरक्षा और स्वास्थ्य से सम्बन्धित राष्ट्रीय नीतियां बनाने में एक तकनीकी पक्ष के रूप में मंत्रालय की सहायता करने के लिए तथा कार्यस्थल पर कामगारों की सुरक्षा, स्वास्थ्य, दक्षता और कल्याण संबंधी मामलों पर राज्य सरकारों और कारखानों को परामर्श देने के लिए भारत सरकार के श्रम मंत्रालय के अधीन डीजीफासली का गठन १९४५ में किया गया था। यह देश के प्रमुख पत्तनों पर सुरक्षा और स्वास्थ्य विधानों का प्रवर्तन भी करता है।

कारखाना सलाह सेवा और श्रम संस्थान महानिदेशालय (डीजीफासली) की संरचना में निम्नलिखित शामिल है :-

- मुंबई स्थित मुख्यालय
- मुंबई स्थित केंद्रीय श्रम संस्थान
- कोलकाता, चेन्नई, फरीदाबाद और कानपुर स्थित क्षेत्रीय श्रम संस्थान

डीजीफासली की संकल्पना:- सभी के लिए कारखानों और पत्तनों में कार्यस्थल पर सुरक्षा और स्वास्थ्य सुनिश्चित करने के लिए ज्ञान का सृजन, नीतियां बनाने, मानक और व्यवहार में उत्कृष्ट संगठन के रूप में स्थापित होना डीजीफासली की संकल्पना है।

डीजीफासली का उद्देश्य:- डीजीफासली का उद्देश्य भागीदारी, मार्गदर्शन, विशिष्ट क्षेत्रों में नियामक क्रियाकलापों के माध्यम से कारखानों और पत्तनों में सुरक्षित और स्वस्थ कार्यस्थल के लिए व्यावसायिक सुरक्षा और स्वास्थ्य में सुविज्ञता उपलब्ध कराना, और सूचनाओं का आदान-प्रदान करना डीजीफासली का उद्देश्य है।

डीजीफासली संगठन में मुंबई स्थित मुख्यालय, मुंबई स्थित केन्द्रीय श्रम संस्थान, चेन्नई, कानपुर, कोलकाता और फरीदाबाद स्थित चार क्षेत्रीय श्रम संस्थान तथा मुंबई, जवाहर लाल नेहरू पोर्ट, कांडला, मारुगांव, न्यू मैंगलोर, चेन्नई, तूतीकोरिन, कोच्चि, विशाखापट्टनम, कोलकाता और पारादीप स्थित ग्यारह गोदी सुरक्षा निरीक्षणालय हैं। डीजीफासली संगठन में लगभग १२९ अधिकारियों (इंजीनियर, फिजीशियन, औद्योगिक हाइजिनिस्ट, शरीर वैज्ञानिक, एर्गोनॉमिस्ट, औद्योगिक मनोचिकित्सक, कमर्शियल आर्टिस्ट आदि) और ८१ तकनीकी कर्मचारी सदस्यों का बहुआयामी दल है। डीजीफासली और केन्द्रीय श्रम संस्थान, मुंबई में विभिन्न विशिष्ट प्रभाग/स्कंध सम्मिलित हैं। यह संगठन आगे, विकास और बढ़ती मांग को पूरा करने के लिए तत्पर है। विकासशील देश में जहां विभिन्न और जटिल प्रक्रिया उद्योग बड़ी संख्या में विद्यमान है वहां कामगारों की सुरक्षा और संरक्षण एक कठिन कार्य है। तकनीक, औद्योगिक समाज की साख और समर्पित कर्मचारियों की शक्ति से सज्जित संगठन आने वाले कल की चुनौतियों को पूरा करने में सक्षम है। यह कार्यस्थल को सुरक्षित बनाने के लक्ष्य के लिए कृतसंकल्प है।

वेबसाइट : www.dgfasli.nic.in देखें।

Safety Audit at a Petro-chemical Industry in Gujarat (Pal, P.B., Sharma, S.C., Major Hazard & Chemical Safety Division, Central Labour Institute, Mumbai)

The document is a report of safety audit carried out in a production area, bulk storage area, raw material & finish product area, electrical section etc., of a petro-chemical industry in Gujarat. The report lists about 110 suggestions including discharge of static electricity at different points. The general impression that arises looking at the observations and the recommendations, is that the management is quite keen in managing the safety and health matters, yet the long term safety aspects like proper housekeeping, electrical safety, safety of storage tanks, pipe lines safety, fire safety, discharge of static electricity, machine guarding, etc. are some of the areas where perpetual attention is required. The safety committee is functioning well in the organisation. It has, however, been suggested that the worker members of the committee should be elected directly by the workers by holding the elections as provided in the rules.

Safety Audit at a Auto-parts Manufacturing Unit in Karnataka (Elangovan, R.K., Safety Division, Regional Labour Institute, Chennai)

A Safety Audit was conducted at a auto-parts manufacturing unit in Karnataka, with a view to identify the hazards so that the management can devise suitable procedures and methods for enhancing safety in the industry. The Safety Audit was conducted as per BIS: 14489:1998. An opening meeting was conducted at the beginning of the Safety Audit. At the end of the Safety Audit, a closing meeting was conducted and the findings were finalized in the closing meeting. Some of the suggestions of the Safety Audit are Safety in LPG loading and unloading, safety with LPG cylinders, emergency preparedness, mock drills, preparation of SOPs and SMPs, specific training on Safety and Health, Metallic hose testing and safety with pipelines.

Safety Audit at a Thermal Power Plant in Andhra Pradesh (Balasubramanian, K.; Varadharajan, N., Safety Division; Sreeramulu, A., Industrial Hygiene Division, Regional Labour Institute, Chennai)

The thermal power plant in Andhra Pradesh is a high tech plant supported by distributed control system covering critical operations along with provision for online maintenance of critical equipments/components using latest SAP technology. The audit team observed that overall OSH maintenance system of the plant is good. However, the team observed certain deficiencies / lacunae in respect of aspects like control of dust, control of noise, storage of materials, maintenance of civil structures, housekeeping, supply and use of Personal Protective Equipments, medical examination of working personnel etc. The team has recommended appropriate remedial measures to overcome the said deficiencies which include effective maintenance of dust extraction system, use of respiratory protective equipments, ear muffs, effective maintenance of waste dispersion system, provision of mobile canteen services to the isolated areas, urgent repairs to damaged civil structures etc.

Noise/Illumination level study at a Cigarette Factory in Karnataka (Elangovan, R.K., Safety Division; Dhende,

K.N., Rengaraj, C., Vasu, G., Industrial Hygiene Division, Regional Labour Institute, Chennai)

A Noise/Illumination Level study was conducted at a cigarette factory in Karnataka with a view to identify the hazards so that the management can devise suitable procedures and methods for enhancing safety in the industry. An opening meeting was conducted at the beginning and a closing meeting at the end. The noise and illumination level were measured at different locations in the factory and the same has been compared with applicable legal statutes and other Indian Standards. The deviations have been highlighted to enable the management to devise proper prevention and control strategies in ensuring effective illumination and preventing the workers from exposure to excessive noise.

Safety Audit at a Plastics Machinery Unit in Tamil Nadu (Elangovan, R.K., Safety Division, Regional Labour Institute, Chennai)

A Safety Audit was conducted at plastics machinery unit in Tamil Nadu, with a view to identify the hazards so that the management can devise suitable procedures and methods for enhancing safety in the industry. The Safety Audit was conducted as per BIS: 14489:1998. An opening meeting was conducted at the beginning of the Safety Audit. At the end of the Safety Audit, a closing meeting was conducted and the findings were finalized in the closing meeting. The Safety Audit was conducted for the first time in the plant and the major recommendations of the audit are establishing safety organization, accident investigation procedures, preparation of SOPs and SMPs, Fire Safety, Safety in handling Ammonia solvents and other chemicals. Recommendations such as testing of earth pits, lightning adequacy, emergency-preparedness and planning, training, PPEs and contractor safety were suggested.

Safety Audit at an Irrigation Systems Manufacturing Unit in Gujarat (Laxminarayana, E., Bairwa, B.L., Staff Training & Productivity Division, Central Labour Institute, Mumbai)

The scope of the safety audit included manufacturing process and operations to provide an opportunity for the management to assess existing its strength and weakness in complying with OSH management policies and procedures with reference to legal requirements. The audit was conducted broadly in line with BIS:14489. The audit made several suggestions for improving the existing OSH initiatives. The salient recommendations are Plan of action for optimum utilisation of the allotted OSH budget, Improvement of procedural requirements for safety committee meetings, Documentation of accidents and improved investigation to avoid major mishaps in future, Assessment of need based training programmes and its evaluation, Introduction of health education, Further strengthening of work permit system, Improving safety and house-keeping through appropriate lay-out systems, Clear identification of panel switches and use of colour codes, Effective use and maintenance of PPEs, etc. In view of the pro-active steps being taken by the management in conducting the safety audit, it is anticipated that the recommendations made in this report will result into better OSH compliance and ensure a safe work place.

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. A brief Material Safety Data Sheet on few points for Methyl Ethyl Ketone is given below.

PRODUCT NAME(S)

Methyl Ethyl Ketone (247)

CHEMICAL USE

Solvent

HAZARDS IDENTIFICATION

Emergency Overview

Form : liquid, clear

Color : colourless

Odor : sweet pungent acetone-like

Hazard Summary: Extremely flammable. In use, may form flammable/explosive vapour-air mixture. Harmful by inhalation. May be harmful if swallowed. May be harmful if absorbed through skin. Irritating to eyes. Irritating to respiratory system. Causes headache, drowsiness or other effects to the central nervous system. Contains a peripheral neurotoxin. Signs/symptoms include muscle weakness and a numbing or tingling sensation in the arms, legs or feet. May cause irritation of the gastrointestinal tract. May cause skin irritation. Repeated exposure may cause skin dryness or cracking.

POTENTIAL HEALTH EFFECTS

Skin: May cause skin irritation. May cause systemic poisoning with symptoms paralleling those of inhalation. Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering.

Eyes: Irritating to eyes. Causes itching, burning, redness and tearing.

Ingestion: Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. May cause systemic poisoning with symptoms paralleling those of inhalation.

Inhalation: Causes respiratory tract irritation. Causes headache, drowsiness or other effects to the central nervous system. Contains a peripheral neurotoxin. Signs/symptoms include muscle weakness and a numbing or tingling sensation in the arms, legs or feet. Inhalation of high vapour concentrations can cause CNS-depression and narcosis. Kidney injury may occur.

Chronic Exposure: Repeated and prolonged exposure to solvents may cause brain and nervous system damage. Contains a peripheral neurotoxin. Signs/symptoms include muscle weakness and a numbing or tingling sensation in the arms, legs or feet. Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering. Kidney injury may occur.

Aggravated Medical Condition: Skin disorders, Eye disorders, Neurological disorders, Heart disease. Target Organs: Eyes, Skin, Respiratory system, Central nervous

system, Cardiovascular system, Peripheral nervous system, Kidney.

FIRST AID MEASURES

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Use oxygen as required, provided a qualified operator is present. Call a physician.

Skin contact: Wash off immediately with plenty of water for at least 15 minutes. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use. Call a physician if irritation develops or persists.

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician.

Ingestion: Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician.

Notes to physician

Treatment: Treat symptomatically.

ACCIDENTAL RELEASE MEASURES

Personal precautions: Wear personal protective equipment. Unprotected persons must be kept away. Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Remove all sources of ignition. Do not swallow. Avoid breathing vapors, mist or gas. Avoid contact with skin, eyes and clothing.

Environmental precautions: Prevent further leakage or spillage if safe to do so. Discharge into the environment must be avoided. Do not flush into surface water or sanitary sewer system. Prevent product from entering drains. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

Methods for cleaning up: Ventilate the area. No sparking tools should be used. Use explosion-proof equipment. Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations.

HANDLING AND STORAGE

Handling: Wear personal protective equipment. Use only in well-ventilated areas. Keep container tightly closed. Do not smoke. Do not swallow. Avoid breathing vapors, mist or gas. Avoid contact with skin, eyes and clothing.

Advice on protection against fire and explosion: Keep away from fire, sparks and heated surfaces. Take precautionary measures against static discharges. Ensure all equipment is electrically grounded before beginning transfer operations. Use explosion-proof equipment. Keep product and empty container away from heat and sources of ignition. No sparking tools should be used. No smoking.

Storage: Requirements for storage areas and containers: Store in area designed for storage of flammable liquids. Protect from physical damage. Keep containers tightly closed in a dry, cool and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Keep away from heat and sources of ignition. Keep away from direct sunlight. Store

MATERIAL SAFETY DATA SHEET

away from incompatible substances. Container hazardous when empty. Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

EXPOSURE CONTROL/PERSONAL PROTECTION

Protective measures: Ensure that eyewash stations and safety showers are close to the workstation location. Engineering measures: Use with local exhaust ventilation. Prevent vapor buildup by providing adequate ventilation during and after use.

Eye protection: Do not wear contact lenses.

Wear as appropriate: Safety glasses with side-shields

If splashes are likely to occur, wear: Goggles or face shield, giving complete protection to eyes

Hand protection: Solvent-resistant gloves. Gloves must be inspected prior to use. Replace when worn.

Skin and body protection: Wear as appropriate: Solvent-resistant apron, Flame retardant antistatic protective clothing. If splashes are likely to occur, wear: Protective suit.

Respiratory protection: In case of insufficient ventilation wear suitable respiratory equipment. For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Use NIOSH approved respiratory protection.

Hygiene measures: When using, do not eat, drink or smoke. Wash hands and face before breaks and immediately after handling the product. Keep working clothes separately. Remove and wash contaminated clothing before re-use. Do not swallow. Avoid breathing vapors, mist or gas. Avoid contact with skin, eyes and clothing.

EXPOSURE LIMITS

Exposure Guidelines

2-Butanone 78-93-3 ACGIH TWA 200 ppm

ACGIH STEL 300 ppm

NIOSH REL 200 ppm 590 mg/m³

NIOSH STEL 300 ppm 885 mg/m³

OSHA Z1 PEL 200 ppm 590 mg/m³

OSHA Z1A TWA 200 ppm 590 mg/m³

OSHA Z1A STEL 300 ppm 885 mg/m³

US CA OEL TWA PEL 200 ppm 590 mg/m³

US CA OEL STEL 300 ppm 885 mg/m³

FIRE FIGHTING MEASURES

Flash point: -9 °C (16 °F)

Ignition temperature: 404 °C (759 °F)

Lower explosion limit: 1.4 % (V)

Upper explosion limit: 11.4 % (V)

Suitable extinguishing media: Alcohol-resistant foam, Carbon dioxide (CO₂), Dry chemical, Cool closed containers exposed to fire with water spray.

Extinguishing media which shall not be used for safety reasons: Do not use a solid water stream as it may scatter and spread fire.

Specific hazards during fire fighting: Extremely flammable.

Vapours may form explosive mixtures with air. Vapours are heavier than air and may spread along floors. Vapours may travel to areas away from work site before igniting/flashing back to vapor source. In case of fire hazardous decomposition products may be produced such as: Carbon monoxide, Carbon dioxide (CO₂),

Special protective equipment for fire-fighters: Wear self-contained breathing apparatus and protective suit.

STABILITY AND REACTIVITY

Conditions to avoid: Heat, flames and sparks. Protect against light.

Materials to avoid: Strong oxidizing agents, Strong acids and strong bases, Amines, Ammonia, Isocyanates, Copper, Pyridine, Plastic materials can be attacked.

Hazardous decomposition products: In case of fire hazardous decomposition products may be produced such as: Carbon monoxide, Carbon dioxide (CO₂).

Hazardous reactions: Hazardous polymerisation does not occur. Stable under recommended storage conditions.

PHYSICAL AND CHEMICAL PROPERTIES

Form: liquid, clear

Color: colourless

Odor: sweet pungent acetone-like

Molecular Weight: 72.11 g/mol

pH: not applicable

Melting point/range: -86.69 °C (-124.04 °F)

Boiling point/boiling range: 79.64 °C (175.35 °F)

Vapor pressure: 98.66 hPa at 20 °C (68 °F)

Relative vapour density: 2.5 (Air = 1.0)

Density: 0.805 g/cm³ at 20 °C (68 °F)

Water solubility: 240 g/l at 20 °C (68 °F)

TOXICOLOGICAL INFORMATION

Acute oral toxicity: LD50 rat

Dose: 2,737 mg/kg

Acute dermal toxicity: LD50 rabbit

Dose: 6,480 mg/kg

Acute inhalation toxicity: LC50 rat

Dose: 23.5 mg/l

Exposure time: 8 h

ECOLOGICAL INFORMATION

Toxicity to fish: flow-through test LC50

Species: Pimephales promelas (fathead minnow)

Dose: 3,220 mg/l

Exposure time: 96 h

Toxicity to bacteria: EC50

Species: Photobacterium phosphoreum

Dose: 3,426 mg/l

Exposure time: 5 min

Toxicity to bacteria: EC50

Species: Photobacterium phosphoreum

Dose: 3,403 mg/l

Exposure time: 30 min

Toxicity to bacteria: Respiration inhibition EC50

Species: activated sludge

Dose: 9.98 g/l

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- 400 022. MSDS on about 1,20,000 chemicals/materials are available with Central Labour Institute. Computer printout will be supplied on nominal charge.

Ph. No.:- 022-24092203, Fax. No.:- 022-24071986

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 Centres. Central Labour Institute, Mumbai has been designated as the CIS National Centres of India. CIS can offer you rapid access to comprehensive information on occupational safety and health through its abstracts on latest OSH publications, the CIS Thesaurus and ILO Bulletin 'Safety and health at Work'.

EXCERPTS FROM CIS-DOC

Title: Guide to inspecting workplace.

CIS Accession Number: CIS 10-0184

Abstract: This guide consists of a series of checklists for workplace inspections involving the following activities and exposures: chemicals and harmful substances; electricity; manual tasks; slips and trips; working at heights; forklifts; new and young workers; machinery and plant; machinery guarding; noise; emergency procedures; violence and aggression; working alone. (110668)

Title: Making the link between health and productivity at the workplace - A global perspective.

CIS Accession Number: CIS 10-0159

Abstract: This article discusses the relationship between health and productivity at the workplace by reviewing the current status of the fields of workplace health promotion and health management. The prevailing chronic disease trends coupled with economic pressures have proven to be significant challenges for employers and employees alike. While an overall progress in workplace health promotion can be observed, the number of companies which take a proactive and integrated approach to workplace health remains small. Workplace health promotion programmes in the United States typically focus on the individual health risks of employees while their European counterparts target physical and, more recently, psychosocial hazards. A number of specific tools and programmes for integrated health management are described, including self-report instruments to measure presenteeism. (110583)

Title: A dose of surgical spirit.

CIS Accession Number: CIS 10-0164

Abstract: This article describes how the National Health Service (NHS) of the United Kingdom, which is the service responsible for operating all public hospitals, is responding to the need to provide safety and health

training to its employees. Such training is particularly important because the hospitals operate 24h per day during which employees may be exposed to poisons, radiation, sharps, a variety of pathogens and contaminated waste. Topics addressed: induction training; on-the-job training; job-specific training; refresher training; training of senior management; role of safety and health managers; record-keeping. (110598)

Title: Injury and disease reporting systems.

CIS Accession Number: CIS 10-0227

Abstract: Collection of articles on occupational injury and disease reporting systems of relevance to countries in the Asian-Pacific region. Contents: Singapore framework for reporting occupational accidents, injuries and diseases; reporting system for occupational injuries and illness in Korea; ILO list of occupational diseases for which health care workers are at risk; reporting of occupational injury and diseases in Malaysia. Other topics: presentation of a WHO online library on occupational and environmental health; presentation of a new IEA/ICOH publication on ergonomics in developing countries. (110680)

Title: WARM - Work adjustment for recycling and managing waste.

CIS Accession Number: CIS 10-0157

Abstract: Safe and efficient waste collection systems are the foundation for recycling and managing waste and protecting our environment. Waste collectors contribute to cleaning our environment through their collection work day-by-day. However, waste collectors often face many risks associated with their collection work such as handling heavy and dangerous waste, traffic accidents, or hot working environment. This training manual aims to improve the safety, health and efficiency of waste collection work. It uses many illustrations of good examples that waste collectors and managers can put to immediate use, based on the ILO's participatory training approaches. It promotes practical collaborative actions between waste collectors and the community for establishing safety and efficient waste collection systems. (110684)

Title: Gender differences, work stressors and musculoskeletal disorders in weaving industries.

CIS Accession Number: CIS 10-0163

Abstract: This study was undertaken to identify the work stressors among male and female weavers in the powerloom and handloom sectors and to examine the association of work stressors with the prevalence of work-related musculoskeletal disorders (MSDs). It involved 516 workers. There was a high overall prevalence of MSDs, with women more prone to developing MSDs in upper back and lower back, while men were more prone to developing pain in the knee and hand. Multivariate analysis indicated that a job duration of over ten years, manual material handling and poor machinery safety were significant risk factors of MSDs in the powerloom sector. Among handloom weavers, significant risk factors

of pain included being aged over 25 years, poor machinery design, mental overload and skill requirements. (110594)

Title: Performance of mechanical filters and respirators for capturing nanoparticles - Limitations and future direction.

CIS Accession Number: CIS 10-0241

Abstract: There is an increasing concern about the health hazards posed to workers exposed to nanoparticles by inhalation, which is the most common route of exposure. Filtration is the simplest and most common method of aerosol control. It is widely used in mechanical ventilation and respiratory protection. However, concerns have been raised regarding the effectiveness of the filters for capturing nanoparticles. This article reviews the literature on the filtration performance of mechanical filters and respirators against nanoparticles. It discusses filtration mechanisms, theoretical models, affecting factors of the filtration efficiency and testing protocols for respirator and filter certification. (110589)

Title: Refresher training on asbestos and occupational medicine.

CIS Accession Number: CIS 10-0242

Abstract: Review of the communications presented at a refresher training seminar on asbestos and occupational medicine. Main topics addressed: occupational diseases due to asbestos; statistical trends of mesothelioma over the past 20 years in Switzerland and forecasts; cost of occupational diseases due to asbestos; types of asbestos and their hazards; early screening; histological, immunohistochemical and radiological diagnosis; awareness and preventive measures; addressing the issue of asbestos in vocational training. (110611)

Title: Some non-heterocyclic polycyclic aromatic hydrocarbons and some related exposures.

CIS Accession Number: CIS 10-0251

Abstract: This volume reviews the potential carcinogenicity of 60 polycyclic aromatic hydrocarbons (PAHs) and several occupational exposures involving coal-derived PAHs. These are formed during the incomplete combustion of organic material. Environmental sources of polycyclic aromatic hydrocarbons include industrial air pollution, urban air pollution, tobacco smoke and diet (which is commonly the main source of exposure in non-smokers who are not exposed to such hydrocarbons through their occupations). High occupational exposure can arise during the conversion of coal to coke and coal tar, and during the processing and use of products derived from coal tar. In this volume, benzo[a]pyrene, other PAHs and related occupational exposures were evaluated by an IARC Monographs Working Group, reviewing epidemiological evidence, animal bioassays, and mechanistic and other relevant data to reach conclusions as to their carcinogenic hazard to humans. (110640)

Title: Risk assessment of gaseous/particulate phase PAH exposure in foundry industry

CIS Accession Number: CIS 10-0253

Abstract: Air samplings in several working areas of two foundries in Taiwan were collected to assess polycyclic aromatic hydrocarbon (PAH) levels. The average PAH level in Foundry A was $19.56\mu\text{g}/\text{m}^3$, which was higher than that in Foundry B ($8.26\mu\text{g}/\text{m}^3$), whereas the reverse was observed for the benzo[a]pyrene toxic equivalent level ($38.81\text{ng}/\text{m}^3$ and $46.52\text{ng}/\text{m}^3$ respectively). PAH levels in the moulding process, painting area and furnace area are described. The gas phase was the major contributor of total PAHs in the manufacturing areas. Moreover, health risk assessment of PAHs exposure showed that lung cancer risks were important in both foundries. It is recommended that workers use appropriate respiratory masks in painting, melting and pouring areas to limit their occupational exposure to PAHs. (110647)

Title: Industrial emergency planning modeling: A first step toward a robustness analysis tool.

CIS Accession Number: CIS 10-0254

Abstract: This article presents a model-based approach to the analysis of the robustness of industrial emergency plans, established by the European Union SEVESO II Directive. Robustness is defined in terms of the capacity of the mechanism to respond to deteriorated conditions. The proposed methodology is based upon a systemic, hierarchical and generic model of an internal or external industrial emergency plan, using the fuzzy inference system (FIS) modeling approach. Potential failures are estimated through an *a priori* analysis of the plan model and an *posteriori* analysis of lessons learned from exercises and past accidents. Assessment of the plan's functions is carried out via assessment checklists, structured via the systemic model for each of the plan's process. This approach can be used as a toolbox both for the assessment of existing plans and the development of industrial emergency plans. (110648)

Title: REACH: an opportunity for trade unions. Putting knowledge to work in the workplace.

CIS Accession Number: CIS 10-0252

Abstract: The marketing of chemicals - especially those that could harm human health - has been regulated by REACH (Registration, Evaluation and Authorization of Chemicals) since 1 June 2007. Not that implementing this regulation will automatically mean better prevention of workplace chemical risks. Real progress, which includes outlawing the most toxic chemicals from workplaces, will not happen unless union representatives take ownership of the regulation. This booklet aims to help them carry out that vital front-line job. (110644)

TRAINING CALENDAR FOR THE YEAR 2011: DGFASLI

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S.No	Title of the Programme	Period	Coordinator (Technical)
1.	One Month Specialized Certificate Course in Safety and Health for Supervisory Personnel Engaged in Hazardous Process Industries.	Nov. 01 -30	N.K. Rustagi
2.	Refresher Course for Senior Inspectors of Factories	Nov. 07-18	S. Bharathi
3.	Impact of Environmental Pollutants & their Control at Workplace	Nov., 21-23	Subhash Chandra
4.	Collaborative Training Programme with NSC-Maharashtra.	Nov.,23-25	S. Bharathi
5.	Workshop on Industrial Noise	Nov.,28-30	Subhash Chandra
6.	AFIH Course for Doctors	Dec.,11 to Feb. 28 2012	Dr. S.S.Waghe
7.	ADIS 2011 – 12 : 2 nd Teaching Term (continued)	Nov.,21, 2011 to May 05, 2012	S. Bharathi
8.	Workshop on Monitoring of Work Environment and its Control in Industries.	Dec., 07-09	Mrs.M.K. Mandre
9.	Training programme on Safety in Storage, Handling and Management of Hazardous substances in Process Industries	Dec., 14-16	S.C. Sharma
10.	Training workshop on Productivity & Quality Improvement through Effective Employee Participation	Dec., 20-22	R.N. Meena

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S.No	Title of the Programme	Period	Coordinator
1.	One Month Certificate Course on Safety & Health	November 01- 30	A.K.Chakraborty
2.	Workshop on Safety Audit	December 13-15	A.K.Chakraborty
3.	Training Programme on Process Safety Management for Inspectors of Factories	December 19-23	Dr. Brij Mohan

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S.No	Title of the Programme	Period	Coordinator
1.	Training programme on Management of Hazardous Substances in Chemical Industries	November 08-11	Dr. S.B.Mishra
2.	Training Programme on Occupational Safety and Health in Construction Industries	December 07-08	K.Balasubra Manian
3.	Training Programme on Dispersion Modelling	December 22-23	Dr. S.B.Mishra & N. Varadharajan

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S.No	Title of the Programme	Period	Coordinator
1.	Workers Development Programme on Health	November 7- 9	Dr. S.K.Haldar
2.	Industrial Safety	October, 31 to November, 4	Shri S.Dutta Chowdhury
3.	One Month Specialized Certificate Course in "Safety & Health" for Supervisory working in Hazard Industries	November 14 - December 13	Shri S.Dutta Chowdhury
4.	Associate Fellow of Industrial Health	December 01, 2011 – February 28, 2012	Dr. S.K.Haldar

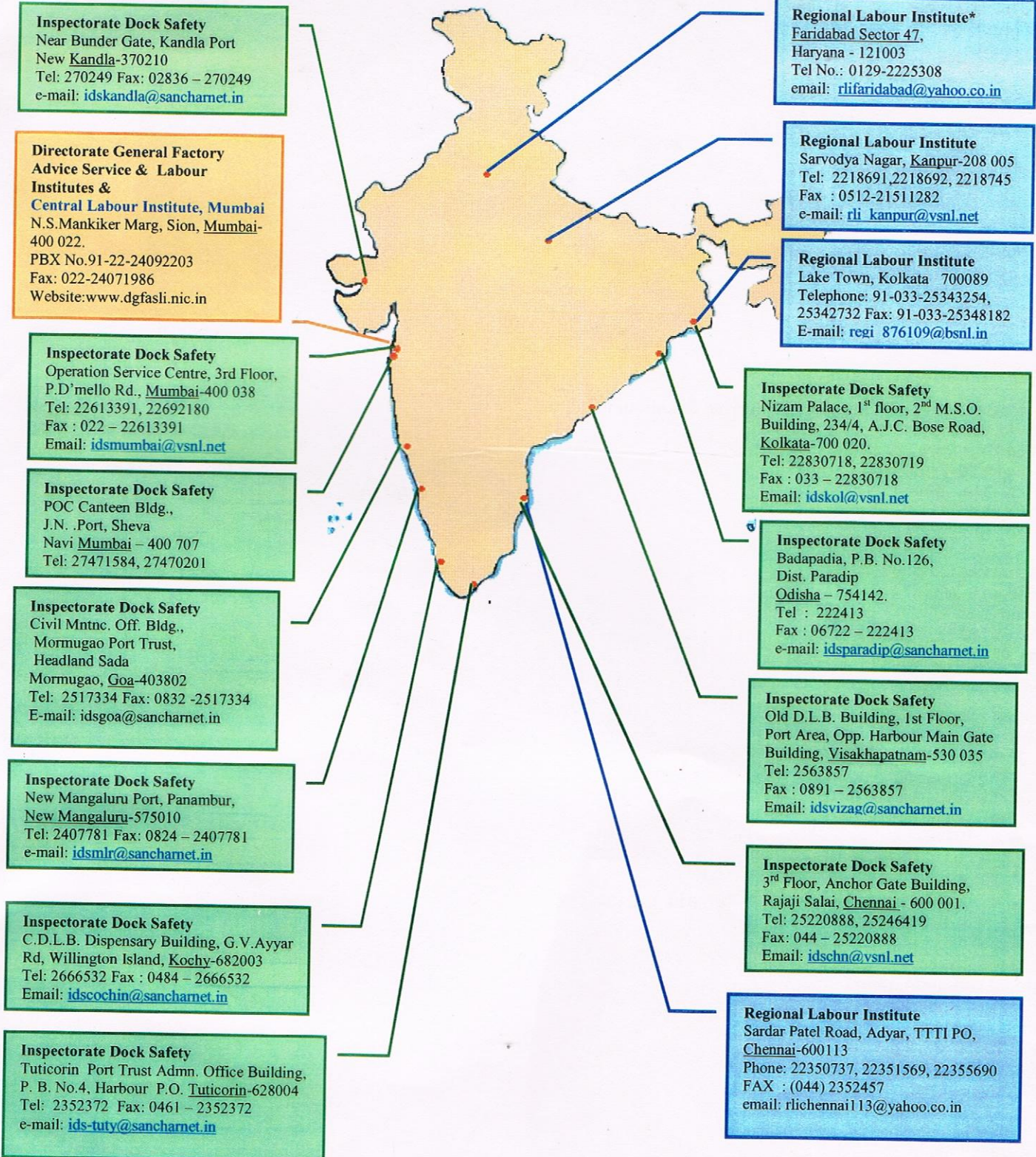
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S.No	Title of the Programme	Period	Coordinator
1.	Occupational Safety and Health in Construction Industry	November 23-25	Rajeev Shukla

- Training programme brochures will be mailed sufficiently in advance, specifying the dates of commencement of course, its venue etc., to the organisations as per mailing list available.
- Course-coordinator may be contacted for details such as training programme dates, venue, programme contents, level of participants, course fee and its payment etc.
- Admission to the course will be restricted to 20 participants on First-Come-First-Served basis. Participants are not allowed to attend the training course without written confirmation by the course-coordinator.
- Limited Hostel Accommodation on sharing and chargeable basis will be available on 'First-Come-First-Served' basis.

कारखाना सलाह सेवा और श्रम संस्थान महानिदेशालय के अधिष्ठान

ESTABLISHMENTS OF DIRECTORATE GENERAL FACTORY ADVICE SERVICE & LABOUR INSTITUTES



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