INDOSHNEWS

Vol.9 No 4
October-December 2004
Published by the Directorate General Factory Advice Service & Labour Institutes,
N.S. Mankikar Marg.
Sion, Mumbai 400 022.
INDIA

Cover page designed by
Shri S.N.Borkar

The electronic version of the Indoshnews on the Internet can be accessed at the following address:
www.dgfasli.nic.in

CONTENTS

DGFASLI
Visit us at:www.dgfasli.nic.in
Telephone : PABX 91-22-24092203
Fax : 91-22-24071986

ANNUAL SUBSCRIPTION
Rs. 100 (India)
Rs. 200 (Foreign)

FROM THE DESK

In this issue of INDOSHNEWS, we have tried to bring attention of managements and workers to the problem of Safety in Construction Industry. Recently, construction industry has been brought under the purview of a safety and health Statute. Earlier, because of lack of Statute, the condition of work was unregulated. In the changed circumstances, there is a need to put in place a satisfactory system of management in the area of health and safety. The cover feature talks about the necessity of a system with a view not only to improve the condition of work, but also minimizing avoidable losses. The DGFASLI is also ready to render services to construction sites and companies to improve their level of safety and health management and also to reduce losses.

The second article talks about Occupational Safety and Health Management System. Recently, we conducted a study in a few industry adopting the system. The article brings out some of the important findings of that study. It will be in the interest of the industry in general if they come forward and respond to DGFASLI's attempts to broaden the coverage of the study.

S.K. SAXENA
EDITOR-IN-CHIEF

SAFETY AND LOSS CONTROL IN CONSTRUCTION INDUSTRY

A.K. GANGULY

The construction industry is one of the major industries of the world. It spans a wide range of activities ranging from small mud house construction to high-rise buildings, from rural work to industrial structures, from village roads to high ways, irrigation tanks to major dams, power plants and other civil infrastructures.

The ILO classifies the construction industry as Government and Private Sector Firms erecting buildings for habitation or for commercial purposes and public works, such as roads, bridges, tunnels, dams or ports.

Unlike a factory, which operates at fixed premises, with the same equipment, the same workers, the same processes and generally the same conditions, construction projects evolve and change from site to site. It is an unorganized industry in India due to the following reasons:

1) Construction is one of the most unorganized sectors in the country and spread even in the interior rural areas.

2) The contractors and construction workers are most unorganized in spite of so many labour laws and acts present.

3) Most contractors are small with no technological or management background and they do not form effective organization.

4) Anyone with finance and entrepreneurship can enter construction without any organization or equipment, and can manage by sub-contracting piece working and sub-letting.

5) The problems relating to all construction activities are varied and diverse.

6) All the state governments have not framed the rules under "The Building and Other Construction Workers (Regulation of Employment and Conditions of Labourers) Act, 1996.

7) There are a number of Public Sector Undertakings in the field of construction. Most of the states do have these. But very few of them are doing well. The objective of stating this is to improve the technology, planning and management. But this has not yielded any result. Most of them get works done by the sub-contract system.

8) It is estimated that 16% of the total population in India is engaged in construction industry and there is no reliable/authentic statistical data available with regard to accidents taking place in construction industry.

9) There are no proper organizations and unions in this sector, except in public sector organizations and organized firms.

In view of the above, the construction industry is being considered as unorganized industry.

CONSTRUCTION - A HAZARDOUS OCCUPATION

When we talk about the rapid industrialization, development and growth of construction industry, we should not forget that construction is a high hazard occupation.

Construction workers are exposed to a wide range of safety and health hazards on the job. Exposure differs from trade to trade, from job to job, by the day and even by the hour. Exposure to any one hazard is typically intermittent and of short duration, but is likely to reoccur. The severity of each hazard depends on the concentration and duration of exposure for that particular job.

Construction continues to be an accident and injury prone sector due to the nature of work but also due to the difficulty in implementing the safety regulations at scattered places, remote construction sites, the nature of work and temporary or seasonal employment.

Construction workers are exposed to a wide range of health hazards, which includes chemical, physical, biological and social hazards.

No reliable and authentic data is available with regard to accidents, however, the trend of accidents (causation-wise) is furnished as below:

Fall from height	:	42%
Fall of material	:	13%
Electrocution		11%
Collapse of earth	:	4%
Moving Machinery	:	9%
Others	:	11,%

Management of Safety, Health and environment at construction projects/sites has been receiving the attention of all concerned after realizing the undesirable effects of work injuries, damages and losses. Few years ago, safety management has been to a great extent, the concern of Government agencies limited to the compliance with the laws relating to this. Even in situations involving safety and health problems, which are not specifically covered by statutes, the response to the management was only reactive.

Safety and Loss Control Management in construction projects/sites is an effort ofexpanding the scope of activities relating to the basic safety function. In other words and in effect, it seeks to include all the techniques, engineering control measures, strategies, human behavioral modification techniques, etc. Loss Control Management provides ideas, tools and inspiration to reduce personal injuries and economic losses to a minimum. It is an application of professional management techniques and skills through these programs, activities (directed at risk avoidance, loss prevention and loss reduction) specifically intended to minimize losses resulting from the pure (non-speculative) risks at project sites.

PRINCIPLES OF LOSS CONTROL IN CONSTRUCTION PROJECTS

Loss control is the function directed towards recognizing, evaluating and eliminating or at least controlling the destructive effects of occupational hazards. These hazards, generally, result from the unsafe acts (human errors) and from the unsafe conditions (situational and environmental aspects of the work place). The primary function of a loss control system is to locate, assess and set effective preventive and corrective measures for those elements of unsafe acts and conditions, which are detrimental to operational efficiency and effectiveness in construction projects.

Loss control at construction projects can be thought of as 'looking for defects at construction work area' in the systems/operations/procedures adopted. The causes of failures often can be determined by answering a series of questions. What can fail? How can it fail? How frequently can it fail? What are the effects of failure? What is the importance of the effect? The opposite of failure is the minimum acceptable success. This is the condition in which operations are run with a minimum number of losses and interruptions, keeping efficiency and effectiveness of the operation within acceptable limits of control. The concept of keeping operations within acceptable limits gives substance and credibility to the process of loss control. In addition to familiarizing management with the full consequences of system defects, loss control management is a tool to pinpoint hazards before any failure can occur. The anticipatory character of loss control increases productivity at a construction site and reduces cost of construction.

PROCESS OF LOSS CONTROL

The processes of an effective loss control program should be directed toward evaluating, eliminating and preventing workplace hazards.

Management and safety engineers can implement many preventive measures when designing a loss control program. An effective loss control program has six steps or processes:

1. Hazard identification and evaluation
2. Ranking hazards by risk
3. Management decision making
4. Establishing preventive and corrective measures
5. Monitoring
6. Evaluating program effectiveness.

HAZARD IDENTIFICATION AND EVALUATION

The first step in a comprehensive loss control program is to identify and evaluate workplace and environment hazards. These hazards are associated with machinery, equipment, tools, operations, materials, sites and the physical plant. The critical incident technique is useful for obtaining information about workplace hazards from workers and supervisors. Manufacturers of construction equipment, tools and machinery offer information about the hazards associated with their products. Information from safety, health and environment personnel, institutions and organizations doing or dealing similar work can be of inestimable value. Old inspection reports, accidents/incidence reports and the hazard analysis are the ways to acquire meaningful hazard information.

Benefits of hazard analysis include:

1) Identifying hazard conditions, which may lead to potential accidents or loss;
2) Providing information with which effective control measures can be established;
3) Determining the level of knowledge and skill as well as the physical requirements workers need, to execute specific tasks; and
4) Discovering and eliminating unsafe procedures, techniques, motions, positions and actions.

RANKING HAZARDS BY RISK (Severity, Probability and Exposure)

The second step in the process of loss control is to rank hazards by risk, potential to cause a damage or loss. Such ranking takes into account the consequence (the severity), the probability and the exposure index. The purpose of this second process is to address hazards according to the principle of 'worst first'. Ranking provides a consistent guide for corrective action, specifying which hazardous conditions warrant immediate action, which have secondary priority and which can be addressed in future.

MANAGEMENT DECISION MAKING

The third step involves providing management with full and accurate information, including all possible alternatives, so that the project managers and site engineers can make intelligent, informed decisions concerning loss control. Such alternatives will include recommendations for training and education, better methods and procedures, equipment, repair or replacement, environmental controls and in rare cases where modification is not enough, recommendations for redesign. Information must be presented to designers/ management in a way that clearly states the actions required to improve conditions.

ESTABLISHING PREVENTIVE AND CORRECTIVE MEASURES

After the SHE team or others have identified and evaluated hazards and provided data for informed decisions, the next step involves implementing control measures.

Controls are of four kinds:

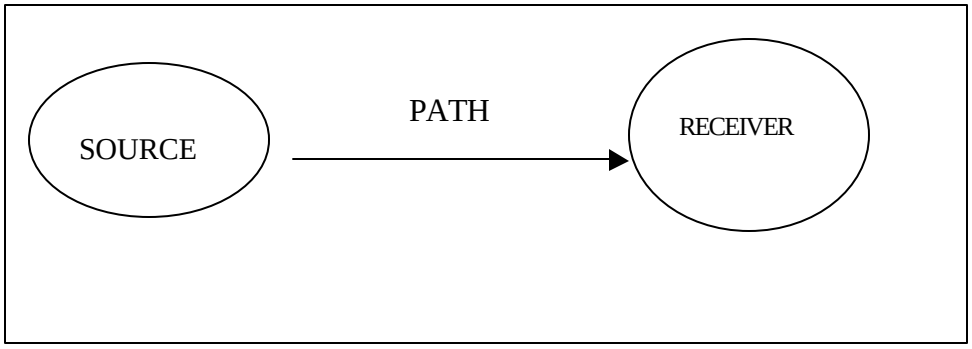
1) Administrative (through personnel, management, monitoring, limiting worker exposure, measuring performance, training and education, housekeeping and maintenance, purchasing)

2) Engineering (isolation of source, lockout procedures, design, process or procedural changes, monitoring and warning equipment, chemical or material substitution)

3) Personal protective equipment (body protection, fall protection, etc.)

4) Statutory compliance, standard compliance.

Before control installation takes place, it is essential that those involved in safety and health activities understand how hazards are controlled. The figure given below illustrates the three major areas where hazardous conditions can be either eliminated or controlled.



The first and perhaps the best control alternative is to attack a hazard at its source. We can design the shoring, formwork based on soil condition (test reports) and concrete load. Scaffolding also can be pre-designed depending upon the height and nature work. One method is to substitute a less harmful agent for the one causing the problem, e.g. asbestos sheets are banned in many countries for roofing.

The second alternative is to control the hazard along its path. This is done by erecting a barricade between the hazard and the worker. Examples of engineering controls are (1) providing guards at moving parts, which prevent a worker's hands from making contact with the moving parts like coupling, gear teeth, etc., (2) protective curtains, which prevent eye contact with welding arc flashes, (3) a local exhaust system, which removes toxic vapors from the breathing zone of the workers, and (4) barricading the work areas like excavated area, road traffic, work areas, etc.

The third alternative is to direct control efforts at the receiver, the worker. Removing the worker from exposure to the hazard can be accomplished by (1) employing automated or remote control options (for example, automatic feeding devices through conveyors, hoppers in batching plant, crushers), (2) providing a system of worker rotation or rescheduling some operations to times when there are few persons in the site like blasting work; or (3) providing personal protective equipment when all options have been exhausted, and the hazard cannot be eliminated or corrected through substitution or engineering redesign.

Protective equipment may be selected for use in two instances; when there is no immediate way to control the hazard by more effective means, and when it is employed as a temporary measure while more effective solutions are being installed.

MONITORING

The fifth step in the process of hazard control deals with monitoring activities to locate new hazards and assess the effectiveness of existing controls. Monitoring includes inspection, industrial hygiene testing, and medical surveillance.

Monitoring is necessary (1) to ensure and provide assurance that hazard controls are working properly, (2) to ensure that modifications have not so altered the workplace that current hazard controls can no longer function adequately, and (3) to discover new or previously undetected hazards.

EVALUATING PROGRAM EFFECTIVENESS

The final process in hazard control is to evaluate the effectiveness of the safety, environment and health program. Evaluation involves answering the following questions. What is being done to locate and control hazards in the project or site? What benefits are being received?

The evaluation team examines the program to see if it has accomplished its objectives (effectiveness and evaluation). Evaluation must be adapted to (1) the time, money and kinds of equipment and personnel available for the evaluation; (2) the number and quality of data sources; (3) the particular operation; and (4) the needs of the project.

Following are the three major characteristics of a professional project manager or site engineer:

1) He should clearly identify and classify the job he manages through other people.

2) He should measure the work performance of sub-contractor's people who do the work required to produce desired results.

3) He should follow certain fundamental truths or principles, e.g. safety, health and environment at a project is a priority one.

The causes of loss may be represented by the lack of control management on safety, health and environment issues, which may be due to (a) inadequate program, (b) inadequate program standard, or (c) failure to comply with standards. To control the losses, a project manager or site engineer should know his work functions in order to manage the same. In case he fails to comply these functions, it will develop some substandard practices or conditions or some other errors, which may lead to accidents, property damage or some other kinds of loss at project site causing inordinate delays for completion of the project and increases the project cost.

In order to achieve the target of loss control program and higher productivity and quality, the project/site management should prepare the action plan on the following activities. Continuous reviewing and monitoring are also required for the success of the program and timely completion of the project.

1) Safety and Health Policy

2) Safety committee

3) Selection, training and tool box talk

4) Accident/incident investigation

5) Occupational health management

6) Sub-Contractor safety

7) Motivation and communication, display, warnings

8) Purchase control

9) Engineering control

10) Hazard identification, Preparation of checklist

11) Personal protective equipments

12) Waste disposal techniques.

Safety, health, environment and project completion are both sides of a coin. Productivity and quality at any construction site depends upon the best utilization of man, machine, material and environment. Any damage to any one of the four components can cause loss of site productivity and deteriorate the quality of the construction as well as delay the project completion. The loss control activities in a construction project should begin with preparation of a 'site safety plan'.
The projects 'site safety plan' should consist of the following details:

- Project details and history of the site.
- Organization chart and responsibilities
- Safety rules and checklists
- Work permit systems
- Equipment and materials required
- Hazard analysis
- Emergency plans and procedures
- First aid and Fire Fighting Facilities

Training is an important aspect for loss prevention. Training programmes on the following topics should be arranged for construction project employees:

- Safety while working at height
- Safety in excavation
- Safety in operation of plant and machinery
- Safety of scaffolding
- Electrical safety
- First aid and fire fighting
- Emergency procedures.

All equipment, vehicles, tools, slings, electrical installations, scaffolds should be inspected regularly as per standard guidelines and statute. Checklist should be prepared which should be followed during inspection. Any deviation noted during inspections should be rectified on a priority basis.

Shri A.K.Ganguly
Director (Safety)
Central Labour Institute, DGFASLI
Sion, Mumbai.400022

CURRENT STATUS OF OCCUPATIONAL SAFETY & HEALTH MANAGEMENT SYSTEM

P.K. GOSWAMI

Management of Occupational Safety & Health (OS&H) in the workplace through planned, systematic and organized way in an organization is to reduce hazard and risks, increase productivity and protect environment. There are many forms of Occupational Safety and Health Management Systems (OS&H-MS) in the work place. The type of OS&H-MS most commonly used in India is the traditional method of safety and health management system. Safety professionals from companies mainly from safety department adhering to the traditional method of safety, direct and control workers so that they complete the expected company's safety standards and regulations. They also enforce laws and government regulations. They are informed on new regulations, devoted to impose rules and regulations to their employees, carry out inspections, audit the system, direct investigations of accidents and injuries and establish recommendations in order to prevent accidents and injuries in the future. For the safety professionals, adhering to this concept means modifying the behavior of worker, motivating them and using prizes and incentives to help them work in a safer way. Rewards are given only to those workers or departments that meet the present safety objectives.

The traditional safety management programme does not always improve the results of safety because they are centered exclusively on the technical requirements and on obtaining short term results. Another shortcoming of the traditional safety management system is that the system is isolated and many times not integrated with the rest of the functions of an organization. It is very common in Indian industries that few elements are traditionally included in their OS&H management programmes like Safety committees meeting, List of rules and certification with respect to statutory bodies, celebration of safety day/week once in a year; display of slogans and posters, suggestion box, safety incentives,etc.

The responsibility of safety programme falls on the safety department and mostly on safety manager or safety officer who in many cases does not have the authority to make changes.

Status of chemical industries adopting traditional OS&H-MS

Objective: A study was conducted among five industries of Maharashtra and Gujarat adopting traditional OS&H-MS with a view to find out the gap in between their existing system and standard OS&H-MS. *Method:* A systematic, objective and documented evaluation of the Occupational Safety and Health system and procedure as per IS-14489, 1998 was used as methodology. *Results:* Responses from industries were exposed to standard OS&H-MS in light of statutory rules of India like Factories act, Environmental act, etc. Elements from management aspects are considered for this study and the findings along with the number of industries with their finding out of the five taken for study(given in bracket) are as follows:

OS&H- Policy

- Policy doesn't specify the intention of management to take into account the health and safety performance of individuals at different levels. (3)
- Policy doesn't specify the arrangement of worker's involvement. (2)

Safety department

- Specific job allocation, responsibility, accountability and authority of safety personnel are not defined for effective functioning of safety department. (3)

- Activity planner pertaining to all functions & departments is not prepared. Safety committee (2)

- Letter of constitution of safety committee including rights and duties, functions, tenure, frequency of safety committee is not in place. (5)

- Members of safety committee are not exposed to safety training. (2)

Safety budget

Safety budget is not included in annual budget/annual report. (4)

Accident reporting, investigation and analysis

- Accident reporting system/procedure and standard form of reporting to management are not in place. (3)

- No standard method to analyze accidents/incidents and no programme to use these data for management decision. (3)

Safety inspection

- No standard procedure for-
  - Safety inspection,
  - Inspecting team formation,
  - Preparation of inspection schedule. (5)

Standard checklist for safety inspection is not in place.(3)

Safety education and training

- No procedure for identification of training needs. (4**)**
- In-house capability and infrastructure facility to conduct training programme are not available. (3)

Safety communication/ promotion/ motivation

No specific management planning is available for safety communication/ promotion and motivation which can change behavioral aspect of employee (5)

First aid box

No standard system is in place to maintain the first aid boxes and their contents (5)

Occupational Health centre(OHC)

OHC is not maintained as per rule with respect to infrastructure, facility and record. (3)

-

House keeping

- No standard practices for housekeeping (5)
- No preventive planning for painting.
- No periodic check
- No planning to dispose scrap and non hazardous wastages.
- No planning to organize unused areas.

Hazard identification and control

- No in-house programme/procedure for identification of hazard (4)

- No system for implementation of recommendations already given for control of identified hazards. (3)

A standard OS&H-MS that is centered on taking proactive approach is more effective than the traditional one that continuously analyses accidents after they happen in order

to generate data on which to focus improvements.

Improvement of OS&H-MS: from traditional to standard

A standard OS&H-MS that is centered on taking proactive approach is more effective than the one that continuously analyses accidents after they happen in order to generate data on which to focus improvements. The objectives of a standard **OSHMS** are to:

- identify and eliminate/reduce/ control the hazard
- Protect workers from hazard
- Eliminate work related injuries, ill health, diseases and death
- Reduce accident rate
- Reduce unsafe act/condition
- Improve working condition
- Increase awareness for safety and health
- Improve communication system
- Protect environment

Some organizations working in the field of OS&H for encouraging safety and health in workplace and/or implementing different standards are:

OSHA - Occupational Safety & Health Administration
NIOSH - National Institute for Occupational Safety & Health
NIEHS - National Institute of Environmental Health & Science
DOE - Department for Energy
BWC - The Ohio Bureau of Workers Compensation
ILO - International Labour Organization
ISI - Indian Standard Institution

An organization can develop its own procedure for implementation of OS&H-MS as per the guideline/standard available. Following are some guidelines/standards available for assistance:

OHSAS	18001: 1999
BIS	15001-2000
ILO-OSH	2001 Guideline

OHSAS - 18001:1999

OHSAS 18001 is a comprehensive occupational health and safety management system specification, designed to enable organizations to control OH&S risks and improve their performance. Legislative and regulatory commitment and continual improvement are two important aspects of OHSAS 18001.

Background of OSHAS 18001

OHSAS 18001 was jointly developed by 13 national standards organizations and leading international certification bodies such as LRQA, BVQI, DNV, SGS etc. It was developed in response to widespread demand for a globally acceptable and recognized standard against which an occupational health and safety management system of an organization will be assessed and/or certified. The importance of managing Occupational Health and Safety is recognized by all interested parties: employers, employees, customers, suppliers, insurers, shareholders, the community, contractors and regulatory agencies. OHSAS 18001:1999 was released in April 1999. OHSAS 18002:2000 is the Occupational Health and Safety Management Systems Guidelines for the implementation of OHSAS 18001.

Elements of OHSAS 18001:1999

OHSAS 18001: 1999 features include the following elements:

- OH&S policy
- Planning
- Implementation and Operation

- Checking and corrective action
- Management Review
- Continual Improvement

BIS- 15001:2000

The Bureau of Indian Standard (BIS) has brought out a standard on OS&H - MS as BIS.15001-2000 for the organizations to develop a practical approach to management of OH&S in such a way to protect employees and general public whose health and safety may be in danger because of organizations' activities. This standard also directs to improve occupational health & safety performance of the organizations by providing the necessary requirements and guidance for use. Each organization can develop its own procedure for implementing it as per the guidance available in the standard. There are six elements of this specification:

- Commitment and Policy
- Planning
- Implementation and Operation
- Measurement and Evaluation
- Management review

IS 18001 is similar to OSHAS 18001.

ILO-OSH - 2001 Guideline

The guideline was prepared on the basis of broad-based approach involving the ILO and its tripartite constituents and other stakeholders. They have also been shaped by internationally agreed occupational safety and health principles as defined in relevant international labour standards. Consequently, they provide a unique and powerful instrument for the development of a suitable safety culture within enterprises and beyond. Workers, organizations, safety and health systems and the environment all stand to benefit.

Elements of ILO - OSH-2001 Guideline.

1) Objective

2) National framework for OS & HMS

3) OS & H-MS in the organization that includes:

   a) Policy

   b) Organizing

   c) Planning & Implementation

   d) Evaluation

   e) Action for improvement

Benefits of standardizing existing OS&H-MS

The benefits of implementing a systematic and effective OS&H management system include the following:

- Reducing the number of injuries to personnel and others in work place through prevention and control of workplace hazards.
- Improving employee's morale by controlling risk at work place and thereby enhance productivity.
- Reducing the risk of major accidents
- Reducing the material loss caused by accidents and in production interruptions.
- Reducing costs of insurance as well as reducing costs due to absence of employees

- Serving the possibility for an integrated management system covering quality, environment health and safety.

- To improve safety and health in the workplace, appropriate occupational safety & health programme should be implemented utilizing expertise from multiple disciplines. In other words, occupational safety and health programme should be a team effort. OSH MS can be meaningful only if it is integrated into the overall management functions of the line staff.

References

Journal of safety Research, N.S.C, USA Vo1.33, 34 Indian standards:IS-14489-1998, IS:3786-1966 Web sites related to OS&H (ILO, TUV.etc) Behaviorally based safety management. (Professional Safety) Occupational health & Safety Guideline (World Bank)

Shri P.K. Goswami
Asst Director (ST/P)
Central Labour Institute, DGFASLI
Sion, Mumbai. 400 022

A TYPICAL CASE STUDY OF AN ACCIDENT IN A FACTORY ENGAGED IN PRODUCTION OF REFINED OIL & VANASPATI GHEE

An accident occurred in a factory engaged in production of refined oil and vanaspati ghee, as a result of which four persons lost their lives. For production of vanaspati ghee, hydrogen gas is required for the process, which is produced by electrolysis of water in the cell room. The hydrogen gas so produced in the cell room is taken through a pipeline to a hydrogen gasholder. The gasholder is of 38ft. in height with a volumetric capacity of $15M^3$ of about 400 mm of water column. From the gasholder hydrogen gas is taken to compressor and stored in two hydrogen gas bullets at $8Kg/Cm^2$ pressure having volumetric capacity of 13 M^3 each. The hydrogen gasholder is a two-piece vessel placed one inside the other, the inner one being in the inverted bell shape. The bell is placed to hold the gas in water displacement technique and is kept in upright position against the buoyancy force by counter balancing weights. A cross bar is provided at the top to limit the upward movement of the bell. Similarly, there is a provision for locking the bell at its minimum position. The entire electrolyser, gasholder and the hydrogen bullets have been installed as per the Indian Explosive Act.

The gasholder was not in operation. Due to a pinhole developed on the crown of the bell, the gasholder was not holding at the desired pressure. The cell room in-charge deployed 3 workers, namely, Welder, Helper and Fitter to carry out the welding job for repair of the pinhole. For the purpose, the cell room in-charge along with above 3 persons climbed up the gasholder and when they started welding, there was an explosion with a loud bang. All the four persons who were on the top of the gasholder were flung due to the upward jerk of the bell and fell down on the ground after being hit against the cross beam of the gasholder at the top. All of them succumbed to their injuries the same day.

Hydrogen gas in isolation is not explosive by character but can form highly explosive mixture when in contact with oxygen. Any source of ignition to it can cause an explosion. In the instant case, the hydrogen gas, which was leaking past the pinhole at the top of the dome of the gasholder, came in contact with the atmospheric oxygen and an explosive mixture was formed. When they started the electric arc welding, the initial spark was adequate to cause the explosion. The explosion at the mouth of the opening of the gasholder resulted in gushing out of the contents inside the bell of the gasholder which developed vacuum inside it causing buckling of the bell of the gasholder. Further, this phenomenon also resulted in sudden movement of the bell of the gasholder in the upward direction, which flung the victims in a projectile manner who was on the top of the gasholder. The victims sustained injuries due to burn, hit against the objects and fall from height resulting in their death.

Chief Inspector of Factories & Boilers,
Orissa.

ASSESSMENT OF DUST LEVELS IN A COMPANY PRODUCING GLASS CONTAINERS

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 the 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 mg/m^3 which is far below the level observed in the previous study but marginally exceeded the PLE i.e. 0.35 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 mg/m^3, 1 mg/m^3 and 0.8 mg/m^3 respectively all of which were well below their PLE. The average concentration of silica dust near sand unloading hopper in sand beneficiation plant was found as 0.9 mg/m^3 which exceeded the PLE for silica dust i.e.0.35mg/m^3.

Remedial measures were suggested to control the dust levels which included regular and preventive maintenance of sand handling and processing plant to minimize 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 also suggested.

ENVIRONMENTAL STUDY IN A COMPANY ENGAGED IN PRODUCTION OF HYDRAULIC PUMPS AND ASSEMBLY OF STEERING SYSTEM

This study was carried out Regional Labour Institute,Chennai in a company engaged in production of hydraulic pumps and assembly of steering system.

OBJECTIVE

The study was conducted with the objective to assess the airborne levels of coolant mist, lube oil mist, phosphate fumes etc. in work environment, measure the sound levels and to suggest remedial measures wherever necessary to improve the work environment.

FINDINGS & RECOMMEN-DATIONS

The samples of various airborne contaminants were collected and analysed using standard methodology. The average concentration of coolant oil mist in all the areas in pump plant were found to range from 0.9 to 2.0mg/m^3. The average concentration of coolant mist in power rack and pinion plant were found to range from 0.9 to 5.1 mg/m^3 all of which except one were well below the permissible level of Coolant Oil mist i.e. 5mg/m^3. The average concentration of lubricating oil mist in pump plant production shop was found as 0.8 mg/m^3 which is also well within the PLE. However, remedial measures were suggested to further improve the work environment in the production areas which included provision of local exhaust system with the grinding machines, avoiding skin contact with coolant/lubricating oil, practicing

personal hygiene and cleanliness among the workers, etc.

The noise levels in generator room were found in the range of 97 and 99.4 dBA. The noise levels near compressors in compressor room were found to range from 86.3 to 91 dBA which is very close to the permissible level of noise i.e. 90dBA. Remedial measures were suggested to control the sound level in generator house and compressor room.

On 23.12.03, during the 3rd shift, a vessel was loading granite stones into a hatch in a Port. Some casual workers informed the supervisor that one casual worker had fallen from the deck into the lower hold and received injuries. The hatch covers which remained closed due to rain was opened by the ship crew and the injured was lifted out by a stretcher and taken to the hospital. The worker received serious injuries.

Investigation into the accident revealed that the workers did not follow the instructions of the supervisor and entered into the hatch on their own. The master should have ensured that the man hatch covers were closed and secured to prevent uauthorized entry.

The employer of dock workers were advised to ensure proper supervision and also see that no workers are allowed to enter into the hatch when the hatches are closed. Further, the master was advised through the agents to ensure that when work is suspended ,both the hatch covers and the man hatch covers are closed and properly secured.

On 15.8.2003, during the 1st shift, logs were being discharged from a vessel berthed in a Port. A dock worker entered the hatch directly from the star board deck and just bent down to look for cavities in between the logs to put the slings through it. He suddenly became unconscious and collapsed in between the logs. Subsequently other dock workers who tried to rescue him also collapsed and in all 4 casualties occurred.

Investigation into the accident revealed that the accident had taken place due to inhalation of toxic/harmful gases and the workers were exposed to high concentrated level of harmful gas as they were deployed soon after opening of hatch covers contravening regulation 39(2). Action against the employer is being contemplated.

On 13.1.2004, during the 3rd shift, a casual labourer was engaged by a contractor for carrying out miscellaneous work at a transit shed in a Port. It appeared that the casual labourer after attending to his work was going to have tea at the canteen when he was run over by a heavy vehicle resulting in his death.

Investigation into the accident revealed that he died due to the injuries he received by the hit of the heavy vehicle. The Port Authorities immediately after this incident had provided road dividers for regulating two-way traffic on that road.

On 3.2.2004, during the night shift, a worker was reported to have fallen down from the hold ladder of a vessel in a Port when he was descending. Due to the fall the victim received severe injuries and subsequently succumbed to his injuries in the hospital.

Investigation into the accident revealed that it had taken place due to insufficient illumination inside the hold ladder area. The master and agent of the vessel were warned for breach of Regulation 16(1) read with Regulations7(7)(b) of the Dock Workers (Safety, Health & Welfare) Regulations, 1990.

On 18.1.2004, at about 0630 hours, a mazdoor was reported to have met with an accident when he got caught between the dead weight of a mobile crane and the container kept in an open plot in a Port.The victim suffered severe injuries in his head and face and succumbed to the injuries on the spot.

Investigation into the accident revealed that it had taken place due to improper supervision and operating of the lifting appliance in an unsafe way by the crane operator breaching Regulation 53(1) read with Regulation 7(5) of the Dock Workers(Safety, Health and Welfare) Regulations, 1990. The supervisor and the crane operator were warned for the said breach.

TRAINING PROGRAMME ON OCCUPATIONAL PHYSIOLOGY, ITS APPLICATION IN INDUSTRY FOR PROMOTION OF SAFETY,HEALTH & PRODUCTIVITY AT WORK

PROGRAMME PERSPECTIVE

Occupational Physiology deals with human physiological and psychological limits and its reaction to various working environments thereby causing physiological fatigue incurred to the workers arising out of various working conditions. To determine the various safe limits of industrial operations, it is essential to have adequate knowledge on occupational physiology. The programme deals with various physiological techniques employed in shop floor to ascertain the safe limit of industrial operations. The benefit of occupational physiology goes to both, the employees and employers. The various physiological parameters, which have considerable influence on physical workload, will be dealt in detail. The actual benefits of the programme would be safe work environment, more work output and thereby increased productivity. The ill effects on various physiological systems due to exposure to physical, chemical, environmental agents will be covered during the deliberation. The important goal of Occupational Physiology is to keep industrial workers fit and productive in general to one and all through the basic knowledge of Occupational Physiology.

OBJECTIVE

To familiarize with:

- Different physiological systems in body.
- Response of physiological systems during rest and work.
- Limitation of physiological systems inherent and working conditions.
- Physiological and Psychological limits of human beings

HIGHLIGHTS

- Determination of safe limits of industrial operation based on physiological parameters.
- Work assessment due to physical exposure.
- Human body as working machine.
- Responses of human beings due to other agents present in working place or shop floor.

TECHNIQUES

- Discussion based on shop floor experience and case studies.
- Laboratory exercise/demonstration and exhibits
- Technical films

PARTICIPANT PROFILE

Industrial Engineers, Plant Medical Officers, Safety Professionals, Production Engineers, Managers, Supervisors, ESIC doctors, Factory Inspectors and all others connected with Safety, Health and Productivity.

FACULTY

Experts from the Central Labour Institute, Mumbai and a few guest speakers who have specialized knowledge and experience in the respective fields

Conducted by:

Industrial Physiology Division,
Central Labour Institute,
Sion, Mumbai.400022

INTERNATIONAL OCCUPATIONAL SAFETY AND HEALTH INFORMATION CENTRE (CIS)

dfdff 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: Lung cancer in heavy equipment operators and truck drivers with diesel exhaust exposure in the construction industry.

CIS ACCESSION NUMBER
CIS 03-1220

ABSTRACT

To study the risk of lung cancer among truck drivers and among drivers of heavy construction vehicles, data from a computerized register of Swedish construction workers participating in health examinations between 1971 and 1992 was used. A total of 6364 male truck drivers and 14,364 drivers of heavy construction vehicles were selected as case groups, while 119,984 carpenters and electricians constituted the reference group. Operators of heavy construction equipment experienced no increased risk of lung cancer compared to controls (61 cases versus 70.1 expected), with even lower rates for equipment with cabins. Truck drivers had increased risks of cancer of the lung (61 cases versus 47.3 expected) and prostate (124 cases versus 99.7 expected), although only mortality for lung cancer was significantly increased. Comparisons with the general population showed similar results. Results are consistent with those of previous studies suggesting that contrary to truck drivers, heavy equipment operators with potential exposure to diesel exhaust may have little or no increased risk of lung cancer.

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 IDENTIFICATION: SILVER NITRATE

HAZARDS IDENTIFICATION

Emergency Overview

Poison! danger! corrosive. Causes burns to any area of contact. May be fatal if swallowed. Harmful if inhaled. Strong oxidizer.Contact with other material may cause fire.

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 – None
Reactivity Rating: 3 - Severe (Oxidizer)
Contact Rating: 3 - Severe (Corrosive)
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Yellow (Reactive)

POTENTIAL HEALTH EFFECTS

Inhalation:Extremely destructive to tissues of the mucous membranes and upper respiratory tract. Symptoms may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. May be absorbed into the body following inhalation with symptoms paralleling those from ingestion exposure. Dust deposits in the lungs may resemble a form of pneumoconiosis.
Ingestion: Corrosive. Swallowing can cause severe burns of the mouth, throat, and stomach. Can cause sore throat, vomiting, diarrhea. Poison. Symptoms include pain and burning in the mouth, blackening of the skin and mucous membranes, throat, and abdomen, salivation, vomiting of black material, diarrhea, collapse, shock, coma and death.
Skin Contact: Corrosive. Symptoms of redness, pain, and severe burn can occur.
Eye Contact: Corrosive. Can cause blurred vision, redness, pain, severe tissue burns and eye damage.
Chronic Exposure: Repeated application or ingestion causes a permanent bluish discoloration of the skin, conjunctiva, and mucous membranes. Repeated inhalation may
cause lung disease.
Aggravation of Pre-existing Conditions: Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

FIRST AID MEASURES

Inhalation:Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion: If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. 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: This oxidizing material can increase the flammability of adjacent combustible materials.

Explosion: Many reactions may cause explosion. Reacts with ammonia to form compounds that are sensitive to mechanical shock.
Fire Extinguishing Media: Use flooding amounts of water. Do not use dry chemical, carbon dioxide or Halon. Do not allow water runoff to enter sewers or waterways.
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.

ACCIDENTAL RELEASE MEASURES

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. 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.

HANDLING AND STORAGE

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage and moisture. Isolate from any source of heat or ignition. Avoid storage on wood floors. Separate from incompatibles, combustibles, organic or other readily oxidizable materials. Protect from light. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

EXPOSURE ONTROLS/PERSONAL PROTECTION

Airborne Exposure Limits:-OSHA Permissible Exposure Limit (PEL): 0.01 mg/m3 (TWA) for silver metal dust and fume as Ag -ACGIH Threshold Limit Value (TLV): 0.01 mg /m3 (TWA) for soluble silver compounds as Ag
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 full face piece particulate respirator (NIOSH type N100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids. glycerine, etc.) are present, use a NIOSH type R or P filter. 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.

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.

TRAINING PROGRAMMES
JANUARY-MARCH 2005
CENTRAL LABOUR INSTITUTE ,SION,
MUMBAI-400 022

Programme title	Contact person
Diploma in Industrial Safety	Director (Safety) & Incharge Indl. Safety Division
Profile SHE Management at work place	Director (Indl.Hygiene)&Incharge Indl.Hygiene Division
Training Programme on Industrial Safety for NSC, Maharashtra Chapter.	Director (Safety) & Incharge Indl. Safety Division
Industrial Ergonomics – its application in Industries for Promotion of Safety, Health & Increased Productivity at Work	Director (Physiology) & Incharge Indl.Ergonomics Division
Team Building for Health,Safety & Welfare at work	Director (Staff Trg./Productivity) & Incharge Staff Training Division
Industrial Heat Stress & Heat disorders– its evaluation & management for ensuring Safety, Health & Productivity at work	Director (Physiology) & Incharge Indl.Ergonomics Division
Occupational Physiology - its application in Industry for Safety, Health and Productivity.	Director (Physiology) & Incharge Indl. Physiology Division
Noise – its impacts & control in industries.	Director (Physiology) & Incharge Environmental Engg.Division
Training Programme on Occupational Health Practice for Nurses, Health/ Medical Assistants etc.	Director (Medical) & Incharge Indl. Medicine Division
Effective Management of Safety, Health & Environment in Thermal Power Plants.	Director (Indl.Hygiene)&Incharge Indl.Hygiene Division
Effective Participative Skills for Safety Committee Members	Director (Indl.Psychology) & Incharge Indl.Psychology Division

Programme title	Contact person
Workshop for Safety Committee Members	Director (Safety) & Incharge Indl. Safety Division
Wage & Salary Management for Business Competitiveness	Director (Staff Trg./Productivity) & Incharge Productivity Division
Training Workshop on Hazard & Operability(HAZOP) studies	Director (Indl.Hygiene) & Incharge Major Accident Hazard Advisory Division
Industrial Fatigue – its evaluation Management for ensuring Safety, Health & Productivity at work	Director (Physiology) & Incharge Indl. Physiology Division
Management of Occupational Stress for ensuring Safety, Health & Productivity at work	Director (Physiology) & Incharge Indl. Physiology Division
Refresher Course for Safety Officers	Director (Safety) & Incharge Indl. Safety Division
Chemical Hazards and their Control at workshop	Director (Indl.Hygiene) & Incharge Indl.Hygiene Division
Effective Supervision for Results	Director (Staff Trg./Productivity) & Incharge Staff Training Division
Occupational Health Hazards in use of Computers & VDT – its evaluation & management for ensuring Safety, Health & Productivity	Director (Physiology) & Incharge Indl.Ergonomics Division
Industrial fitness, a key to improve Safety, Health & Productivity at work	Director (Physiology) & Incharge Indl. Physiology Division

TRAINING PROGRAMMES
JANUARY-MARCH 2005
REGIONAL LABOUR INSTITUTE , NO.1,SARDAR PATEL ROAD
ADYAR, CHENNAI-600 113

Programme title	Contact person
Diploma Course in Industrial Safety	Director Incharge
Safety in Chemical Industries	Director Incharge
Technical Meet of Safety Officers	Director Incharge
Refresher Course on Occupational Health	Director Incharge
Training Programme on Occupational Safety & Health in Sugar Industries	Director Incharge

TRAINING PROGRAMMES
JANUARY-MARCH 2005
REGIONAL LABOUR INSTITUTE , LAKE TOWN
KOLKATA-700 089

Programme title	Contact person
Training Programme on Techniques of Chemical Safety Management	Director Incharge
Safety, Health & Environment at Work Place	Director Incharge
Chemical Safety for worker members of Safety Committee	Director Incharge
Advanced Training Programme on Environmental Hazards and their Control in Industries.	Director Incharge

TRAINING PROGRAMMES
(JANUARY-MARCH 2005)
REGIONAL LABOUR INSTITUTE , SECTOR 19
FARIDABAD

Programme title	Contact person
Seminar on Occupational Safety & Health	Director Incharge
Making Safety Committee Effective	Director Incharge

TRAINING PROGRAMMES
JANUARY-MARCH 2005
REGIONAL LABOUR INSTITUTE, SARVODAYA NAGAR
KANPUR- 208 005

Programme title	Contact person
Diploma Course in Industrial Safety	Director Incharge
Training Programme on Major Accident Hazards & Chemical Safety	Director Incharge
Training Programme on Effective Supervision in managing Safety & Health at Work	Director Incharge
Training Programme on Monitoring of Work Environment	Director Incharge
Workshop on Safety Audit	Director Incharge
Advance training programme on Occupational Health	Director Incharge
Training Programme on Physical Hazards in Industry	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.**