

OCCUPATIONAL HYGIENE IN CONSTRUCTION WORK





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INTRODUCTION

The Occupational Health and Safety Act, 1993 (Act no 85 of 1993) requires employers to provide a healthy, and safe working environment that is free from hazards.

Construction is one of the most dangerous occupations in the world, incurring more occupational fatalities than any other sector.

For this reason the construction sector has been identified as one of the high-risk sectors in the country by the Department of Labour and in order to reduce injury and disease in the construction sector a Health and Safety accord has been signed between Government, organised business and organised Labour organisations.

DEFINITIONS

Construction work means any work in connection with:

- The construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure
- The construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work.

Construction site means a work place where construction work is being performed.

Construction contractor means an employer who performs construction work.



PURPOSE OF THE BOOKLET

The purpose of this booklet is to:

- make employers and employees aware of occupational health and hygiene stressors
- Raise awareness about occupational hygiene stressors and disease
- Identify hazards
- Assess risks
- Control exposure
- To assist employers and employees to identify, assess and control their working environment.

This booklet must be used in conjunction with other booklets published by the Department as well as relevant legislation. It should be noted that this is just a guidance book and the requirement of the Occupational Health and Safety Act, 1993 still apply and employers must still comply with the requirement of the legislation.

OCCUPATIONAL HYGIENE STRESSORS

During construction work employees can be exposed to the following stressors/hazards and excessive exposure to these stressors may result in acute injury, chronic illness, permanent disability or even death.

Type of occupational hygiene stressor	Type of exposure
Chemical	Dust (e.g. Asbestos /Silica/Hazardous Chemical substances') Fumes (welding fumes) Smoke Mists (e.g. spray painting) Gases
Physical	Illumination (Poor/excessive lighting) Noise Vibration Temperature Radiation
Ergonomics	Heavy lifting Un-natural posture Repetitive motion
Psychological	Shift work, bullying and distance from family and work stress
Biological	Poor hygiene and snake bites



CHEMICAL STRESSORS IN THE CONSTRUCTION SECTOR

DUST/ASBESTOS/SILICA

Asbestos is the name given to a group of naturally occurring minerals used in certain products, such as building materials and vehicle brakes, to resist heat and corrosion.

Definitions

Asbestos work means work that exposes or is likely to expose any person to asbestos dust.

Registered asbestos contractor means a mandatory or employer conducting asbestos removal work, who is registered with the Chief Inspector.

Asbestos work must be carried out by a Registered Asbestos Contractor (criteria to register as an Asbestos Contractor is available from the Department) and during asbestos removal, Approved Inspection Authority (list of AIAs is also available) must be appointed to monitor the release of fibres in the air.

Often wet methods are employed when removing asbestos containing building material to reduce the release of hazardous fibres. Asbestos waste must be safely removed and disposed of.

Building material containing Asbestos includes: cement, insulation boards, tile, pipe sand lagging, roof sheeting, ceiling boards and ducts.

Cement dust

Cement dust occurs commonly in the cement production and construction industry. Cement dust can be very harmful if inhaled or swallowed. The cement dust will harden when exposed to the moisture in the body. Cement dust causes lung function impairment, chronic obstructive lung disease, restrictive lung disease, pneumoconiosis and carcinoma of the lungs, stomach and colon.



Hazardous chemical substance

Workers may be exposed to harmful chemical substances and when exposed they may become ill or are likely to die due to exposure to these harmful chemicals. According to the Regulation for the Hazardous Chemical Substances (1995), HCS means any toxic, harmful, corrosive, irritant or asphyxia substance or a mixture for which an Occupational Exposure Level is prescribed or is not prescribed but create a hazard to health.

Effect of exposure to chemicals may include chemical burns, asthma, allergies, irritant contact dermatitis, allergic contact dermatitis, skin infection, skin cancer, asphyxiant, reproductive problems and even death.



Welding fumes and gases

Welding fume exposure in the workplace is a serious occupational hazard. All welding processes produce these the fumes, but the most fumes are produced during arc welding.

The contents of the welding fumes depend on the components of the base metal, coatings and/or filler materials and the temperatures used in the welding process. Types of metals commonly found in welding fumes include aluminum, beryllium, cadmium oxides, chromium, copper, fluorides, iron oxide, lead, manganese, molybdenum, nickel, vanadium and zinc oxides.

Welding fumes also produce gases, which can contain carbon monoxide, fluorine, hydrogen fluoride, nitrogen oxide and ozone. Inhalation of these fumes can be very hazardous to a workers health, even more so if the worker is a smoker.



Effect of welding fumes and gases includes hoarseness, sore throat, eye irritation and metal fume fever and the long-term effects includes bronchitis, cancer and may cause damage to the central nervous system.

Spray-painting/mists

Employees can be exposed to highly volatile and toxic materials during spray-painting. Spray-painting is the process where a liquid coating substance, usually paint, is changed into a mist or aerosol, in order to apply a coating onto an object or surface. Hazards associated with spray-painting involve exposure to hazardous substances through either inhaling of vapours, injection of paint or skin contact, fire and explosion, electricity, plant and noise.



Short-term health effects that spray painting can cause are irritation contact dermatitis, burns to the skin and eyes, vomiting and diarrhea, irritation to the nose, throat and lungs, headaches, dizziness, nausea and fatigue.

Long-term health effect that can result from spray-painting are occupational asthma, allergic contact dermatitis, lung cancer, 'painter's syndrome' which is prolonged inhalation of paints and solvents resulting in brain damage, damage to the reproductive system and kidney or liver damage.



Physical stressors in the construction sector

Illumination

The Environmental regulations for workplaces require an employer to ensure that the workplace be lighted. This can be achieved by using the illuminance values specified schedule. Health effects of exposed to excessive or poor lighting include eye discomfort, eye strain, eye irritation, blurred vision, dry burning eyes and headache. poor sight leading to accidents.

Here are some of the examples of lux level

Location/Industry	Place or type of activity	Illuminance (lux)
Ablutions	Wash-room, toilets and changing rooms	100 (at floor level)
Building and construction	Industrialised building plants	200
	Concrete shop	150w
	General working areas	20
	Walkways and access	5 (at floor level)
Paint shops and spraying booths	Rubbing, dipping, ordinary painting, spraying and finishing	200
	Fine painting, spraying and finishing	300
	Retouching and matching	500

Noise

Noise is commonly agreed to be unwanted sound. Sound can be considered unwanted due to reasons of volume, type of noise, the time of day, or any factor making sound unpleasant or annoying. Noise is one of the mostly highly present physical stressor in the construction sectors. Types of noise sources in the construction sector include:

- Construction and demolition process
- Building operation
- From use of heavy machinery and tools e.g. excavators, roller, concrete drills, concrete grinders and concrete vibrators (jag hammer).



The Noise-Induced Hearing Loss Regulation strictly stipulates that no employer or self-employed person shall permit any person to enter any workplace where a person might be exposed to noise at or above 85 dB noise-rating limit.

Effects of noise exposure to human health include tinnitus, annoyance, and hypertension, sleeping disorder, hearing impairment and hearing loss.

Vibration

Vibrations enter the body from the organ in contact with vibrating equipment, when an employee operates handheld equipment such as chainsaw or jackhammer; vibration affects hands and arms. Such exposure is called handheld vibration exposure. When an employee sits or stands on a vibrating floor or seat the vibration affects almost the entire body and thus is called whole body vibration exposure.

Temperature

Both very cold and very hot temperatures could be dangerous to your health. Excessive exposure to heat is referred to as heat stress and excessive exposure to cold is referred to as cold stress.

The most serious concern in a very hot environment is heat stroke and can be fatal if it does not get medical attention. Heat exhaustion and fainting (syncope) are less serious types of illnesses which are not fatal but interfere with a person's ability to work.

When employees are exposed to very cold temperatures, the concern to health is hypothermia or dangerous overcooling of the body. Another serious effect of cold exposure is frostbite or freezing of the exposed extremities such as fingers, toes, nose and ear lobes. Hypothermia could be fatal in absence of immediate medical attention.



Radiation (ultraviolet rays)

Construction workers or outdoor workers can be exposed to too much (ultraviolet) radiation in the sunlight that can be harmful to the skin. Construction workers have a higher risk of skin cancer than many other workers due to long periods exposed to UV radiation from direct sunlight and UV rays reflected from nearby surfaces such as concrete.

Short-term exposure can cause reddening of the skin or sunburn can blister the skin. Long-term exposure can increase the chance of developing skin cancer.

Ergonomics

Employees in the construction site can be exposed to ergonomic risk factors such as lifting heavy items, bending, reaching overhead, pushing and pulling heavy loads, working in a awkward body posture and performing the same task repetitively. When employees are exposed they can develop muscular skeletal disorders (MSDs). MSDs affect the muscles, nerves and tendons and can cause temporary or permanent disability.

Neck pain, back pain (upper extremities and lower back) are some of the work-related MSD's. Employers can do a risk assessment and come up with programmes to reduce such risks.

Pshychological stressors

Work-related stress can be an occupational health issue for the construction sector. Working long hours, having too much work to do at the same time, being bullied at work, family problems and distance from family are some of the factors that can cause stress. Employers can establish employee health and wellness programmes to assist employees.



Biological stressors

Employees at the construction site may be exposed to vector-borne disease, micro-organisms, venomous wildlife, insects and poisonous plants during construction work (mostly during construction site establishment). Examples include poison ivy, scorpions and spider bites, mosquitoes and snakes. Poor hygiene can also be a contributing factor to spreading disease.

Construction site hygiene encourages good housekeeping, provides workers with clean drinking water, sanitary restroom and washing facilities.



The Regulation for Hazardous biology Agents (20010) prescribe methods to handle hazardous biology agents safely.

What is a health risk assessment

A human health risk assessment is the procedure to evaluate the nature and probability of adverse health effects in humans who may be exposed to environmental stressors.

To explain this better, a human health risk assessment addresses questions such as:

- What types of health problems may be caused by environmental stressors?
- What is the chance that people will experience health problems when exposed to different levels of environmental stressors?
- Is there a level below which some chemicals don't pose a human health risk?
- What environmental stressors are people exposed to and at what levels and for how long?
- Are some people more likely to be susceptible to environmental stressors because of factors such as age, genetics, pre-existing health conditions, ethnic practices, gender, etc.?
- Are some people more likely to be exposed to environmental stressors because of factors such as where they work, where they play, what they like to eat, etc.?

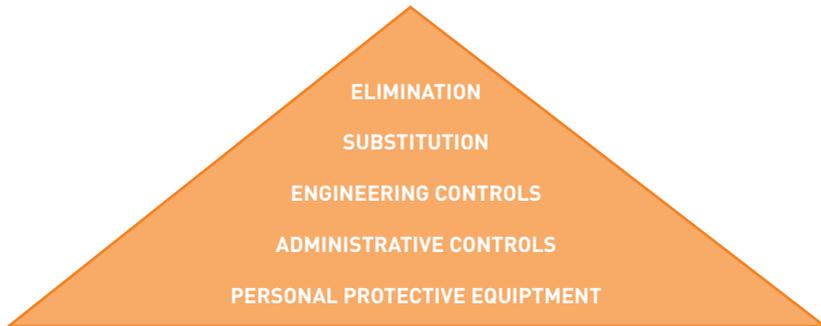
Monitoring of occupational environmental stressors

Occupational hygiene monitoring is a process of evaluating and documenting potential exposures to environmental stressors. Only Approved Inspection Authority (AIA) can monitor environmental stressors in the workplace. AIA's are approved by the Chief Inspector of the Department of Labour.



HEIRACHY OF CONTROL FOR ENVIRONMENTAL STRESSORS

The Occupational Health and Safety Act (1993) clearly specify that employers must provide a working environment that is safe and free from hazards/danger. If the hazards cannot be removed the employer must have control measures in place to prevent employees from exposure to hazards/danger.



Option 1: Hierarchy of control	Option 2: Different approach to control
(Elimination) - can be by substitution of chemicals used or automation	Selection of workers by doing the pre-employment examination, interview, psychological testing and pre-placement medical examination
(Engineering control) - by isolating the process (noise zones), screening (welding zones) or by introducing wet spray method in a dusty environment (dusty environment)	Induction of employees on legislative requirement (OHSACT): good housekeeping policy and procedure, personal hygiene, signs and symptoms of excessive exposure to substances and educational programmes
(Administrative control) - by demarcation, good housekeeping and training. Control access, safe working procedure and reduce number of exposed employees	Control at source by eliminating the problem by automation or substitution, or change process
(Personal protective equipment) - using masks, goggles or hearing protectors etc.	Control along the path: Partition or screening, and insulation
	Control at worker: limiting time of exposure, issuing personal protecting equipment
	Improve work environment.

WHO SHOULD BE INVOLVED IN HEALTH AND SAFETY ISSUES IN THE WORKPLACE?

Occupational health and safety is a team effort, it requires constant inter-action between employer, employee and Government.

Duties of the employer

- Provide and maintain a safe system of work
- Identify hazards and evaluate risks
- Take steps to eliminate or mitigate all hazards before resorting to PPE
- Provide information, training and supervision
- Provide means to apply safety measures
- Do not permit employees to work unsafely
- Enforce health and safety measures at work
- Ensure that every person on the premises knows the Act
- Ensure that supervisor have work-related safety training
- Empower supervisors with authority.



Duties of employees

- Take reasonable care of their own health and safety and of other who may be affected by their acts or omission
- Cooperate with the employers to enable him/her to comply with the Act
- Carry out ant lawful order, and obey the health and safety rules
- Report any unsafe situation to the employer or to the health and safety representative.



Functions of an inspector

- Enter any workplace without notice to conduct an inspection
- Conduct incident investigations and interview employees
- Conduct information session with employees, employers or Organised Labour
- Attend and solve dispute or complains between employers and employees
- Issue out improvement or, contravention notice
- Prohibit dangerous work environment or activities.

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