

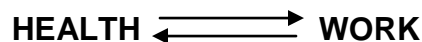
# CHAPTER 6

## Occupational Health

### What is Occupational Health?

Occupational health is a multifaceted activity concerned with the prevention of ill health in employed populations. This involves a consideration of a two way relationship between work and health. It is related to the:-

- effects of the working environment on the health of the workers
- influence of workers state of health on the ability to perform their tasks



Its main aim is to prevent, rather than cure, ill health from wherever it arises in the work.

A joint International Labour Organization/ World Health Organization (ILO/WHO) Committee has defined occupational health as “the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities”.

### 6.1 Objectives of an Occupational Health Programme

- To eliminate all workplace hazardous situations as related to occupation, work, workers' behaviour and work environment
- Evaluation of work hazards, and control measures, by using simple methods and techniques
- Concerned bodies to be kept informed about the work and environmental hazards in work places
- Be knowledgeable about the principles of control of work hazards and work environment, and to offer advice on selection of appropriate control measures and optimal use of available resources

- Educate workers on the principles of safe conduct at work and prevention of occupational diseases and injuries
- Promotion of healthy work settings in all workplaces
- Establish coordination with other stakeholders on occupational health, in conducting preventive and promotional activities

## 6.2 Occupational Hazards

Hazard is something which has the *potential to cause harm*, e.g., a piece of equipment (fan blades can cause cut injuries), a form of energy (electricity can cause electrocution), work practices (working without wearing personal protective equipment), or a feature of the environment (strong winds in a foundry).

### Types of occupational hazards

The hazards found in work place can be mainly divided into physical, chemical, biological, ergonomical and psychological hazards. An understanding of these hazards can be helpful because routes of entry of the contaminants, applicable Personal Protective Equipments and appropriate control measures will be determined by the type of hazard.

**Physical hazards:** excessive noise, light, heat, vibration, pressure, radiation

**Chemical hazards:** acids alkalines, solvents fumes, dust, mists

**Biological:** bacteria, viruses, fungi

**Ergonomical:** mismatch between worker and workplace/ workstation

**Psychological:** work stress, overwork, underwork

### Aims of hazard control

- Protection of the health of exposed workers
- Ensuring comfort and safety for workers
- Compliance with legislation
- Protection of workers and the public, from the risks created by the process or workplace
- Reduction of environmental pollution
- Minimizing economic loss from raw materials, products, or valuable wastes

Often there are several options available for the control of hazards. Sometimes, the optimal control may not be the most practicable, and an alternative needs to be considered. More than one control measure may be required to reduce exposure to an acceptable level. Sometimes, control may not eliminate the hazard, but will reduce the magnitude of exposure to some extent.

Controlling hazards can be expensive, especially when the wrong option is chosen, resulting in further assessments and installations to be implemented. To prevent this, a methodological approach to control is required when selecting methods for hazard control.

## **Taking a methodological approach to control hazards**

Following steps should be followed in selecting a hazard control method;

1. Identify the nature and source of hazard
2. Consider the emission source(s) and nature of emission
3. Characterize the worker(s) and workplace
4. Identify current controls and assess their efficiency
5. Brainstorm alternative controls that are cost effective, efficient, and acceptable to workplace
6. Select the most practicable control option(s) after considering costs, extent of hazard reduction and regulatory requirements
7. Trial the anticipated controls
8. Seek feedback and evaluate the effectiveness of control
9. Re-assess the implemented controls to ensure their suitability
10. Regularly maintain controls for continued efficiency and effectiveness

### **1. Identify the nature and source of hazard**

Hazard is first identified and then assessed (i.e., excessive noise, dust, etc.)

### **2. Consider the emission source(s) and nature of emission**

Identify the source of generation and the emission (i.e., which part of the machinery is generating the noise)

### **3. Characterize the worker(s) and workplace**

Identify characters related to the exposure. Some questions that need to be asked include;

- Is the worker sited close to the source of emission?
- What personal characteristics impact on exposure? (e.g., height, predisposing health factors like asthma, ability to wear protective equipment)
- What work practices are adopted? (e.g., chewing betel while working, not wearing personal protective equipment)
- What is the level of education and training of workers?
- How is the workplace laid out?

### **4. Identify current controls and assess their efficiency**

Before other control options are fully investigated, existing controls should be identified and assessed. This can be done by;

- Inquiring from workers about existing hazards and current controls that are in place
- Monitoring workers' exposure to contaminants and occupational hazards, (e.g. dust levels, blood lead levels)
- Reviewing health surveillance data, records of incidents of work related injuries or illnesses that can be attributed to insufficient control of the hazards
- Direct measurement of the performance of control systems (e.g., noise levels)

**5. Brainstorm alternative controls that are cost effective, efficient, and acceptable to workplace**

Often the best ideas come from those who are exposed to the hazards, and are familiar with the process. Involvement of workers in the identification of hazards, design and implementation of controls, is useful in several ways:

- It promotes consultation between employers, supervisors, and workers
- Workers feel a sense of ownership and empowerment of decisions that they have been involved with
- Job satisfaction may increase in the realization that workers opinions are valued and sought after
- Workers have intimate knowledge of the workings of a process or system and whether the proposed controls are practical and usable
- Selects the most practicable control option(s) after considering costs, extent of hazard reduction and regulatory requirements

**6. After considering the merits of optimal control strategies, they should be fully tested and evaluated in terms of their anticipated suitability to control the hazard.**

e.g., personal protective equipment (PPE) may be preferred as a short term control for exposure to noise or hazardous substances. But the long term costs far outweigh the cost of alternatives such as engineering controls. In some cases (e.g., emergency rescue) PPE may be the best option

**7. Trial the anticipated controls**

Once a decision about the controls has been made it should be implemented on a trial basis

**8. Seek feedback and evaluate the effectiveness of controls**

Once controls are implemented, a thorough investigation of the effectiveness of the controls should be conducted

**9. Re-assess the implemented controls to ensure their suitability**

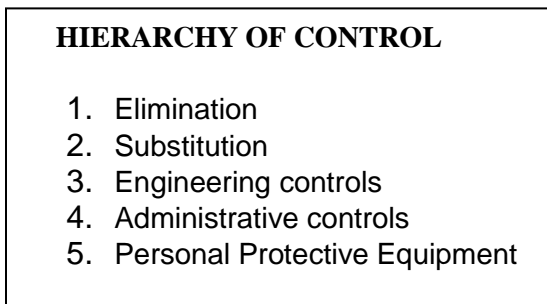
Where deficiencies are identified, alterations to the implemented system may be required

**10. Regularly maintain controls for continued efficiency and effectiveness**

Regular maintenance is one of the main items in hazard control

**Hierarchy of control**

The hierarchy of control is a list of control options that have been placed in a preferred order.



### 1. Elimination

Accepted as the best method for controlling exposure, e.g., use of unleaded petrol in place of leaded petrol. However, practical difficulties may arise if the substance is a raw material without which the production cannot be done. In such instances industry may not be able to eliminate a substance or process without compromising its entire production or viability of the company.

### 2. Substitution

Where the hazard cannot be totally removed, the second preferred option considers an alternative process or material.

e.g., using lead in liquid form instead of powder form to avoid exposure through dust.

Using vacuum cleaner to remove dust than sweeping with a brush, which may disperse dust

### 3. Engineering controls

One of the most commonly used control method. Its advantage lies in the ability to physically alter the path of transmission of the hazard, or isolate the worker from the agent. Three alternatives can be used.

- **Segregation or isolation** - Enclosing either the hazard or worker, to restrict movement of the hazard. Segregation can be achieved by placing a physical barrier between one area of the workplace to another. For example, relocating a dusty process to an isolated section of the plant.

Isolation requires physical detachment of the process or person, e.g., enclosing a noisy process in a sound insulated booth

- **Guarding and signs** - Reduce the path between the hazard source and the worker. Physical barrier is installed to prevent access to a hazardous area, e.g., ventilated booth for spray painting. Signs are used to provide information or warnings. Therefore it is a barrier conveying instructions or information, which should bring compliance
- **Ventilation** - For atmospheric contaminants, ventilation is the most effective control when elimination and substitution cannot be achieved. e.g., Heat Ventilation and Air Conditioning (HVAC), Local Exhaust Ventilation (LEV), Forced Dilution Ventilation.

### 4. Administrative controls

Rely on human behaviour and compliance for success. Useful in situations where the risk is low.

- **worker rotation** - Aims to reduce an individual's overall exposure, by sharing the work with several workers
- **job placement** – Assessing fitness for a particular type of work, where pre-existing condition or illness is taken into account, when making job placement

- **education and training** - Assist workers in performing their work safely. With knowledge and understanding about the risks and methods of combating exposure, workers can make an informed decision about their exposure (e.g. making use of Material Safety Data Sheets (MSDS) for hazardous substances, Technical documents or Brochures about tools, equipments and plants).
- **good housekeeping** - Minimizes safety related incidents, e.g. slips and falls ;  
Reduces dusts and other contaminants that may become airborne
- **scheduling of work** - High risk work may be rescheduled so that the least number of workers and members of the public are exposed. E.g., demolition of buildings during week ends or non-peak hours to minimize exposure of large number of persons to dust, noise and vibration, fumigation of buildings during weekends or holidays
- **maintenance** - Scheduled maintenance of tools, equipment and plants to minimize wear and tear associated loss of performance
- **monitoring and health surveillance** - Occupational hygiene and biological monitoring can be used to assess risk and track the success of control measures

## 5. Personal Protective Equipment (PPE)

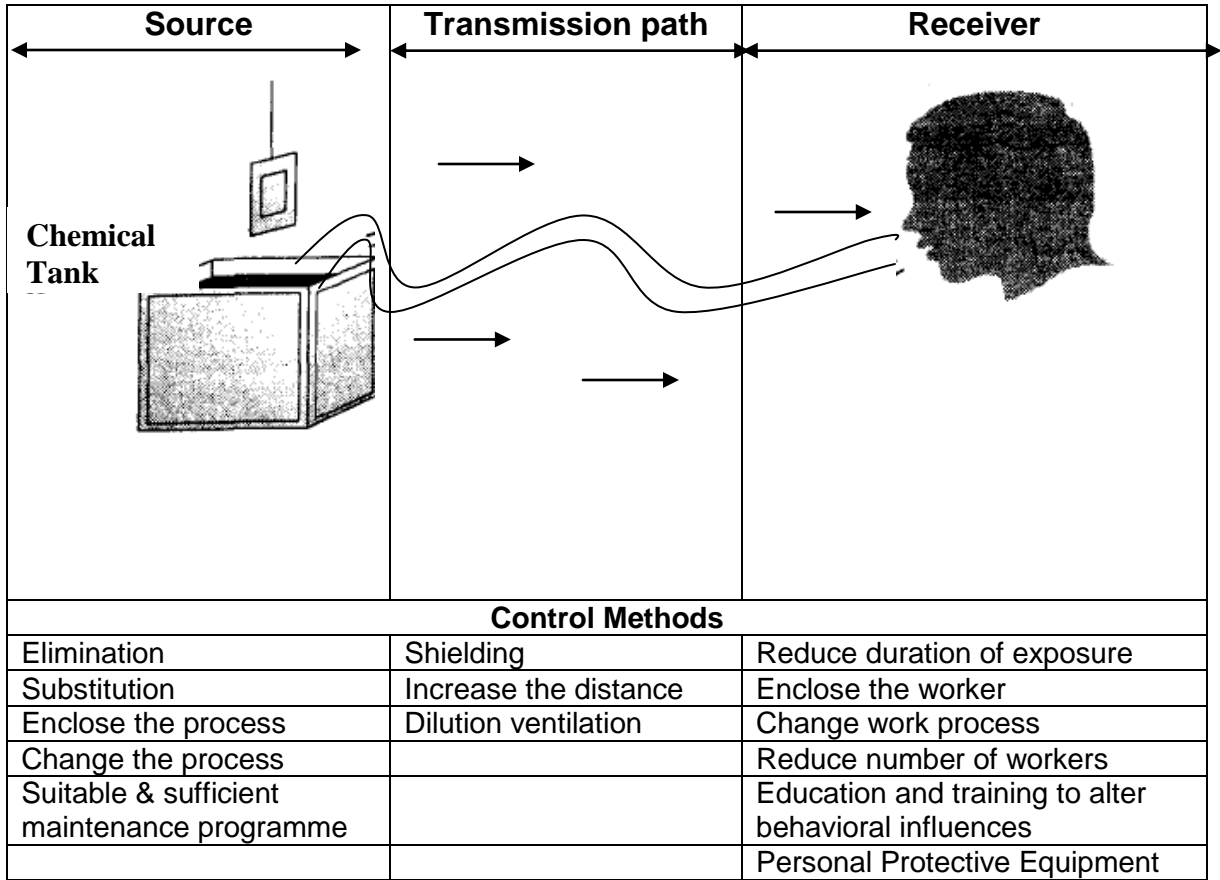
Personal Protective Equipments are worn to protect the human body parts that are vulnerable to attack from external sources, e.g. eyes, ears, skin, respiratory system and aim to minimize exposure at the receiver. However, the PPE option should be taken when control could not be obtained by other methods (elimination, substitution, engineering control, administrative control) or to supplement other methods.

Examples of situations in which the use of PPE may be necessary

- Where it is not technically feasible to achieve adequate control by other measures alone. Control should be achieved by other methods as far as reasonably practical and thereafter PPE should be used as a additional measure
- Where urgent action is required such as in a plant failure, and the only practical solution is to use PPE
- During routine maintenance operations

- Eye and face protection – safety spectacles, goggles, eye shields,
- Skin and body protection – gloves, apron, overalls, caps
- Leg and foot protection – knee pads, leggings, molded footwear, rubber ankle boots
- Respiratory protection – face mask, respirators
- Head protection – safety helmets
- Ear protection – earplugs, earmuffs

**Movement of a contaminant from a source to a receiver with control techniques for each component**



**Physical hazards**

**1. Light**

Every workplace should have suitable and sufficient lighting. Lighting levels at work can affect health and safety in a number of ways;

- When people move about, they must be able to see obstacles that could lead to accidents from tripping, falling or by just walking into them
- The tasks must be adequately lit to enable workers to see sufficient detail so that these jobs can be carried out correctly
- Operators of machinery must be able to see the controls, information dials and screens
- Colours should be correctly visible if that forms part of work
- Glare must be minimal
- The colour output of any artificial light source must not distract the colour of the item being worked on, if it is important

**Units used in lighting**

Luminous intensity: Unit - Candela (cd). A measure of brilliance or brightness, which is the power of a source to emit light.

Illuminance: Unit - lux (lx). This is the unit that expresses the amount of light falling on a surface.

### Recommended lighting standards

Area	Recommended light level (lx)
Circulation areas - corridors, stairs, lifts	100-150
Entrances, lobbies, waiting areas	500
Factories	500
Offices, Groceries, Show Rooms, Laboratories	500
Typical outdoor levels	10000
Warehouses	150
Mechanical Workshops	750
Detailed Mechanical Workshops	1000

## 2. Heat

Body temperature is maintained within close limits by an efficient homeostatic mechanism. Physical exercise will increase body temperature in proportion to oxygen consumption, the range being 0.5 °C for moderate exercise, up to 4 °C for heavy work. In normal conditions the body temperature stays within the range 36-39 °C.

### Recommended work/ rest regimes

	Work load (total) & Temperature		
	Light	Moderate	Heavy
Continuous	30.0 °C	26.7 °C	25.0 °C
75% work, 25% rest each hour	30.6 °C	28.0 °C	25.9 °C
50% work, 50% rest each hour	31.4 °C	29.4 °C	27.9 °C
25% work, 75% rest each hour	32.2 °C	31.1 °C	30.0 °C

*Work conditions & metabolic rate: Light 230W, Moderate 230-400W, Heavy 400-800W  
(W=Metabolic Rate)*

### Heat control

- Insulation of ceiling to maximize solar heat transfer
- Reflective blinds within offices or factories to alter the path of transmission of heat
- Glass or tinted windows
- Exhaust ventilation such as part enclosure or hoods above heat generating process
- Forced air ventilation to increase airflow

### Health effects

Excessive heat can give rise to conditions like irritation, discomfort, heat rash, heat cramps, heat exhaustion and heat strokes.

## 3. Noise

Noise is a physical hazard where excessive noise could give rise to adverse health effects in the exposed worker.



### Recommended noise ratings

Class room	25dB
Sleeping room	25dB
Conference room, Hospital	30dB
Private office	40dB
Restaurant	45dB
Office with typewriters	55dB
Workshop	65dB

**Sound level standard:** A weighted continuous sound pressure of 85dB over 8 hours

### Recommended maximum noise doses for unprotected ear

Limiting dB	Maximum duration Of exposure
85- 90	8h
93	4h
96	2h
97	1h
102	30min
105	15min
108	7min
111	4min
114	2min
117	1min
120	30sec

### Health effects

Noise induced hearing loss is the main adverse health effect. It is permanent and is not improved by use of hearing aids. Other effects include headache, irritability and lack of concentration.

### Methods of preventing noise generation

- Substitution for a quieter process: eg. Welding instead of reverting
- Cushion impact – plastic parts instead of metal parts
- Improved designs for fans, fan casings, compressors etc.
- Better mechanical maintenance
- Limit the duration for which a noisy machine or part of a machine is used

### Control of transmission path

- Use of barriers
- Enclosure of the source
- Increase the distance between the source and receiver

### Control of receiver

- Enclosure of receiver – e.g. sound proof booths
- Use of PPE, e.g. ear plugs, ear muffs

#### **4. Vibration**

Vibration is oscillatory motion about a point. Workers may be exposed to two types of vibrations;

1. Hand transmitted vibration – Vibration that enters the body through the hands when vibrating tools or work pieces are grasped or pushed by the hands or fingers.
2. Whole-body vibration – Occurs when the body is supported on a surface which is vibrating (e.g. sitting on a seat which vibrates, sitting on a vibrating floor). Whole body vibration occurs in transport and when working near some industrial machinery.

#### **Health effects**

Various health effects ranging from bone and joint disorders, neurological disorders (e.g. numbness, tingling), muscle disorders could occur.

#### **Control**

Limit exposure  
Proper maintenance of machinery  
Proper usage of machinery

#### **5. Pressure**

Main occupational groups exposed to pressure are deep sea divers, tunnel workers, high flying aviators.

#### **Health effects**

Limb pain, dizziness, headache, chest pain, convulsions (fits), coma, bone necrosis

#### **Control**

Limit duration of exposure

#### **6. Radiation**

Radiation is energy which is transmitted, emitted or absorbed in the form of waves. There are two types of radiation.

1. *Ionizing radiation* – Ability to ionize molecules, e.g. X Rays, Gamma Rays. Adverse health effects occur mainly due to the effects of ionization of cell molecules. Usually occupational exposures are at lower levels, but are prolonged.
2. *Non-ionizing radiation* – Energy waves that are composed of electric and magnetic field components. This energy is insufficient to eject electrons from atoms, thus is not able to ionize other matter. Therefore reported health effects are not profound as in ionizing radiation, e.g. radio waves, microwaves, high voltage power lines.

#### **Control**

Instrument shielding, personal protective clothing, increase distance from source and receiver, reduce exposure period.

### **Chemical hazards**

A chemical substance that can cause potential damage or adverse health effect on someone.

### **High Risk Occupations**

- Industries that produce chemicals or use chemicals as raw materials  
Eg. Chemical industries
- Occupations that use produced chemicals in their work activities  
Eg. Agrochemical usage in agriculture
- Occupations that have a risk of exposing to chemicals naturally released to the surrounding  
Eg. Exposure to methane gas in mining

### **Exposure**

- Workers can be exposed to chemical hazards at any stage of the industrial process
- At the storage area
- During the industrial process
- During distribution
- During application
- During disposal

### **Workers can be exposed to chemical hazards**

- By inhalation
- By ingestion
- By absorption through contact
- Indirectly due to pollution of the environment

### **Biological hazards**

Any microorganism or material of biological origin that has the ability to cause illness could act as a biological hazard. Certain work activities are associated with an increased risk of contracting infections. This may be due to work bringing an individual into contact with large number of infected people or animals, e.g. health care workers, laboratory workers, agricultural and livestock farmers.

### **Health effects**

- Blood borne infections: Hepatitis B, Acquired Immune Deficiency Syndrome (AIDS)
- Vector borne infections: Malaria, tic borne disease
- Food and water borne disease: Typhoid, E coli infection, food poisoning
- Infections spread by droplets and close contact: Tuberculosis, Meningococcal Meningitis
- Zoonotic infections: Anthrax, Leptospirosis
- Allergies

### **Control**

- Elimination or substitution of the hazardous agent
- Ventilation
- Isolation of person or microbe
- Administrative controls- Immunization, health surveillance, sterilization of equipment
- PPE- Uniforms, gloves, eye ware

## Ergonomics

Ergonomics is matching the job to the worker. It describes the interaction between the worker and the job demands and focuses on how work affects workers.

Ergonomic hazards refer to workplace conditions that pose the risk of injury to the musculoskeletal system of the worker. Ergonomic hazards include repetitive and forceful movements, and awkward postures that arise from improper work methods and improperly designed workstations, tools, and equipment.

The goal of ergonomics and human factors is to make the interaction of humans with machines as smooth as possible, enhancing performance, reducing error, and increasing user satisfaction through comfort. Ergonomics in the workplace has to do largely with the safety of employees, both long and short-term. Ergonomics can help to reduce costs by improving safety.

Ergonomics draws on many disciplines in its study of humans and their environments, including anthropometry, biomechanics, mechanical engineering, industrial engineering, industrial design, physiology and psychology.

One of the most commonly encountered health effects of poor ergonomics is musculoskeletal disorders.

### Work related musculoskeletal disorders

They can be defined as *disorders of the muscles, tendons and nerves that are caused or aggravated by exertions or movements of the body*. The primary cause may be work related or non-work related. In either case, work exposure is an important consideration in determining work-relatedness and in return to work from an injury.

### Characteristics of musculoskeletal disorders

- they involve both mechanical and physiological process
- they are related to work intensity and duration
- they require periods of weeks, months or years to develop
- they require periods of weeks, months or years for recovery
- their symptoms may be poorly localized, nonspecific and episodic
- they are often unreported
- they may have multiple work and personal issues

### Work related factors of musculoskeletal disorders

- Repeated or sustained exertions
- Forceful exertions
- Localized mechanical stresses
- Work posture
- Vibration
- Work duration
- Psychosocial stresses

### Risk Assessment

Risk is a measure of the *likelihood that the hazard will manifest some degree of harm*.

### **Elements of risk assessment and risk management**

- Consider all activities and situations, both routine and non-routine, including foreseeable emergencies and loss of control
- Identify the hazard, both intrinsic and those generated by all of the above activities
- Identify which individuals or groups of workers may be exposed to be at extra risk by virtue of susceptibility, illness and other medical conditions
- Determine and assess the risks to health from the hazards
- Determine the degree of control of these risks and whether this is adequate
- Can these risks be eliminated or reduced
- Implement newer improved risk control measures
- Monitor the effectiveness of these controls
- Review and if necessary, implement any appropriate corrective action

### **Methods of control**

Risk control should begin at the **design/planning** phase of a process or workplace. It is more expensive and inconvenient to attempt to redesign a workplace once it has been built. However, most hazards exist in a workplace that has been run for many years. An alternative approach is needed for the problem by addressing factors required for exposure;

- A source
- A mechanism or path for movement of the hazard
- An unprotected receiver

Removal of any of these partners will minimize exposure.

### **Walkthrough Survey (Factory Inspection)**

One of the most important and most simple acts in risk assessment is to actually venture into the workplace and “see for yourself” what people do and how they do it. In order to maximize the benefit of the visit, it is common for people to use a walk through survey checklist.

It is generally best to start the walkthrough survey at material incoming/ receiving section, and then following the natural manufacturing or other processes in the workplace. This gives the PHI an understanding of the actual processes that occur. During a walkthrough, it is important to speak to the workers, as they will often have their own ideas regarding health and safety hazards or potential preventive measures. This will also initiate a relationship between the workers and PHI and will give the PHI an indication of the workers understanding of their job and potential hazards and their attitudes toward their work and safety. Appropriate questions for workers might include the following; what kind of hazards are there in your particular job? What measures do you take to keep yourself safe? What kind of preventive measures do you do you think might be helpful in this workplace?

In viewing the task the PHI should carefully look at worker factors such as body position and posture. What kind of movements are required by the worker? Observation of the physical effort may include measuring or observing the force required, the direction of the movements (forward, backward, etc.), the location (floor to waist or above shoulder-level), the frequency (once per hour or once per minute), and the duration (sustained for several minutes or intermittent).

Understanding of the task itself should include such aspects of work practices as productivity expectations, variation in physical demands during the day, and how the job

is compensated. For example, is there a quota system or an incentive system? Incentive pay for productivity may increase the risk of cumulative trauma disorders by promoting continuous, sustained exertion by employees.

In evaluating the environment, the workplace conditions such as temperature, ventilation, vessels and pipes, housekeeping, sanitary facilities, and lighting should be reviewed. The degree of crowding, the ambient noise, and the general appearance of the workplace are all relevant to safety and the likelihood of injuries or illnesses. For example, an increase in the ambient noise can stimulate the sympathetic nervous system and increase the likelihood of accidents. There is evidence that a reduction in general noise level is accompanied by a reduction in accidents.

Poor housekeeping may increase the risk of accidents by the presence of oil or water on the floor and the persistence of slip and fall hazards. Signs and labeling, chemical storage, emergency preparations and equipment such as eye-wash stations, first aid and fire equipment can be checked and evaluated for working order, suitability, and location.

The equipment with which employees work includes their own equipment and other machines. Hand tools should be inspected for such aspects as ergonomic fit, appropriate use for the job, and maintenance. For example, the design of the hand tool influences its position of use. The shape and composition of the handle influence the comfort of use and the likelihood that the prolonged use of this tool will increase the risk of cumulated-trauma disorder. At work sites where use hand tools extensively, employees should be offered options depending on their own demographics and preferences.

Machinery can be inspected for ergonomics, effectiveness, and maintenance. The presence and effectiveness of safety devices for the machines should be carefully reviewed. Modern machine design has dramatically reduced the risk of major traumatic injuries (power presses and cutting devices), but these safety devices must not be bypassed or modified, and workers must be carefully educated in their use and effectiveness.

In many environments, machines themselves are ventilated. The four basic components of a local ventilation system are *hoods* to capture a contaminant, *ducts* to carry the contaminant away, *filters* to clean the air before it is discharged or re-circulated, and *fans* to power the system. Unfortunately, ventilation systems in workplaces are not always properly designed to control the health hazard. For example, the hood may not effectively capture the contaminant because it is not close enough or encapsulating enough of the process. A duct system may not be properly balanced or maintained. Finally, fans may lack sufficient power to carry the contaminant through the duct system. An effective occupational safety and health program should have a well-designed program to monitor the effectiveness of a local ventilation system, and the PHI should ask enough questions to ensure that the program is effective.

Dilution ventilation is the general exhaust of air from a workplace and the replacement of an appropriate portion with outside, fresh air. The purpose of general ventilation is to maintain comfort for workers by controlling humidity, removing unpleasant odors, and maintaining a comfortable ambient temperature. A portion of air in every general ventilation system is re-circulated to control the costs of conditioning the air. An insufficient supply of "makeup" air from the outside may contribute to the buildup of carbon dioxide, nonspecific irritants, or identifiable contaminants in the workplace.

Dilution ventilation is appropriate to control by-products of the work processes (e.g., smoke) only if these products are not toxic and are present at very low levels. Care must be taken to ensure that the exhaust of the general ventilation is not close to any intake air vents on the outside of the building.

The workplace walk-through provides the opportunity for the PHI to directly observe the workers. A walk-through gives a feel for the workforce as a whole. By observing the age, apparent physical condition, and other demographics of the workforce, the PHI may be able to advise the employer regarding other interventions such as health promotion programs and screening programs. Speaking to the workers during a walk-through can be very enlightening with respect to worker attitude toward health and safety, their knowledge of the hazards, and their feelings about work.

### **Report writing**

After a comprehensive walk-through, the inspector should write a report with observations and recommendations and guide the employer in improving the health and safety of the workplace.

This report should generally contain the following;

- begin with a summary statement
- identifying the major manufacturing processes
- the important occupational health hazards
- suggested preventive measures

The body of the report should contain;

- more detailed discussions of each hazard identified
- the rationale for preventive measures
- suggestions for preventive measures

The hierarchy of controls should be used. In all cases, worker education and training should be part of the recommended preventive measures.

### **6.3 Health promotion at workplace**

Health promotion has been defined by the WHO as the *Process of enabling people to increase control over, and to improve, their health*. In other words it is a science and art of helping people to change their lifestyle to move to an optimal state of health.

Health promotion intends to address humans as individuals and groups *in the settings*, in which they live, work, and play. Health promotion is supposed to refer to two different levels of social change;

- improvement of lifestyles and work styles conducive to health
- improvement of working and living conditions conducive to health

The settings approach focuses on the physical, social and organizational environments in which people spend their time (i.e. schools, hospitals, workplaces and communities) and aims to create settings that support and enhance health.

#### **Importance of work site health promotion**

Over the years there has been evidence of positive effects of worksite health promotion programmes on health of the worker, healthcare costs, absenteeism, health outcomes

and employee health and work related attitudes. Work place as a setting is important since,

- the relationship between work and health
- great amount of productive life spent at the work place
- can approach workers as a group, easy to approach / intervene

### **Scope of programmes for health promotion**

Programmes can range from health awareness campaigns, educational seminars biologic screening, behaviour change programmes. The important feature of all approaches is to leverage positive employee health behaviours supported by the workplace environment.

***Preventive screening/examinations:*** Biological screening and preventive examinations are central to essential detection of disease and thereby prevention of effects. The screening should be followed by follow up visits for detected employees.

***Diet:*** Many people do not recognize the importance of healthy diet. Education of workers about the benefits of healthy diet, help with developing skills to prepare healthy meals, and promote healthy diet at worksites are some of the promotive activities the PHI can embark on.

***Physical exercise:*** The goal of physical exercise promotion is to improve cardiovascular fitness, increase strength and improve flexibility. The psychological benefits as well as improved morale, attitudes and productivity are also indirect effects of physical exercise.

***Stress management:*** There is proven association with many illnesses and stress. Stress potentially plays a role in cardiovascular diseases, asthma, skin disorders and gastritis among others. Effective stress management techniques can improve workers sense of well being and reduce likelihood of stress related symptoms.

***Accident prevention:*** Accident prevention is an important area that should be included in health promotion programmes in work settings. There are many accidents taking place in work sites due to negligence of workers which could be easily prevented. The magnitude of this problem is largely unknown as only few work related accidents are being reported.

***Sexually Transmitted Diseases:*** This is one of the areas where lack of knowledge exists. In Sri Lanka especially where segregated industries such as free trade zones which employs large number of youths are vulnerable for spread of sexually transmitted diseases. PHII should organize educational programmes with the participation of other healthcare staff in his MOH division targeting the workers.

***Tobacco and alcohol prevention:*** Workforce largely consists of young adults. This is much true in unskilled workers where physical labour is needed. These young workers, mostly with primary education are vulnerable for being introduced to alcohol and Tobacco. As this group at workplace is a captive population they could be easily reached to address the issues related alcohol and tobacco use.



## 6.4 Factory Inspection Report

Annexure- 1

### Medical Officers of Health/ Public Health Inspectors Factory Inspection Report

1. MOH/PHI area: ..... Date of inspection: .....

2. Name of establishment: .....

3. Address: .....

4. Labour Department Registration No: .....

5. Nature of work done:  
.....

6. Size of industry:

1. Cottage  2. Small scale  3. Medium scale  4. Large scale

7. No of employees: 1. Males ..... 2. Females: ..... 3. Total: .....

8. No of employees per shift: 1. Males ..... 2. Females: ..... 3. Total: .....

**Premises** (S: Satisfactory, NS: Not Satisfactory, NA: Not Applicable)

#### 9. Condition of the workpremises

		S	NS	NA	Remarks
1.	Lighting				
2.	Space				
3.	Ventilation				
4.	Heat				
5.	Humidity				
6.	Noise				
7.	Dust/Fumes/Smoke				

#### 10. Housekeeping

		S	NS	NA	Remarks
1.	Demarcation of areas				
2.	Safety signs				
3.	Storage of raw materials				
4.	Storage of finished products				
5.	Maintenance of premises				
6.	Emergency evacuation procedures				

S- Satisfactory, NS- Not Satisfactory, NA- Not applicable

**Machinery & safety**

11. Use of power: Yes  No

12. Type of power

1.	Electricity	
2.	Gas	
3.	Petrol/Diesel/ Kerosene	
4.	Firewood	
5.	Others (specify)	

13. Type of machinery

1. Small  2. Medium  3. Large

14. Guarding of machinery

	Type of machinery	Yes	No	NA
1.	Small			
2.	Medium			
3.	Large			

15. Machinery operation

		S	NS	NA	Remarks if any
1.	Easiness of operating the machinery				
2.	Easiness to reach controls				
3.	Heights of working surfaces				
4.	Vibration of equipment				
5.	Noise of machinery				
6.	Heat from machinery				
7.	Safety of mobile equipment				
8.	Exposure of body to continues or repeated motions of the equipment				
9.	Use of hand tools ( <i>hard to squeeze, slippery, heavy etc.</i> )				

**Worker safety**

**16. Work Environment**

		S	NS	NA	Remarks if any
1.	Workstation comfortable to perform task (does not require unusual positions/stretching/straining)				
2.	Safety of working surface (not slippery of unnecessarily hard)				
3.	Protruding objects which are prone for accidents (handles/knobs/materials etc)				
4.	Demarcation of areas				

**17. Personal Protective Equipment (PPE)**

		Yes	No	NA
1.	Are PPE available			
2.	If PPE available are they appropriate for the task			
3.	If PPE available are they available in adequate numbers			
4.	If PPE available are they being properly worn			

**18. If PPE are provided, do workers wear PPE?**

	Type of PPE	Yes	No	NA
1.	Ear Plugs			
2.	Face Masks			
3.	Gloves			
4.	Helmets			
5.	Goggles/Eye protectors			
6.	Overalls			
7.	Boots			
8.	Others			

**Training**

**19. Are employees trained in safety procedures?** 1. Yes  2. No  3. NA

**20. If yes; they are trained**

1.	Once in 3 months		
2.	Once in 6 months		
3.	Once a year		
4.	Only at the time of recruitment		
5.	Others		

**21. Are employees given a formal training before assigning to operate machinery?**

1. Yes  2. No  3. NA

**22. Are employees trained in emergency evacuation procedures?**

1. Yes  2. No  3. NA

**23. Are employees exposed to health education programmes?**

1. Yes  2. No  3. NA

**Medical/ Injuries**

**24. If a worker is injured or falls sick during work**

1.	Treated by company doctor at the factory premises		
2.	Treated by a Nurse/Healthcare worker at the factory premises		
3.	Sent to a General Practitioner		
4.	Sent to the government hospital		
5.	Other		

**25. Is a pre employment medical examination done?**

1. Yes  2. No  3. NA

**26. Is periodical medical examination done?**

1. Yes  2. No  3. NA

**27. If “yes”; how often**

1.	Once in 6 months		
2.	Once a year		
3.	Once in two years		

**28. If a worker is injured, is it notified to the Factory Inspecting Engineer (FIE) by the management?**

1. Yes  2. No  3. NA

**29. If yes; how many notifications were made during the past year?**   
(verify with records)

**30. Work conditions**

		Yes	No	NA	Remarks if any
1.	Work performed in shifts				
2.	Is hours of work reasonable				
3.	Is adequate rest period given/taken				
4.	Is extended period of heavy work required				

**31. If shift worker, duration of shift**

	Duration	Remarks on off period
1.	8 hours	
2.	9- 12 hours	
3.	13 -18 hours	
4.	19 - 24 hours	

**Hazardous exposure**

**32. Is there *segregation* of workers who are exposed to hazardous activities/ substances?**

1. Yes     2. No     3. NA

**33. Are workers exposed to hazardous activities/ substances *rotated* to minimize exposure duration?**

1. Yes     2. No     3. NA

**34. Are workers exposed to hazardous activities/ substances monitored periodically?**

1. Yes     2. No     3. NA

**35. Physical demands**

		Yes	No	NA	Remarks if any
1.	Workers required to work at excessive speed				
2.	Workers are required to carry excessive weight				
3.	Workers are required to use excessive force/strain				
4.	Unusual & uncomfortable working positions required				
5.	Can work be performed adhering to safety rules/procedures				

**36. Mental demands**

		Yes	No	NA	Remarks if any
1.	Lengthy periods of concentration required				
2.	Work pace is too fast				
3.	Social interactions possible				
4.	Targets cause mental stress				
5.	Satisfactory labour – Management relationship				

**37. Waste disposal**

	Method	Yes	No	NA	Remarks if any
1.	Stored in premises & Removed by local authorities				
2.	Liquid waste discharged to environment without treatment				
3.	Solid waste discharged to environment				
4.	Smoke released to the atmosphere in a hazardous way				
5.	Others				

**38. Welfare and Sanitation**

		S	NS	NA	Remarks if any
1.	Toilets				
2.	Safe drinking water at premises				
3.	Meal rooms				
4.	Changing rooms				
5.	First Aid Facilities				
6.	Trained First Aid workers on site				

**39. Waste Disposal**

		S	NS	NA	Remarks if any
1.	Solid waste				
2.	Liquid waste				
3.	Gas, smoke, fumes				

**40. Reporting of accidents and Occupational Diseases**

*(Reporting of Accidents/Diseases that should be reported -During past 6 months)*

	Type of accidents/ Occupational disease	Total No.	Number Reported	Number Not Reported	Remarks if any

**Remarks/Observations**

**Name & Signature of PHI**

**Things to observe during a walk through survey**

**1. The worker**

1. How many workers are there?
2. What is the age distribution of the workforce?
3. What is the turnover rate?
4. What educational background do the workers have?
5. What is the physical condition of the workforce?
6. What medical problems are common in the workforce?
7. What psychosocial resources are available to workers in the workplace?
8. What psychosocial resources are available to workers in the community?

**2. The task**

1. Is work performed in shifts?
2. Are hours of work reasonable?
3. Are adequate rest periods provided and used?
4. How much overtime is worked? Is it required?
5. Are tasks rigidly paced?
6. Are changes in work procedures explained to workers?
7. Are extended periods of heavy work required?
8. Is there any visual strain?

***Physical demands***

1. How much lifting, pulling, pushing is required?
2. What is the frequency of the physical task?
3. What are the locations of the physical actions?
4. Are unusual or uncomfortable working positions required?
5. Are workers required or induced to work at excessive speeds?
6. Can work be performed while following all safety rules?
7. Are workers thoroughly trained?
8. Is work done sitting, standing, or walking or is there a combination of positions?

***Mental demands***

1. Are directions easy to follow?
2. Are frequent decisions necessary?
3. Are lengthy periods of concentration required?
4. Are there rest periods?
5. Is the work pace too fast?
6. Does the job create boredom?
7. Are social interactions possible?
8. How are labor management relations?



### **3. The environment**

1. Is adequate space for working available?
2. Is the workstation comfortable to use or does it require unusual positions, straining, or stretching?
3. Is a clear path provided for emergency escape and are exits well marked?
4. Are working surfaces slippery or unnecessarily hard?
5. Are there protruding objects that can cause accidents (handles, knobs, materials, etc.)?
6. Is the work space safe from materials handling equipment, such as trucks and cranes?
7. Is the work space located in an unnecessarily hot, cold, drafty, noisy, or contaminated area?
8. Is the temperature comfortable?
9. Is the relative humidity comfortable?
10. Is there adequate general ventilation?
11. Are all ventilation, heating, and cooling devices working properly?
12. Is the lighting appropriate for the work?
13. Is the housekeeping effective?

### **4. The equipment**

1. Is equipment or machinery difficult to operate?
2. Are controls hard to reach?
3. Does movement of controls require excessive effort?
4. Can controls be moved without placing hands, wrists, arms, or body in unusual positions?
5. Are controls on materials handling equipment compatible with operator characteristics?
6. Are gauges and instruments easy to read and understand?
7. Are the characteristics of hand controls compatible with the forces required to operate them (shape, size, surface), and are forces acceptable?
8. Are emergency shut-offs accessible from locations where an operator might get caught?
9. Are lockouts provided and are they foolproof?
10. Are the functions of all controls labeled or readily apparent?
11. Are chairs or stools comfortable?
12. Are they adjustable for proper height?
13. Are appropriate backrests provided?
14. Is there adequate space for legs and feet?
15. Are working surfaces of the proper height so as not to cause unnecessary reaching, bending, stretching, etc.?
16. Do working surfaces cause glare?
17. Are all guards and safety devices in use and in good working condition?
18. Do they interfere with operation or maintenance in any way?
19. Does equipment vibrate or cause excessive noise?
20. Is mobile equipment stable?
21. Does material handling equipment allow unobstructed vision in all necessary directions?
22. Are any parts of the body exposed to continuous or repeated motions of equipment?

***Hand tools***

1. Are tools easy to hold?
2. Are tools too heavy?
3. Are there sharp edges?
4. Are there pinch points?
5. Is use of tool difficult (e.g., hard to squeeze, twist, slippery, etc.)?
6. Does tool vibrate?
7. Are power tools noisy?
8. Does use require unusual or uncomfortable hand, wrist, arm, shoulder, or body position?
9. Are tools maintained properly?
10. Is there a selection of tools?

***Personal Protective Equipment (PPE)***

1. Is personal protective equipment provided?
2. Is personal protective equipment adequate, comfortable, and effective?
3. Are personal protective devices required?
4. Are devices selected or fitted properly?
5. Are they comfortable or are they causing added irritation?
6. Are they properly maintained?
7. Do protective devices obscure vision or create other hazards themselves?
8. Do protective devices produce false sense of confidence?
9. Has the worker been trained on use of PPE?
10. Is there good compliance with PPE use?