Safety Audit in Occupational Health Hazards and Safety in Worldwide Measures

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ABSTRACT

Occupational safety and health is an area concerned with protecting the safety, health and welfare of people engaged in work or employment. The goals of occupational safety and health programs include fostering a safe and healthy work environment. This study was to assess the existing situation of occupational health and safety in the textile industries of Lahore. The study also focused to analyze the health and safety related issues in the industries along with their risk assessment and to evaluate work related diseases which affects the health of labors. Health, safety and risk analysis were carried out in large scale textile industries of Lahore. To carry out this assessment survey was conducted from workers in both industries.The questionnaire was based on working time, number of accidents, cause of accident, affected part of body, nature of injury, use of personal protection equipment's(PPE), health safety policy, first aid facility and risk analysis was based on severity and likelihood of workers. Results showed that the mostly noise level, illumination level, humidity level, and stack emission values were within the NEQS and OSHA values. Pearson's chi-square showed the significance (p = 0.05) relation between affected part of respondent and working section, nature of injury and working section. The overall health safety policy was not well applied and mostly workers were unaware about PPE.

Keywords: safety, work, health, accidents.

CHAPTE 1
INTRODUCTION

1.1 OCCUPATIONAL HEALTH HAZARDS

Occupational safety and health (OSH) is a cross-disciplinary area and it is concerned with guarding the safety, health and welfare of people who are engaged in work or employment. Health is associated to the physical conditions of both mind and body, of all people at the workplace including the workers, contractors and visitors, and their protection from harm in the form of injury or disease.Safety is related to the physical condition at the worksite and applies to a state where the risk of harm and damage has beenremoved or reduced to a tolerable level. And the protection of environment is comprised of usually two types.

First is the internal environment at the workplace and it is related to overall condition in the workplace. Second are the harmful conditions which are present in the external environment outside the workplace (Towlson 2003).

The general international statistics and historical view indicates that Occupational health and safety has always

been challenging (Hinze 2006) and the integration of OHS into worksite management, allocation of safety activities, and role of the employees' involvement in safety matters are the features that previous literature classifies as correlated to lower injury rates (Gallagher et al. 2001). Physical working conditions compriseof work space, and the width of the stairs, lighting, fire escape facilities, and the number of toilets.

Evidence shows that the physical working conditions are often poor in the industries (Kabeer 2004; Paul-Majumder 2003; Paul-Majumder 2000; Zohir2001)..Also the materials and the operational processes becamemore complex which infused the workplace with potential health hazards.

The workers had to cope with work stress due to mechanizationand the demand for increasing productivity which exerted an increasing influence on their well-being (Kaminski 2001; Shannon et al. 2001; Roy 2003; Zacharatos et al. 2005).The purpose of the adopting new technologies andflexible manufacturing methods are to shorten processtimes and to maximize the effective work time thus increasing the speed and intensity of work.

This increases stress and strain level leading to the occurrence psychosocial and ergonomic problems (Harrison 2003).In the media work- related injuries and illnesses is widely discussed but according to the international labor organization still the actual numbers not known accurately (ILO 2003). According to data of 2003 the accidents at work and diseases annually take some 2 million lives world-wide and they cost an estimated $1,250,000 million US dollars to the global economy. Most recent data from Europe gives account of around 4 million people injured at work resulting in more than three days of absence from work (Eurostat 2009).

1.1 PHYSICAL INJURIOUS AT WORKPLACE

A study showed that the physical injuries in industrial workers were ranging from moderate to serious in severity. Whereas the hands and the fingers were mostly damaged in these accidents. Injuries indicated that the fingers of the upper extremity accounted for highest number ofaccidents. The thumb, index and middle fingers of both left and righthand were maximally affected in accidents.The majority of accidents in case of lower extremity were on the foot, toe and then leg (Nag1998). The environmental noise exposure is linked with various adverse psychological and physiological health effects (WHO 2011).Working in places where the everyday doses of noise exposure go above 89 dB is additionally hazardous for those who are suffering from mild noise induced hearing loss. Reducing the noise contact decreases the number of workers injured because unable to hear auditory cautionary signals. This should improve not only the general working conditions, but also reduce the risk of acquiring noise-induced hearing loss (Picard et al. 2008).

1.2 SEASONAL INFLUENCE ON HEALTH OF WORKERS ATWORKPLACE

Seasons also have a strong influence. A number of questionnaire studies have found links between low relative humidity (RH 5–30%) and an increase of occurrence of dry air and the sensory irritation of the upper airways and eye. Further studies showed less complaint by an increase of relative humidity (Wolkoff2007). The associations are more dominant atroom temperatures above 22˚C and generally more common during the heating season (Mizoue et al. 2004). Several of the studies also indicate that a temperature increase, which could result in some decrease of relative humidity, increases the frequency of symptoms of eye-irritation (Mendell et al. 2002). Also high temperature could lead to desiccation of the workers eyes (Wolkoff et al. 2012).

1.2 HUMAN FACTOR AND ERGONOMICS AT WORKPLACE

Some specific ergonomic problems also exist in most of the industries which includes training, awareness, motivation, and occupational health and safety programs with regard to management.Hand tools, machines, manual materials handling and workstations with regard to the work andworkplace design.Upper-body and neck aches, discomfort, fatigue,backaches, wrist and hand pain, dissatisfaction and stress with regard toworkforce and problems of noise, heat, humidity and dust with regard tothe environment (Shikdar 2003).

Hence the work environment exposesworkers to many health hazards and contributes to respiratory diseases, injuries, musculoskeletal disorders, cancer, reproductive disorders, cardiovascular diseases, eye damage andhearing loss, mental and neurological illnessas wellas other communicable diseases(Kortum2005). Working conditions are verypoor in hazardous industries, so the workers are affected most in those industries and face diseases like lung cancer, skin and eye allergies, deafness. So health andsafety council must be set up by the government at national, provincialand plant levelsto ensure that lives and health of workers are protected(Awan 2001)

CHAPTER- 2 LITREATURE SURVEY

SITUATION : OCCUPATIONAL HEALTH HAZARDS AND SAFETY WORLD WIDE

In Malaysia a study was directed to examine the awareness regarding health and safety among the staff members who are working in the higher learning institutions. The main objective was to study the connection between the organizational policies regarding safety at the workplace, environment of the office, attitudes of staff-members, and commitments by the management.

The findings showed that there was a very significant co- relation among the analyzed and studied variables, which suggested that itis necessary for the management of the organization to set up and promote some safety codes in the organization (Ibrahim et al.2012). In Thailand a study was carried out to present a general impression of the status of OSHManagement in enterprises which are both medium and small(SMEs). The industries were medium having 100 to 299 workers and small having 20 to 99 workers.All over Thailand the response rate received from small industries was 22.4% and from medium size industries the response rate was 14.7%. Many enterprises take excellent care of the hygiene andhealth of their workers and thus have arranged numerous welfare facilities for this purpose.Maximum accident cases were reported fromthe production enterprise.

For small and medium enterprises the essential safety elements are safety inspection, investigation of accidents and the reports of accidents. In Thailand the SMEs had better management of health and safety either because by value their products were in the set of the 24 maximum exporting supplies or either they were forced by their customers (Kongtip et al. 2008).The small scale businesses are more likely to adopt very unreliable and non-formalized employment relations (Lamm 2003).The small scale firms display for the temporary or self-employed workers and may not be interested in proposing the safe working conditions to these workers (Guadalupe 2003).

Insufficient representation of workers may undermine the effectiveness of workers' control on changes in working conditions and reduce the pressure on managers to commit to safety. Also these small firms usually show weaker workers representation in health andsafety as compared to large scale mills/industries (Walters 2004). Spainhad the highest rates fornon- fatal mishaps i.e. 7073 per 100,000 persons in occupation and the 3rdfor fatal accidents i.e. 5.5 per 100,000 persons in service behind Ireland (5.9), and Portugal (7.7) in the year 1998 (Dupre´ 2001) Spain has undergone a progressive transformation that has resultedin placing it in the most advanced group of the western economies.This was an importantstructural change, along with the movement to a private sector services from a highly agricultural country is a part of this revolution. Its present status has made it likely to evaluate the Spanish productive system toother European countries in a process of sustainable development.

All the Spanish people get the security of health care and assurance of social services and the Institution of Social insurance is an example of social protection in Spain. These benefits help in covering illness, covering unemployment, ensuring family protection, and a pension system for public. Rates and the state are responsible for this financial support of social insurance institution (Sese´et al.2002) nother study investigated the influence of the practices for risk prevention and the organizational factors which comprised of the safety measures, intensityof risk, risk prevention, quality management tools implementation,the enhancing the empowermentof the workers, and the usage of flexible technologies for production.

The results showed that the emphasis upon the prevention activities, empowerment of workers, and the wise use of quality management tools are the factors which contribute to lessen the number of injuries. Incontrast to all this higher accident rates were observed as a result of these implementing flexible manufacturing processes (Arocena et al. 2008). The similar kind of study was conductedin the textile industries of Ahmadabad, India. This has a primary dominance in textile industries. In which the numbers of accidents were recorded with the help of questionnaire which included data about the organization, along with the date and time of accident, number of injured persons, the circumstancesand the nature of injury, the body parts affected the most, the working conditions in the organization, and the general complaints regarding health.

The study helped in identifying the causes of these accidents. The departments which are covered in this industry include boiler room, weaving, finishing process, and spinning, dyeing (Nag 1998).Assessments show that over 50% of industrial-based accidents occur due to poor training, poor management, and other psychological factors (Flemming2002).

A major problem in Turkey and all over the world is the occupational accidents.As a result of these occupationalincidents every year nearly one thousand people die and two thousand people are injured leading to temporary or permanent disability.

As a result, this leads to social and economic problems for these people and their families suffer from occupational accidents socially andpsychologically.Also the economyof the country suffers badly and the employers are encountered with economic loss and work day loss. In this study the results of occupational accidents which took place between the years 2000 to 2005 in Turkey were assessed. A falling trend was also seen in permanent disabilities since 2002. Occupational accidents are frequently observed in the textile.

CHAPTER 3

METHODLOGY

3.1 OCCUPATIONAL DIESEASE

Workers for sewerage and on-site systems face the risk of various health problems by virtue of their occupation since they are exposed to a wide variety of chemicals, micro-organisms and decaying organic matters that are present in sewage.

Diseases	Causes
Infections - Leptospirosis - Hepatitis - Helicobacter pylori - Tetanus - Diphtheria	Pathogen present in sewers or sewage
Dermatitis	Chemicals, mineral oil and tar
Respiratory symptoms	Endotoxins, Bio-aerosols

Source: Rajnarayan Tiwari, 2008Confined Space Hazards

Possible hazards in confined space include oxygen deficiency, hydrogen sulphide poisoning, and danger of combustible gases.
Risk of Oxygen Deficiency

(%) Oxygen Concentration	Symptoms of anoxia
19.5	Human begin to suffer adverse health effects when the oxygen level of their breathing air drops below 19.5%.
16 to 19.5	Workers engaged in any form of exertion can rapidly become symptomatic as their tissues fail to obtain the oxygen necessary to function properly. Increased breathing rates, accelerated heartbeat, and impaired thinking or coordination occur more quickly in an oxygen-deficient environment. Even a momentary loss of coordination may be devastating to a worker if it occurs while the worker is performing a potentially dangerous activity, such as climbing a ladder.
12 to 16	Concentration of 12 to 16 % oxygen causes increased breathing rate, accelerated heartbeat, and impaired attention, thinking and coordination, even in people who are resting.
10 to 14	At oxygen conc of 10 to 14 %, faulty judgement, intermittent respiration, & exhaustion can be expected with minimal exertion.
6 to 10	Breathing air containing 6 to 10% oxygen results in nausea, vomiting, lethargic movements, and perhaps unconsciousness.
Below 6	Breathing air containing less than 6% oxygen produces convulsions, then cessation of breathing, followed by cardiac arrest. These symptoms occur immediately. Even if a worker survives the oxygen deficiency, organs may show evidence of oxygen-deficiency damage, which may be irreversible.

3.2 Risk of Hydrogen Sulphide Poisoning in Confined Space

Hydrogen sulphide is extremely toxic. Sometimes it may be generated in high concentration in a STP,also which causes immediate death.Hydrogen sulphide enters the body through eyes or mucous membrane of breathing organs.Blood seeps out from the capillaries incavities of the lungs, causes pulmonary oedema, leading to breathing difficulties and death by suffocation.In sewer facilities, it is generated in rising mains with no oxygen supply and in inverted siphons, etc., where sludge is likely to accumulate easily.It is generated in grit chamber, pumping well, sedimentation basin and sludge thickening tank in sewage treatment plants.Hydrogen sulphide generated in sewage and settled sludge is sealed within the static condition,so it does not disperse into the atmosphere easily.However, when agitated, it disperses all at once to the atmosphere.

3.3 Personal Protection and Protective Device

A.Head Protection

All personnel working in any areas where there may be danger from falling, flying tools or other objects must wear approved hard hats. Such hats should be according to the relevant BIS.Specially insulated hard hats must be worn when working around high voltage to protect the personnel from electrical shock.It is advisable to have detachable cradle and sweat bands for two reasons to permit easy replacement of cradles and sweatbands and
(2) to make possible assignment of one helmet to severalworkers each with its own cradle and sweat band for sanitary reasons.Once broken, the crown of a hard hat cannot be effectively repaired. Itmust be replaced.

B. Face and Eye Protection

Impact goggles must be worn mandatorily to protect against flying object They can be spectacle or cup goggles.Spectacle goggles must have rigid frame to hold lenses in proper position before the eyes.Frames must be corrosion resistant and simple in design for cleaning and disinfection.Cup goggles should have cups large enough to protect theeye socket and to distribute impact over wide area of facial bones.. A hood treated with chemical-resistance material having a glass or plastic window gives good protection. There should be a secure joint betweenthe window (glass or plastic)and hood material.Face shields can be used against light impact. Plastic shields should be non- inflammable and free from scratches or otherflaws, which introduce distortions.Welding masks must be used for protection from splashes and radiation produced by welding.

C. Hands and Lower Arms

Protective sleeves, gloves and finger pads are used for different types of hazards and jobs.Rubber and asbestos gloves should be long enough to come well above the wrist, leaving no gap between the glove and coat or shirtsleeve.

D. Body Protection

A good quality diver suit should be provided to the diver whose services are very necessary while plugging the sewer line or removal of some hard blockage due to stone etc. at the mouth of the pipe in the manholes.

E. Legs and Feet

Leggings are provided where leg protection is necessary and are in the same category as coats, frocks and aprons. Knee pads made of cloth, padding, rubber, cork are used on jobs where kneeling is required.Ordinary work shoes are acceptable.They should have non-skid soles to prevent slips.Safety shoes are required where there is danger of dropping tools or materials on the feet. Toe guards have been designedfor the men to wear when operating machines like air hammers,concrete breakers etc.For working on electrical equipment suitable safety shoes must be used.

Self-contained breathing apparatus

This apparatus is equipped with a cylinder containing compressed oxygen or air, which can be strapped on to the body of the user or with a canister, which produces oxygen chemically when a reaction is triggered.This type of equipment is suitable for an oxygen deficient atmosphere. It is also suitable for spaces having high concentration of chlorine.The self- contained breathing apparatus is shown in overleaf.Air-line respirator: Air- line length 90 m (maximum).It is suitable in any atmosphere, regardless ofthe degree of contamination or oxygen deficiency, provided that clean, breathable air can be reached. This device is suitable for high concentrations of chlorine, provided conditions permit safe escape if the airsupply fails.

Safety Belt

When you work on ladders or scaffolding, use extreme caution to prevent falls. Safety belt should be used to prevent falls.Portable Lighting Equipment.The equipment normally used is portable electric hand lamps ofpermissible types, electric cap lamps and explosion-proof flashlights.

Portable Blowers / Ventilating Fan

Replace the air in oxygen deficient and hazardous spaces with fresh air using exhaust fan andexhaust ducts.

Source: GVT Engineering FigurePortable blower (ducting blower) Workplace specific preventive measures

Good design and the use of safety equipment will not prevent physical injuries in sewerage works unless safety practices are understood by theentire crew and are enforced.These measures specific for the workplace aredescribed here.On-site

Traffic Hazards

Before starting any job in a street or other traffic area, study the workarea and plan your work.
Traffic may be warned by high-level signs well ahead of the job site. Traffic cones, signs or barricades to be arranged around the work,and

signboards to direct the traffic.Whenever possible place your work vehicle between the working site and the oncoming traffic.Use fluorescent jacket while working along roads.
Figure shows a fluorescent jacket

Grit channels

Keep walking surfaces free of grit grease, oil, slime or other material to prevent accidents due to slip and fall.Before working on mechanical or electrical equipment, be certain that it is locked out and properly tagged.Install and maintain guards on gears, sprockets, chains, or other moving parts that are normally accessible.Rubber boots with steel safety toes anda non-skid cleat-type sole should be worn.

Clarifiers or Sedimentation Basins

Always turn off, lock out and tag the circuit breaker before working onthe drive unit.
Maintain a good non-skid surface on all stairs, ladders and catwalks to prevent slipping.
When it is necessary to actually climb down into the launder, always wear a harness with a safety line to prevent a fall accident and havesomeone to accompany you.
Watch your footing on the floor of pits and sumps as the floor may be very slippery.
Guards should be installed over or around all gears, chains, sprockets, belts, or other movingparts. Keep these in place whenever the unit is in operation.C Digesters and Digestion Equipment
Methane gas produced by anaerobic conditions is explosive when mixed with air.
Smoking and open flames should not be allowed in the vicinity of digesters, in digestion control buildings, or in any other areas or structures used in the sludge digestion system.

All these areas should be posted with signs in a conspicuous place, which forbid smoking andopen flames.All enclosed rooms or galleries in this system should be well ventilated with forced air ventilation.Never enter any enclosed area or pit which is not ventilated.When oxygen concentrationis less than 19.5% and hydrogen sulphide concentration is more than 10 ppm, use forced ventilation to ventilate the tank before entering it.Explosion-proof lights and non-sparking tools and shoes must always be used when working around, on top of, or inside a digester.When working on equipment such as draft tube mixers, compressors and diffusers, ensure that equipment is properly isolated in function by closing valves locked outand appropriately tagged,to prevent the gas from leaking.If a heated digester is installed, read and obey the manufacturer's instructions before working on the boiler or heatexchanger because there is a risk of explosion.Sludge pump rooms should be well ventilated to remove any gases that might accumulate from leakage, spillage or from a normal pump cleaning. Good maintenance of flame arresters will ensure that they will be able to perform their job of preventing a back flash of the flame.D Aerators

Sewage Quality Test Laboratory

Toxic substances should be handled with the following precautions:Store poisonous substances in containers with tight lids. Clearly indicate the contents of the containers; place them in a special cupboard with glassfront for chemicals that can be locked and record the quantities of the substances used.Some substances may decompose when exposed to light and explode and store them in cool and dark location.

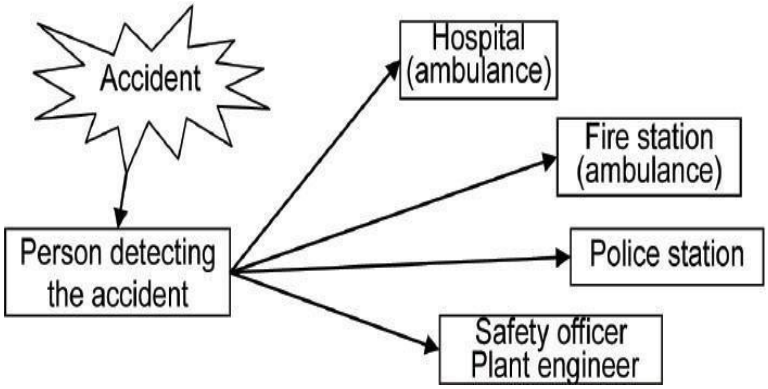
Store gaseous substances in well-ventilated locations.

Gaseous substances should generally be handled in well-ventilated locations. If this is not possible, safety masks should be worn, the location ventilated thoroughly, and after use, thepersons handling the substances should gargle and wash their face.Alkali / acid should be handled with the following precautions:Wear protective goggles, rubber gloves and protective clothing, if necessary.

Emergency Measures

Workers frequently perform dangerous work or handle dangerous chemicals while working in sewerage systems and on-site systems.For this reason, emergency measures need to be thoroughly understood beforehand. Workers need to adopt appropriate action if such an unexpected situation arises. Information on emergency measures is as follows.

The supervisor of the safety personnel (organization) should always inspect and maintain rescue appliances and clearly indicate their storage location.



Source : JSWA , 2003
Figure Example of emergency contacts

The supervisor of the safety personnel (organisation) should establish assistants for rescue action at each workplace and train them beforehand. Medical organisations to be contacted in an emergency should be decided beforehand (names and telephone numbers of hospitals with internal medicine, surgical department, ophthalmology and general hospital to be kept ready so they can be summoned immediately).Should be able to offer first-aid immediately.Subsequently, the doctor, and if necessary, the rescue organisation where the patient is being given treatment, should be notified the type and seriousness of the accident, the first aid given, the rescue appliances in hand, etc.The patient should be made to lie in arelaxed manner.Although it is good to rest the head and the body in ahorizontal condition on a bed, if theface isflushed, the head should be raised slightly.If the colour of the face turns blue, the pillow should be removed from underneath and the head to be maintained at a low level to enable better blood circulation.The patient's body temperature should be checked, and the patient should be encouraged, but should not be movedat random.Attention should be paid so as not to overlook any wound, burn, bone fracture, hip dislocation, etc.

Extinguisher

Fires are classed as A, B, C, or D type fires, according to what is burning. Class A fires (general combustibles such as wood, cloth, paper or rubbish)are usually controlled by cooling. Water is used to cool the material.
Class B fires (flammable liquids such as gasoline, oil, grease, or paint) are usually smothered by oxygen control - as by use of foam, carbondioxide, or a dry chemical.
Class C fires (electrical equipment) are usually smothered by oxygen control - use of carbon dioxide or dry chemical extinguishers - non- conductors of electricity.
Class D fires occur in combustible metals, such as magnesium, lithium or sodium, and require special extinguishers and techniques.
Use carbon dioxide or halon compressed gas extinguishers to control fires around electrical contacts.Do not use soda-acid type extinguishers because the electric motor will have to be rewoundand you could be electrocuted attempting to put out the fire. Also, remember that carbon dioxide candisplace oxygen.

CHAPTER 4

4.1 EMERGENCY LIGHTING

Emergency lighting is required for illuminating critical control areas andfor allowing fast exit from an area if the normal lights go out.
An emergency generator that starts automatically with a power failure is wired separately to turn on emergency lights in critical areas. Instead of an emergency generator,battery packs are often used for evacuation.Searching out Hazards
The safety management officer should carry out the following safety examinations:
Record the status of occurrence of accident (Appendix B.9.6). Study the status of occurrence andcauses of accidents, and based on the studies pick out the conditions for occurrence of accidents(risk locations, risky work, risky actions, etc.).Examine which parts of the workers' bodies were affected by accidents from the records of accidents. Examine the necessity of protective gear.
Check the status of work location, and study unsafe actions and inappropriate working methods of the workers.

4.2 HEALTH ASPECTS AND MEASURES

Personal Hygiene against Pathogen

The worker should take precautions because a large number of coliform groups, various kinds of micro-organisms, and egg parasites exist in sewage.The workers should strive to maintain good health by taking care of the following points:

Welfare Measures

The Draft Sanitation Workers (Regulation of Employment and Conditions of Service) Act 2012 proposes constitution of a Sanitation Workers State Welfare Board to exercise powers conferred on it and to perform welfare functions such as the following for sanitation workers: Provide immediate assistance to a beneficiary in case of an accidentMedical expenses for treatment of major ailments
Financial assistance for education of childrenPayment of maternity benefit
Make provision and improvement of welfare measures and facilities asmay be prescribed.

Corrective MeasuresHumanResources
Safety officer is to be assigned, and safety management to suit the number of workers in the workplace is required to be implemented.
The plant engineer should select and assign safety officer to ensure thesafety and health at the workplace.
The plant engineer should give permission for any required repair works on equipment / facilities in the STP.Prevent risks or personal injury to workers and promote health checks and other improvements to health of the workers.
Select a safety supervisor to manage worker's safety and select a health supervisor to manage workers' health.

The plant engineer should nominate a safety and health promoter at a site where a safety supervisoror a health supervisor is not selected.The safety and health promoter is selected by the plant engineer and has the following duties:
The safety and health promoter should inspect the facility and equipment, check their usage stage, and based on the results of these checks, should dopt relevant measures.
The safety and health promoter should make efforts to maintain the health of the workers through health checks and impart safety and health education to workers.
The safety and health promoter should collect information on workers' safety and health, prepare and maintain statistics of work accidents, diseases and absence from work.

CHAPTER 5

5.1 AWARENESS AND TRAINING

Safety training should aim for improving awareness and techniques of persons engaged in work so that accidents during work are prevented. Safety training should consist of four courses to be imparted to Manager.

Technical, Skilled and Unskilled grades of personnel.

The Manager is a person who performs labour management and manages the work environment so as to ensure the safety of workers.

A person in the Technical grade is an Assistant Engineer or Junior Engineer, who operates and repairs mechanical and electrical machinery and equipment by his own judgement.

A person belonging to the skilled grade is one who uses machines and equipment, and performs work following the instructions of the superior using the Work Manual.

A person belonging to the unskilled grade is one who performs manual work mainly in the plant under the instructions of the superior.

Trainees should upgrade/acquire skills to perform their work safely through training.

Technical Staff

The plant engineer should ensure that training in their respective fields is imparted to the technical staff once every three years in the mechanical andelectrical sections (Technical Grade).

Mechanical

O&M of mechanical machinery and equipment such as pumps and blowers.Repairs to mechanical machinery and equipment such as pumps and blowers
Methods of examining the causes of breakdown in mechanical machinery and equipment such as pumps and blowers.Methods of operating machinery and equipment (welding equipment) used for repairs during of pumps, etc.Safe work
Maintenance of mechanical machinery and equipment such as pumps and motors
Repairs to mechanical machinery and equipment such as pumps andmotors Hazardous work (oxygen deficiency, hydrogen sulphide poisoning) Measuring instrument (oxygen concentration meter, etc.)

Electric shocks

Hazardous work (oxygen deficiency, hydrogen sulphide poisoning)

The plant engineer should warn the trainees on items assessed as unsatisfactory, and improve their awareness to such items. The worker should receive safety training and should preferably not be transferred toa different workplace within one year.
Otherwise, this would result in lowering the quality of work at the workplace and may lead to a drop in work

efficiency. For this reason, workstatus at the workplace, stationing of personnel and training assessment should be considered during transfers.

EMERGENCIES

What is an Emergency?

An emergency is a situation developing before our eyes with full conscience and realization that soon the situation will turn to adversity and even fatal. We may not be equipped to deal with it.
We cannot take control. This leaves us with no time to locate the source of help. We may not know where to get help for a given situation.

How to Think during Emergencies?

The foremost requirement is not to jump to conclusions. Always think of what is most important and imperative at that moment. Let us consider some situations that can arise
Example situation

You notice a colleague during working hours trying to repair a floodlight during broad daylight at a height of some 6 m by standing on a permanent secure ladder but he is not wearing safety gloves.

You are afraid that he may get electrocuted and nobody could reach him at that height soon enough.This is a simple emergency situation. You have the options of (a) calling him on sthe cell phone to alert him about hisnot wearing gloves, (b) going up the ladder personally with a spare set of gloves,(c) quietly switching off the electrical circuit to that mast and (d) quietly slipping out of the scene unnoticed .Each solution will merit itself under certain situations. Solution (a) is apt when the electrical circuit is already found switched off. Solution (b) is apt when the electrical circuit is switched off and the fuse is in your pocket. Solution (c) is apt when you find that the circuitry is energized. Solution (d) is apt when you find the circuitry is already switched off and your colleague has recorded in the works register that he is taking thefuse with him, so that nobody can energize the circuit until he returns.

EXAMPLE situation 2

A colleague is sitting on the walkway of a clarifier and collecting a sample of the treated sewage overflowing the weir. You notice that a snake is slowly making its way towards him. If you move in speedily, the snake may be hustled and move away from you faster and move closer to your colleague.This is a very serious emergency. Now, what will you do? / whatshould you do? The first thing to do will be to call the colleague on cell phone and tell him not to move and sit still as reptiles are alerted only whenthereis movement ahead of them. The next thing to do will be to ask your colleague to jump into the clarifier and swim to the safety of the channel and launder only if he knows swimming.

Suppose he does not know swimming, ask him immediately to stand upright, so that if it bites, it may spare the body parts closer to the heart and he can be saved by tying up the limb above the bite with a rope or a torn piece of a shirt.Simultaneously, you can follow the reptile and try to push it into the water surface with whatever piece of extended tool that youmay have.

Example Situation 3

During a monsoon season, let us say there is a sudden cloudburst and torrential downpour and before the staff could realize, the entire site is flooded to about knee- height and the sludge pits are marooned.
Electrical connections are shorted somewhere and there is total darkness. The staff are scattered at different locations in the STP area of over 25 hectares. There was no way of setting foot forward, as they cannot locate here the pump pit is.
The fear of more floods is very much there.

You can somehow make out the silhouette of the administrative building and slowly wade towards it by announcing yourself. When all the staff members reach the building, they do not hear the voices of two persons in that shift.
Panic grips them. However, nothing could be done until next day morning when it is discovered that of the two missing persons, one was absent and the other had gone out on personal work without informing others.
The lesson here is that in every shift, be punctual in reporting and ensurea mini assembly of handing over and taking over at the "meeting point". This ensures mutual knowledge of presence or absence Another lesson is to have solar powered lampposts with self-contained circuits insulated against rains and located adjacent to electrical lampposts so that when total electricity fails, these will come on at least for that interval of time.

Example situation 4

When two operators were moving a portable diesel pump on a trolley over a gravel roadway, the road caves in suddenly.They were pulled into a huge pit fortunately after the engine was pulled in.
Later, it was found that the reason was the plant bypass concrete pipeline crossing the road had a corroded crown to such a degree that it could not take that load. There were no signs on the site showing that the pipeline is crossing the road there.
Bypass pipelines flow rarely, and gases accumulate and corrode the pipe easily. Always provide bypass pipelines in non- corrodible pipe material. Always erect markers over the route of big buried pipes.

Example situation 5

A primary settling tank sludge-removal-arm is not rotating for sometime but the settling tank continues to be operated. After sometime, it is noticed that the accumulated sludge is becoming visible through the sewage liquid when seen from the top.The settling tank is stopped from service and the sludge is allowed to dry up. Manual labourers are employed to walk into the settling tank and scoop out the sludge and transport it as head loads.

Suddenly, two of labourers are found to be"sinking" into the sludge..Fortunately, the other labourers throw a rope and the two are able to grab itand are pulled out. The lessons are simple.
Wet grit dumps can behave like quicksand in such locations. Suppose the two were not noticed sinking, they would have been located only after death, while the sludge was being scooped.Removing such grit dumps should be as per regulations for confined spaces and all personnel shouldbe watched and accounted for, by a supervisor.

THE NEED TO RESIST

Sometimes, tasks required to be carried out by field staff may involve risks, ignoring safety and potential emergency. The employee must politely resist doing the same. If every staff member resists,only then the management will know and make amends.

SUMMARY

Sanitation workers or STP operators are often forced to work under poor working conditions with high risk of operational diseases or accidents.Each operator or worker should ensure operational safety by wearing designated personal protection or by using designated protection devices.Above all, they should follow the working procedures thoroughly when working in confined spaces.

CHAPTER 6

6.1 CONCLUSION

The present study explored the situation of occupational health and safety in large scale textile industries of Lahore along with the risk analysis. The study found that there were different issues, which create hurdle to achieve an effective OHS system in textile industry.At management level the occupational health and safety awareness was not very high and in spite of awareness the implementation of OHS services were not satisfactory. To carry out the responsibilities of health and safety there was not sufficient numbers of competent personals and the people who were employed for the job were not a specialist in the field of OHS. The available medical facilities on site were not satisfactory. The majority of the management did not recognize the significance of discussion to the workers at the policy making level. At the workers level they were not aware about the significance of occupational health and safety. Chemical safety and physical hazards are frequently encountered in the industries.Furthermore the workers were not aware their legal rights.There was the shortage of technical facilities such as air checking and biological monitoring. The rate of the use of PPEs was low among workers.

CHAPTER 7

7.1 REFERENCE

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