PRIA

INTERNATIONAL ACADEMY

Initiative in Education & Lifelong Learning

Certificate Programme

Occupational Health and Safety: Legal and Operational Guide

Unit 1

Introduction to Occupational Health and Safety

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Units of Certificate in Occupational Health and Safety

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Introduction

Occupational health and safety is a discipline with a broad scope involving many specialised fields. It encompasses the social, mental and physical well-being of workers - that is the health of the "whole person". This unit aims at providing students with general background information on OHS, and on the magnitude and variety of health and safety problems worldwide. It would help learners develop an understanding of the ergonomic, physical, chemical, biological, psychological and social determinants of occupational health and safety.

Occupational health and safety is the discipline concerned with preserving and protecting human resources in the workplace.

As per the definition adopted by the Joint ILO/WHO Committee on Occupational Health (1950), occupational health is the adaptation of work to human beings and each being to her/his job. Occupational health comprises the following components:

- Promotion and maintenance of the highest degree of physical, mental and social well being of workers in all occupations
- Prevention of deterioration in workers' health caused by hazardous working conditions
- Protection of workers in their employment from risks resulting from factors adverse to health
- Placement and maintenance of a worker in an occupational environment adapted to her/his physiological and psychological equipment

Learning Objectives

After completing this unit, you should be familiar with the following concepts and issues:

- Key principles and aim of occupational health and safety (OHS) programmes
- Occupational health scenario in India
- Different types of occupational hazards
- Science of ergonomics and its relevance to occupational health

1.1 Historical and Legal Context of OHS

The origins of occupational health and safety concerns can be traced back to the Industrial Revolution (late 18th to 19th century), which was marked by innovations like cotton spinning and textiles, steam engines, iron founding etc. This resulted in the emergence of cotton mills, semi-automated factories and iron industries, which became the 'leading sectors', and which established the base for the Industrial Revolution. Although the Industrial Revolution contributed to economic development, it had a negative impact on the health and safety of the workers working in these factories and industries. Men and women workers were exposed to harmful gases, toxins, acids, extreme hot and cold temperatures, as well as light and sound that had a harmful impact on their physical, social, and psychological health. The injuries, diseases and health hazards faced by workers as a result of the Industrial Revolution drew the interest of scholars and leading thinkers of that period, who felt that issues of industrial health and hygiene must be addressed.

Note Bank:

What is Occupational Health?

Occupational health deals with all aspects of health and safety in the workplace and has a strong focus on primary prevention of hazards. The health of the workers have several determinants, including risk factors at the workplace leading to cancers, accidents, musculoskeletal diseases, respiratory diseases, hearing loss, circulatory diseases, stress related disorders, communicable diseases and others.

(World Health Organisation, 2014)

Alice Hamilton, an American toxicologist, physician and educator studied the impact of industrial metals and chemical compounds on human beings. She became a pioneer in industrial diseases and hygiene and contributed immensely to the discipline through her publications, which included issues such as Industrial Poisoning, Industrial Toxicology, and Exploring the Dangerous Trades (Answers, 2014).

Occupational health and safety is a cross-disciplinary area and it interacts with other disciplines such as occupational medicine, occupational or industrial hygiene, public health, safety engineering, ergonomics, toxicology, epidemiology, health physics, environmental health, industrial relations, public policy, industrial sociology, medical sociology, social law, labour law, and occupation health psychology. Although the urgency to address the occupational (industrial) health and safety issues emerged during the Industrial Revolution, it becomes much more crucial to address the issue at present, given the tremendous expansion of cities across the world, further resulting in wide spread industrialisation and growth of population. Issues of health, hygiene and hazard control are essential and have to be dealt with by state governments and other bodies responsible for ensuring the safety and well-being of all workers, by ensuring that there are health and safety policies and systems in every workplace and that these are implemented in the best possible manner.

Occupational health has therefore gradually developed from a mono-disciplinary risk-oriented activity, to a multidisciplinary and comprehensive approach that considers an individual's physical, mental and social well-being, and general health and personal development. Across the world, acts, legislations, and policies were created with the objective of ensuring good health and safe work environments for all workers. Every country has its own act and policy on OHS.

In United States of America, the Occupational Health and Safety Act of 1970, was an effort to protect workers from the dangers they faced in the workplace. The Act for the very first time established a nationwide federal programme to protect the workers from occupational illness, injury and death. The main objective of the Act was to ensure that employers provide employees a work environment that is free from hazards such as exposure to toxic chemicals, mechanical dangers, heat or cold stress, unhygienic conditions etc.

The Act created the National Institute for Occupational Safety and Health (NIOSH[1]) and the Occupational Safety and Health Administration (OSHA[2]).

In Canada, workers are covered under the provincial or federal labour codes depending on the sector in which they work. The Canadian Centre for Occupational Health and Safety (CCOHS), which is an agency of the Government of Canada, was created by an Act of Parliament in 1978. The CCOHS has been delegated to promote safe and healthy workplaces. The CCOHS is a non-for-profit federal department corporation and upholds the vision of "the elimination of work-related illnesses and injuries" and believes that "all Canadians have a fundamental right to a safe and healthy working environment" (Canadian Centre For Occupational Health and Safety , 2013).

In Malaysia, the Department of Occupational Health and Safety (DOSH) under the Ministry of Labour ensures that the safety, health, and the welfare of workers in the private as well the public sector is taken care of. It is responsible for enforcing the Factory and Machinery Act 1969 and the Occupational Health and Safety Act of 1994. The DOSH undertakes research and analysis on issues of occupational health and safety. It carries out promotional programmes for employers, workers and the general public. The Department also has its own *Health and Safety Policy* that aims to provide a safe and healthy work environment to all employees. The department is engaged in reviewing safety reports, and emergency action plans. It also conducts audits on hazardous and non-hazardous equipment and monitors health hazards at worksites (Ministry of Human Resources, Malaysia, 2014).

[1] *The NIOSH in the United States is the federal agency responsible for undertaking research and making recommendations for the prevention of work related injuries and illness.*

[2] *The OSHA is an agency of the United States Department of Labour and its aim is to prevent occupational health hazards by enforcing workplace health and safety standards and also by educating workers about their rights.*

1.2 Fundamental Objectives and Principles of Occupational Health and Safety

1.2.1 Objectives of Occupational Health and Safety

The prime objective of OHS at a global level is to ensure that health and safety is accessible to every worker employed in any sector across the economy. The World Health Organisation (WHO) since its inception has included elements of occupational health in its policy. The need to protect the worker from occupational health hazards and promote safety of all at the workplace has been emphasised in key documents of WHO, including the Constitution of the WHO, Declarations of Alma Ata Declaration, Global Strategy on Occupational Health for All, WHO General Programmes of Work and several resolutions of the World Health Assembly.

As a result of the changing work-life trends and the growing demand for higher productivity from the worker, there is an urgent need to address issues of OHS at the workplace for each worker. Based on this vision, the Network of WHO Collaborating Centres in Occupational Health, comprising of 52 research and expert institutions from 35 countries, met twice to discuss the need for a new Global Strategy in Occupational Health. The proposed strategy aims to set the standards for addressing the upcoming health and safety needs within the workplace. It also aims to address the differing conditions within the workplace, as well as the OHS requirement within countries that are in different stages of development.

According to the document, *Global Strategy on Occupational Health for All*, the ten high priority objectives proposed by the strategy are as follows:

- Strengthening of international and national policies for health at work and developing the necessary policy tools

- Development of healthy work environment
- Development of healthy work practices and promotion of health at work
- Strengthening of OHS
- Establishing of support services for occupational health
- Development of occupational health standards based on scientific risk assessment
- Development of human resources for occupational health
- Establishment of registration and data systems, development of information services for experts, effective transmission of data and raising public awareness through public information
- Strengthening of research
- Development of collaboration in occupational health and with other activitiesand services (World Health Organisation, 1995).

According to the *Global Strategy on Occupational Health for All* document the objectives stated above stress upon the significance of “primary prevention” and encourage countries (receiving support from WHO), to devise national policies and programmes for occupational health with required infrastructure and resources for occupational health. The importance of devising national policies further lays

emphasis on the role of the government (World Health Organisation, 1995).

The document therefore lays emphasis on creating policies, structures, systems and activities for addressing OHS needs at the workplace. It highlights the need for adequate support services and human resources for implementing the new strategy. Importance is laid on collaboration within the WHO, which is between the International Organisations and NGOs and the various disciplines associated with occupational health issues at national and at local levels.

1.2.2 Principles of Occupational Health and Safety

Occupational health and safety is a multi-disciplinary field, covering issues related to law, medicine, technology, economics and industry specific concerns. The core occupational health and safety principles put forth by the ILO are as follows:

- *All workers have rights*. Workers, as well as employers and government, must ensure that these rights are protected and foster decent conditions of labour. As the International Labour Conference stated in 1984:
    - Work should take place in a safe healthy environment
    - Conditions of work should be consistent with workers' well-being and human dignity
    - Work should offer real possibilities for personal achievement, self-fulfilment and service society[1].

- *Occupational health and safety policies must be established.* Such policies must be implemented at both the governmental and enterprise levels. They must be effectively communicated to all parties concerned.

- *There is a need for consultation with the social partners (that is, employers and workers) and other stakeholders.* This should be done during the formulation, implementation and review of such policies.

- *Prevention and protection must be the aim of occupational health and safety programmes and policies.* Efforts must be focused on primary prevention at the workplace level. Workplaces and working environment should be planned and designed to be safe and healthy.

- *Information is vital for the development and implementation of effective programmes and policies.* The collection and dissemination of accurate information on hazards and hazardous materials, surveillance of workplaces, monitoring of compliance with policies and good practices, and other related activities are central to the establishment and the enforcement of effective policies.

- *Health promotion is a central element of occupational health practice.* Efforts must be made to enhance workers' physical, mental and social well- being.

- *Occupational health services covering all workers should be established.* Ideally all workers in all categories of economic activity should have access to such services, which aim to protect and promote workers' health and improve working conditions.

[1] Conclusions concerning Future Action in the Field of Working Conditions and Environment, adopted by 70th Session of the international Labour Conference on 26 June 1984, section I, paragraph 2.

- *Compensation, rehabilitation and curative services must be made available to workers who suffer occupational injuries, accidents and work related diseases.* Action must be taken to minimise the consequences of occupational hazards.

- *Education and training are vital components of safe, healthy working environments.* Workers and employers must be made aware of the importance and the means of establishing safe working procedures. Trainers must be trained in areas of special relevance to different industries, which have specific OHS concerns.

- *Workers, employers and competent authorities have certain responsibilities, duties and obligations.* For example, workers must follow established safety procedures; employers must provide safe workplaces and ensure access to first aid; and the competent authorities must devise, communicate and periodically review and update occupational health and safety policies.

- *Policies must be enforced.* A system of inspection must be in place to secure compliance with occupational health and safety and other labour legislation (Alli, 2001, pp17-19).

Implementation of such principles requires appropriate legal provisions, administrative enforcement and service systems for occupational safety and health and occupational health services.

1.3. Workplace and Health

Work is an important component of an individual's daily life. A major proportion of an individual's life is spent at the 'workplace', where she/he is expected to display their commitment and sincerity in performing various tasks. In contemporary times, workplaces demand a high degree of expertise and competency from its workers in every task they perform. This means that a worker's time and quality of work both play key roles in determining their performance and in ensuring the output produced. Therefore, the question that needs to be asked is whether workplaces are only emphasising the 'performance of tasks' and on the 'output produced'? What about the individual? Has any concern been shown towards protecting or restoring the well-being of the worker? This would mean addressing concerns like a worker's health, safety measures within the workplace, a pleasant and secure working environment, policies or systems contributing to an employee's physical, social and psychological well-being. Thus, approaching the workplace or an occupation from the perspective of health and safety is a crucial requirement and is the very basis of OHS.

Work receives considerable attention due to its social and economic importance. The primary function of work in any society is to produce and distribute goods and services. Not enough attention is paid to the importance that work has for the individual. However, studies have shown that work plays a crucial and unparalleled psychological role in developing self-esteem and a sense of work. Work for which there is no economic reward is also satisfying and personally gratifying. This refers to work such as childcare, care for the sick and aged, household-work, voluntary work etc.

An individual's work environment is very crucial. The work environment can have a positive or negative impact on the individual. If the environment within the workplace is healthy and secure, which means that if the workplace has sufficient structures

and systems that addresses the well-being of the worker, then the worker will be able to perform better and her/his productivity levels will be very high. In other words, the environment of the workplace has an impact on the individual's socio-psychological health, which has an impact on the overall output.

Work Environment ⟶	Individual ⟶	Workplace
(Healthy and safe)	(Physical, social and psychological well-being)	(Higher productivity)

When we say safe and secure work environment, we are not only referring to the availability of safe and hazard free equipment or tools within the workplace, but also aspects such as human relations within the workplace, which have a direct impact on the physical and psychological health of the individual. For example:

- How do the men behave with the women at the workplace?
- How is the behaviour of an employer towards his or her employee?
- Does any employee face various forms of harassment such as sexual harassment, bullying from a fellow staff member or a senior, which makes her/him insecure and reduces their productivity, further resulting in illness and health problems?
- Does the workplace have policies such as a health and safety policy, prevention of sexual harassment policy and other such policies, which ensure that everyone working in the work place is secure and is free from stress?

These are questions that every workplace should be finding solutions to and addressing.

The role of the Governing Board or the management of an organisation holds importance, as they are the key people responsible for framing systems and policies within the workplace and implementing them. If the senior management, the Human Resource Department and team leaders or coordinators work towards ensuring a conducive work environment, which is healthy and safe for all workers, then the organisation as a whole will benefit. Particular emphasis should be given to women and there should be enough mechanisms in all workplaces to ensure that their health and safety requirements are addressed, as they are the most vulnerable. In factories, construction work, mines, railway stations, power-plants, jewellery making, weaving factories etc., workers work in the midst of dust, extreme temperatures, strong light and loud sounds and they may face numerous physical, biological, chemical health hazards. Pregnant women working in factories with bad lighting or for longer working hours are prone to danger. Thus every workplace must strive towards ensuring the well-being of all its employees irrespective of their sex, class, caste and ethnic identities.

Occupational health and safety issues are relevant in the present period. The concept of establishing safe and healthy workplaces is acquiring importance across the world. Workplaces both formal and informal, must introduce preventive measures in the workplace to reduce the number of accidents or health hazards at the workplace. The key concepts associated with OHS are “health promotion” and “well-being” of the individual.

The ILO states that health promotion and well-being at work programmes focus on the promotion of workers and their families’ health through preventive programmes in a number of areas. These are drug and alcohol abuse, HIV/AIDS, workplace stress, violence at work and the promotion of tobacco free workplaces. The approach adopted by ILO is the social dialogue approach, resulting in the implementation of initiatives by the workplace and community. The ILO engages in dialogue with workers, employers, government, NGOs and undertakes steps towards promoting the good health and safety of all workers and secure work environments.

Think Tank:

Try This Out!

Name one government organisation in each of the following countries that addresses occupational health and safety issues.

Canada

South Korea

US

Australia

Israel

India

The definition of a healthy workplace extended by WHO is “A healthy workplace is one in which workers and managers collaborate to use a continual improvement process and promote the health, safety and well-being of all workers and the sustainability of the workplace by considering the following based on identified needs

- Healthy and safety concerns in the physical work environment;
- Health, safety and well-being concerns in psychosocial work environment including personal health resources in the workplace.
- Ways of participating in the community to improve the health of all the workers, their families and other members of the community”

(Pan American Health Organisation; WHO, 2010, p.9)

1.3.1 Interaction between Work and Health

The social and economic importance of work receives considerable attention, because a primary function of work in any society is to produce and distribute goods and services. Far less attention is paid to the importance of work to the individual, yet it is clear from recent research that work plays a crucial and unparalleled psychological role in the formation of self-esteem and a sense of order. It is believed that work for which there is no economic gain, such as childcare, care for the aged and voluntary work, also has its rewards and contributes to personal gratification.

There is a continuous two-way interaction between a person and the physical and psychological working environment; the work environment may influence the person's health either positively or negatively and productivity is in turn, influenced by the worker's state of physical and well-being.

Work when it is well adjusted and productive can be an important factor in health promotion, e.g. partially disabled workers may be rehabilitated by undertaking tasks suited to their physical and mental limitations and in this way, may substantially increase their working capacity.

However, the fact that work can have a positive influence on health has not yet been fully exploited; knowledge of work physiology and ergonomics needs to be further developed and applied to benefit worker's health. The converse may also be true, poor working conditions of any type have the potential to affect a worker's health and safety. When work is associated with health hazards, it may cause occupational disease; it may be one of the multiple causes of other disease or may aggravate existing ill health of non-occupational origin.

Note Bank: Women and Work

"In addition to their domestic responsibilities of childbearing, child rearing, and family care, women in the developing world have worked in the agricultural and informal sectors for millennia. However, because their work is usually not valued monetarily in these sectors, it is often discounted and rendered invisible. In the formal sector as well, gender inequalities are commonplace in such areas as limited job opportunities, limited tracks for promotion and leadership responsibilities, and discrimination based on work hazards. Women's work, particularly in the developing world, is not adequately protected by national policies and is generally restricted by traditional social norms and such misperceptions that women's work is less significant, is merely supplementary, or is unskilled. Hence, there is an urgency to "examine the *wider* impact of women's different productive and reproductive roles on their occupational health."(Loewenson 1999, p39) Again, this challenge to occupational health transcends the boundaries of the workplace and requires a multidisciplinary approach in which occupational health researchers' partner with other social scientists and advocates."

(Nuwayhid 2004, p1919)

1.4 Occupational Health and Safety in Developing Countries

Health and safety innovations in the workplace, with low-cost and locally relevant solutions, have been initiated in several developing countries. However, occupational health remains neglected in most developing countries under the pressure of overwhelming social, economic, and political challenges.

In developing countries across the world, OHS issues are not being addressed seriously. The American Journal of Public Health puts forth that the current deficiencies related to occupational health in developing nations of the world, such as Bangladesh, Central America, Lebanon, South Africa and Thailand are due to "a lack of government interest in occupational health, poor data and data collection systems, and weak enforcement of health and safety regulations." (Nuwayhid 2004, p1917)

The issue of OHS is an area of concern in developing as well as developed countries of the world. However, in the developing nations the problem is more acute as 'health and safety' is related to issues of poverty, unemployment, discrimination, and ignorance due to the lack of education, which are pertinent issues. In countries like India, the population is growing at a very fast pace and a majority of the people are being pushed to the margins of society. They live in regions within the city where there is little or no basic facility to meet their needs and no avenues for employment. Most of these people come to the city as rural migrants, or displaced people, who take up menial jobs in nearby factories or are engaged in construction work, in disposing off waste, as sweepers and as domestic labour etc. For most of these people the 'workplace' is not a very pleasant, safe or secure environment. Even women and children live and work in the most unhygienic and harmful conditions, which can damage their health.

In developing countries one witnesses stark discrepancies – on one hand there are huge multinational organisations growing at a fast pace, catering to the basic health and safety needs of their employees and also providing them with a pleasant work environment; on the other hand there exists a large percentage of working population, who still work in the most difficult physical conditions. In no way can their working conditions improve nor can they be guaranteed a safe and healthy work environment. These are the large number of people who work on the roads, small and dingy factories, or are employed in the most degrading professions, which does not ensure them a proper or a healthy life.

Another essential issue that needs to be addressed is gender concerns within occupations. Work life poses challenges to women, as they have to deal with dual or multiple responsibilities. A working woman has to handle responsibilities within the workplace, as well as home. Thus it is vital to ensure that women employed in different sectors of the economy are able to work freely and safely, and the workplace also takes full responsibility for their health especially their reproductive health.

Another very important category of labour is child labour. In developing countries across the world, children are forced to start working at a very young age. They are also employed in professions, which can pose serious health hazards and can cause severe disabilities in them. In India, despite the existing legislations the problem of child labour still exists.

1.4.1 The Cycle of Neglect

Current deficiencies of occupational health in the developing world are attributed to a lack of governmental interest in occupational health, poor data and data collection systems, and weak enforcement of health and safety regulations.

The solution to occupational health problems in developing countries therefore, requires not only technological innovation, but also significant institutional and legal developments. They must recognise the leading role of forces fighting for social justice, particularly the role of organised labour, which is instrumental in advancing national occupational health agendas and ratifying international labour laws. Occupational health researchers in developing countries also must be alert to the potentially negative effect of global trade on the health and safety of the poor and marginalised workers.

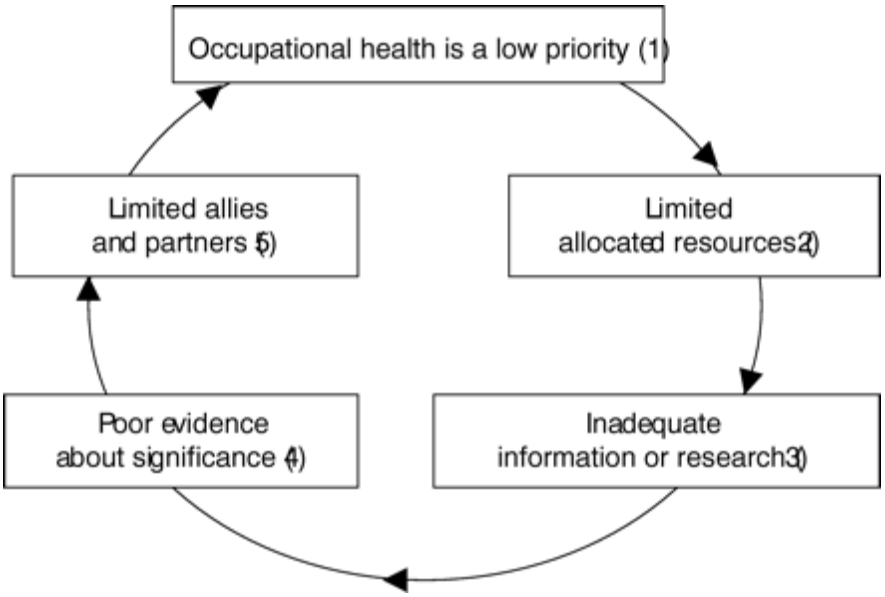

Fig.1 The occupational health "cycle of neglect" in developing countries

Consequently, a different research paradigm is warranted for occupational health research in developing countries. The paradigm should make the most efficient use of existing assets and minimise conflict with practical realities. Specifically, instead of focusing on the workplace as an isolated entity and moving outward to the wider social and political arena as done in industrialised countries, occupational health research in the developing world should focus on social and political issues and then

move inward to address the particularities of the workplace. In other words, the vicious "*cycle of neglect*" (Fig.1) of occupational health in developing countries should be broken at the allies' link (step 5) to build consensus and "fundamental change in the *attitude*" (emphasis added) towards the day-to-day exposure to risk. Occupational health research should be "mainstreamed" as an integral component of public and environmental health research and placed in its broader social and cultural context by addressing issues such as globalisation, the importance of health hazards, women at work, migrant workers, and child labour, in addition to the narrower social and economic burdens of work-related diseases and injuries (Nuwayhid 2004).

1.4.2 Indian Scenario

Health and Safety Concerns across Sectors in India

Agricultural Sector

The total population of India, according to the Census of India 2001, was 1.025 billion; 72 per cent of who live in rural areas. A majority of the employed population in India are employed in the agricultural sector as landowners and agricultural labourers. Although large numbers of men and women in India are employed in the manufacturing and service sector, in comparison to other developing countries of the world, the proportion of workers employed in agriculture in India is higher. Fifty eight per cent of the population in India are employed in the agricultural sector. If this percentage is compared further with the developed economies of Western Europe and America, then the percentage of employed workforce within the agricultural sector is four per cent to 12 per cent (Saiyed 2004)

Employment in millions in different economic sectors and activities in urban and rural areas:

Total Rural Urban	Persons Males and Females	Total Workers	Cultivators	Agricultural Labourers	Household Industry Workers	Other Workers
Total	Persons	403	128	107	16	151
	Males	275	86	57	8	123
	Females	127	41	50	8	28
Rural	Persons	311	125	103	12	71
	Males	199	84	55	6	55
	Females	111	41	48	6	16
Urban	Persons	92	3	4	5	80
	Males	76	2	3	3	69
	Females	16	1	2	2	11

*: Other workers = Mining and quarrying, manufacturing, processing, servicing and repairs, construction, trade and commerce

Source: Saiyed 2004, p.142

Dr Saiyed observes that in India, in addition to the rise in the population from 1991 to 2001, there has also been an increase in the percentage of male and female workers (increase of 28% males and 45% females). There has been an increase of the female workforce in all economic activities. In 1991 the proportion of male: female working population was 78:22 and by 2001 it became 68:32. An increase in the female workforce means that more caution has to be taken from the perspective of occupational health and safety of the worker. In other words, workplaces have to take special care of the reproductive health needs of the women and protecting them from harmful health hazards and exposure to toxins and chemicals. In addition to this, workplaces need to devise concrete ways of addressing issues like sex based discrimination (low wages or salaries, glass ceiling) and sexual harassment at the workplace which may have a serious impact on a women's health. (Saiyed 2004)

Industrial Sector

India has a very poor health and safety record. Much legislation exists to protect the worker's rights and health but they are not implemented properly. Only an elite

section of workers enjoy the benefits of these legislations. Of the total workforce only 8.8 per cent are organised. The workforce is abundant, low skilled and easily available and the high rate of unemployment makes them susceptible to exploitation. For them, getting work is more important than the hazards involved. The ILO estimates that over half the world's occupational accidents occur in the Asia-Pacific region. Occupational accidents are grossly under reported in India. Official figures in 1994 showed 23 injuries per 1,000 factory workers. This compares with four per 1,000 workers in Japan in 1992, and 10 per 1,000 in Singapore. In any case the Factories Act does not cover the vast majority of workers who work in the informal sector. This invalidates government statistics.

The process of industrialisation began in India from the 1850s, but it was only in the post-Independence (1947) era that large scale industrialisation began.

Immediately after Independence, there were 31,000 factories where 2.5 million workers were employed. In the following two decades, the number of factories doubled to 81,000 and as a result of this the number of workers also doubled. By 1981, there were seven million factories, with a total of one lakh workers working in these factories. India now has 2.3 lakh factories and it employs around eight million people.

In India, there are some chemical industries which have been labelled Major Accident Hazards (MAHs). At present there are 1,539 MAH factories in our country, there are 166 chemicals that pose the risk of being MAHs.

Think Tank:

Did you know?

The top five states in India with the major concentration of hazardous industries are:

1. Gujarat
2. Maharashtra
3. Andhra Pradesh
4. Tamil Nadu
5. Rajasthan

The highest rate of accidents occurs in industries like textiles, basic metals and alloys, non-metallic mineral industries, transport equipment and parts, machinery, machine tool parts and electrical machinery. Annually 50,000 to 60,000 accidents occur in the manufacturing sector. The accidents cause injuries to the person and have an adverse impact on him or her. About 1000 people die every year due to accidents. There has been no significant decrease in the rate of injuries and the frequency rate over the years.

Service Sector

The service industry in India is growing at a fast rate. Service industry here refers to services such as:

- Transport, Storage and Communications
- Banking and Insurance
- Real Estate and Dwelling Business
- Trade, Hotels and Restaurants
- Public Administration
- Development
- Defence
- Information Technology
- Entertainment

Each of these services has specific OHS needs, which must be addressed. The service sector must deal with health and safety concerns within the workplace by identifying key areas where preventive measures need to be introduced. Whether the change would be brought about through technological innovation, introduction of new policies or through a change in the institutional systems and structures is for

every sector within the service industry to identify. Once the area of change has been identified, efforts towards its implementation should be carried out.

In India, the occupational health and safety needs across sectors, need to be addressed. This also holds true for every developing nation of the world.

Legal framework and its enforcement

The salient features of the National Policy on Safety, Health and Environment at Workplace India, 2009 are derived from the Constitution of India. The Articles 24, 39 and 42 address issues such as child employment, health and strength of workers, just and humane conditions of work, etc.

There are many different legislation (see Box) to take care of the safety and health of workers. Some of these are sector or occupation specific and others are equipment or substance specific.

Limitations of existing statutes and problems of enforcement

- There are numerous units employing less than 10 workers, which handle hazardous chemicals and undertake dangerous operations. The workers employed in these units are not protected against hazards.
- Laws relating to OHS are enforced by different agencies, and the requirements are not consistent with one another.
- The Factories Act 1948 contains requirements that are so detailed and specific, that factories, particularly small ones are not able to comply with these procedural requirements.
- At present the Dock Workers (Safety, Health and Welfare) Act 1986 and the Dock

Workers (Safety, Health and Welfare) Regulation 1990 are not applicable to minor and intermediate ports, as the rules are yet to be notified by the respective state governments. Workers in these ports have no protection against workplace hazards.

- The Building and Other Constructions Workers (Regulation of Employment and conditions of Service) Rules are notified by nine states only. The benefit of protection is not extended to the construction workers in other states.
- There is no legislation which covers the aspects of OHS for agricultural workers.
- Compliance is not satisfactory due to inadequate inspectors. In major ports, only 10 per cent of the ships are inspected against the norm of 50 per cent.
- Infrastructural facilities such as transport, telephones, computer, etc. are not available to factory inspectors and dock safety inspectorates.

The Employees' State Insurance Act

The International Labour Organisation adopted a declaration on setting fundamental principles and rights at work at its 86th session in 1998. India has ratified 40 conventions including those concerning the OHS. The Government of India is taking steps to incorporate safety and health standards in national statutes as an ongoing measure.

Note Bank: Bhopal Gas Disaster

The Bhopal Gas Disaster occurred on December 2, 1984, when over 40 tonnes of highly poisonous methyl isocyanate gas leaked out of the Union Carbide pesticide factory at Bhopal in Madhya Pradesh. Thousands immediately died of poisoning. At least 20,000 have died in the years since, and ten more die every month due to exposure-related diseases.

In the scandal that followed the disaster, the company was taken over - Chairman, Robert Kennedy who had 35,000 shares in the company, profited by $70,000. Union Carbide's policy at the plant was to switch off the refrigeration unit to save about Rs.700 (US $50) per day. If the cooling unit had been switched on, a runaway reaction could have been delayed or prevented. The factory workforce had been halved to maximise profits, training was reduced from six months to 15 days, and routine maintenance was very slack. Equally over-confident was J. Mukund, Carbide's works manager, who said, "The gas leak just can't be from my plant. The plant is shut down. **Our technology just can't go wrong. We just can't have such leaks.**" As soon as it was confirmed that the gas was from the Union Carbide plant, the Chief Medical Officer denied that the gas was fatal; instead he described it as a minor irritant.

The 120,000 victims, who survived however, face a future of misery. They suffer from acute breathlessness, brain damage, menstrual chaos, and loss of the body's immune system leading it to be dubbed chemical AIDS.

The first claim against Union Carbide sued for damages of up to $15 billion. Then without any consultation with victims' representatives, the government reduced the claim to just over $3 billion. Four years later with no consultation, the government settled for $470 million. A less damaging incident had occurred in 1982, but despite the warning this should have given the company, T S Niyogi, Labour Minister at the time said, "A sum of Rs. 25 crore [US$17.8 million at 1982 exchange rates] has been invested in this unit. The factory is not a small stone, which can be shifted elsewhere. **There is no danger to Bhopal, nor will there ever be.**"

(*Source:* ALU Issue No. 39, April - June 2001)

A major landmark was the promulgation of the Employees' State Insurance Act, 1948, which envisaged an integrated need based social insurance scheme that would protect the interest of workers in contingencies such as sickness, maternity, temporary or permanent physical disablement, and death due to employment injuries resulting in loss of wages or earning capacity. The Act also guarantees reasonably good medical care to workers and their immediate dependants.

The ESI Corporation was set up to administer the scheme, which was first implemented at Kanpur and Delhi in February 1952. The Act further absolved the employers of their obligations under the Maternity Benefit Act, 1961 and Workmen's Compensation Act 1923.

The benefits provided to the employees under the Act are also in conformity with ILO conventions. *Till date (2005) it has been implemented in all the states except Nagaland, Manipur, Tripura, Sikkim, Arunachal Pradesh and Mizoram*.

Moreover, with the opening of the insurance sector, a few private organisations have tied up with international companies for introducing new insurance products in the country. These would also cover the risk insurance arising out of manufacturing operations including the compensation to be paid to accident victims. As a result of this market enlargement, insurance companies would be computing the insurance premiums on the basis of the status of safety and health in the customer units. Insurance companies will also be taking steps to promote OHS in industry and assist them in reducing the risk arising out of manufacturing operations.

Think Tank:

How do you think social factors like Poverty and Gender accelerate exposure to health hazards in workplaces?

In developing countries, a different paradigm has to be adopted to undertake a study of the occupational health issues. “Instead of focusing on the workplace as an isolated entity and moving out to a wider social and political arena as done in occupational health research in industrialised countries, occupational health research in the developing world should focus on social and political issues and then move inward to address the particularities of the workplace (i.e. from the “external-contextual domain” to the “internal domain” (Nuwayhid 2004, p.1918). Such an approach also creates a wider alliance with social scientists, economists, political scientists, NGOs, unionists, human rights groups and women’s organisations as an entry point into the occupational health field.

Occupational health and safety issues should therefore be brought into focus as a crucial component of public and environmental health research. It should be placed under a broader socio-cultural context by addressing issue like globalisation, the importing of health hazards, women at work, migrant workers, and child labour, in addition to the narrower social and economic burdens of work-related diseases and injuries.

1. 5 Occupational Hazards and Hygiene

1. 5.1 Occupational Hazards

An occupational hazard can be defined as any condition that may adversely affect the well-being or health of the exposed persons. Identification of hazardous agents and groups of workers potentially exposed to these hazards are essential to characterise a workplace involving any occupational activity.

Occupational hazards can be divided into two categories: *safety hazards* that cause accidents that physically injure workers, and *health hazards* that result in the developing of a disease. It is important to note that a “hazard” only represents the potential to cause harm. Whether it actually does harm will depend on circumstances, such as the number of workers exposed and the degree and duration of exposure. The occurrence or severity of occupational disease is related to the exposure to factors on the job or in the work environment. Such factors can be:

- Physical – heat, noise, radiation, vibration, cold
- Chemical – solvents, pesticides, heavy metals, dust
- Biological – Tuberculosis, hepatitis B virus, HIV
- Psychosocial stressors – lack of control over work, inadequate personal support
- Mechanical –causes of work accidents and injuries

Characteristics of Occupational Diseases

The cause of occupational disease is often overlooked by healthcare providers. This is due to several special characteristics of occupational disease that may obscure its occupational origin.

- The clinical and pathological presentation of most occupational diseases is identical to that of non-occupational diseases; e.g. asthma (excessive airway narrowing in the lungs) due to airborne exposure to toluene di-isocynate is clinically indistinguishable from asthma due to other causes.

- Occupational diseases may occur even after the termination of exposure. An extreme example would be asbestos-related mesothelioma (a cancer affecting the *pleura* and *peritoneum*) which can occur 30 or 40 years after the exposure. The clinical manifestations of occupational disease are related to the dose and timing of exposure; e.g. very high airborne concentrations of elemental mercury is acutely toxic to the lungs and can cause pulmonary failure, while at lower levels of exposure, elemental mercury has no pathologic effect on the lungs but can have adverse chronic effects on the central and peripheral nervous systems.

- Occupational factors can act in combination with non-occupational factors to produce diseases; e.g. exposure to asbestos alone increases the risk of lung cancer five-fold, but along with the long-term smoking of cigarettes, the risk of lung cancer increases between 50 and 70 fold.

- Pre-existing diseases may make a person more susceptible to occupational hazards, e.g., a person suffering from a respiratory disorder is more susceptible to dust hazards, or a person with liver disease to organo-chloride compounds.

1.5.2 Occupational Hygiene

The profession that aims specifically at the prevention and control of hazards arising from work processes is occupational hygiene. The goals include the protection and promotion of workers' health, the protection of the environment and contribution to a safe and sustainable development.

Definition

Occupational hygiene is defined by the International Occupational Hygiene Association (IOHA) as 'the discipline of anticipating, recognising, evaluating and controlling health hazards in the working environment with the objective of protecting worker's health and well being and safeguarding the community at large.
' So, it involves the practice of identifying the hazardous agents (chemical, physical and biological) in the workplace that could cause disease or discomfort, evaluating the extent of the risk due to exposure to these hazardous agents, and the control of those risks to prevent ill-health in the long or short term.

Occupational hygiene draws upon, yet integrates, background disciplines such as biology, chemistry, physics, medicine, engineering, toxicology, environmental management etc. In part, it can be regarded as that aspect of the risk assessment field, which focuses on the interface between workplace-derived hazards and chronic human health consequences. The management of these risks (by means of control programmes) is similarly an integral part of the discipline.

Practice of Occupational Hygiene

The classical steps in occupational hygiene practice are:

- The recognition of the possible health hazards in the work environment.
- The evaluation of hazards, which is the process of assessing exposure and reaching conclusions as to the level of risk to human health.

- Prevention and control of hazards, which is the process of developing and implementing strategies to eliminate, or reduce to acceptable levels, the occurrence of harmful agents and factors in the workplace, while also accounting for environmental protection.
- Participate in overall risk analysis and management of an agent, process or workplace, and contribute to the establishing of priorities for risk management.
- Understand the legal framework for occupational hygiene practice.
- Educate, train, inform and advise persons at all levels, in all aspects of hazard communication.

The ideal approach to hazard prevention is “anticipated and integrated preventive action”, which should include:

- Occupational health and environmental impact assessments, prior to the design and installation of any new workplace.
- Selection of the safest, least hazardous, and least polluting technology (‘cleaner production’).
- Environmentally appropriate location.
- Proper design, with adequate layout and appropriate control technology, including the safe handling and disposal of the resulting effluents and waste.
- Elaboration of guidelines and regulations for training on the correct operation of the processes, including on the safe work practices, maintenance and emergency procedures.

1.6 Ergonomics

Ergonomics is the application of scientific information concerning humans to the design of objects, systems and environment for human use. The aim is to ensure that the job must fit the person in all respects and the work situation should not compromise human capabilities and limitations. So, ergonomics comes into everything that involves people. Work systems, sports and leisure, health and safety should all embody ergonomic principles, if well designed.

The term “ergonomics” is derived from two Greek words: “ergon”, meaning work and “nomoi”, meaning natural laws. Ergonomists study human capabilities in relationship to work demands. It is 'the science of making the job fit the worker'; or in other words is 'the application of human sciences to the optimisation of people's working environment`.

In broader terms, ergonomics seeks to improve the match between the job and the worker’s physical abilities, information handling and workload capacities. The subject is synonymous with 'human factors engineering', a term used in North America. Its fundamental importance is recognised in the International Labour Organisation, which defines ergonomics as:

“The application of the human biological sciences, in conjunction with the engineering sciences to the worker and his working environment, so as to obtain maximum satisfaction for the worker which at the same time enhances productivity.”

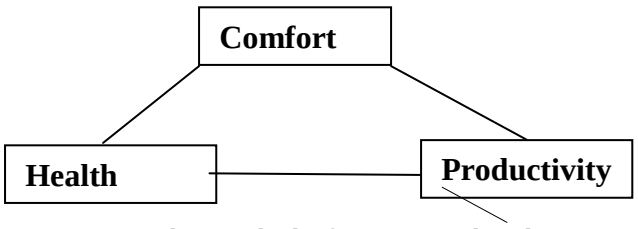

Fig.2 Triad of Ergonomic Elements

Ergonomics seeks to adapt work to human physical and psychological capabilities and limitations. In seeking this goal, it draws on many disciplines including anatomy, physiology, psychology, sociology, physics, and engineering.

The multi-disciplinary nature of ergonomics (sometimes called 'human factors') is very obvious. The ergonomist works in teams that may involve a variety of other professions, design engineers, production engineers, industrial designers, computer specialists, industrial physicians, health and safety practitioners, and specialists in human resources. The overall aim is to ensure that our knowledge of human characteristics is brought to bear on the practical problems of people at work and in leisure. We know that, in many cases, humans can adapt to unsuitable conditions, but such adaptation often leads to inefficiency, errors, unacceptable stress, and physical or mental cost.

Using Ergonomics

How do you use ergonomics? Ergonomics incorporates elements from many subjects including anatomy, physiology, psychology and design. Ergonomists apply their diverse knowledge to ensure that products and environments are comfortable, safe and efficient for people to use.

Knowledge of ergonomics is of great value in preventing ill-health and injury from work, as well as in rehabilitating people (e.g. someone with back pain). For example, personal protective equipment will generally not be used unless it is acceptable to employees, (it should fit well be comfortable and not interfere unduly with the task for which it is needed).

Focal areas for ergonomists in any organisation are:

Size and shape: Anthropometry is the branch of ergonomics that deals with human variability in size, shape and strength. Tables of anthropometric data are used by the

ergonomists to ensure that places and items they are designing fit the user.

Vision: Vision being the prime channel for information, designers should ensure that the users see the workplace clearly. Many workers using computers cannot see their screens because of the glare or reflection. Similarly, those doing precise assembly tasks under insufficient lighting suffer eyestrain.

Sound: Sound can be a useful way to provide information, especially for warning signals. However, care should be taken not to overload this sensory channel.

Job design: One goal of ergonomics is to design jobs to fit people. This means taking account of differences such as size, strength and ability to handle information for a wide range of users. Then the tasks, the workplace and tools are designed around these differences. This leads to improved efficiency, quality and job satisfaction.

Human error: Human errors in nuclear and chemical industries, rail and sea transport, aviation, etc. could be catastrophic. However, when disasters occur, the blame is often laid with the operators, pilots or drivers concerned, and labelled as ‘human error’. Often though, these errors are caused by poor equipment and system design. Here ergonomists pay particular attention to the mental demands on the operators, designing tasks and equipment to minimise the chances of misreading information or operating the wrong controls, for example.

Ergonomic design is a way of considering design options to ensure that people's capabilities and limitations are taken into account. This helps to ensure that the product is fit for use by the target users. The various aspects that should be stressed upon for an ideal ergonomic design can be product design, age-related design (accounting for older and disabled people), and design of information (signs and symbols).

(Please refer to the extra reading provided for a better and complete understanding of the practical principles of ergonomics.)

The value of ergonomics is easily understood by anyone who has tried to do a job using the wrong tools. The increased difficulty causes the job to take longer, leading to frustration and loss of temper. This in turn leads to use of excessive force and increases the risk of a slip of the hand and injury. In the wider world of industry and commerce, such problems arising from poor design of jobs, machines or workplaces may lead to large-scale inefficiencies, risk taking, increase in accidents and 'near-misses', and increases in absenteeism related to dissatisfaction with the job.

Glossary

- ***Absenteeism**:* It is a habitual pattern of absence from a duty or obligation. Frequent absence from the workplace may be indicative of poor morale or of sick building syndrome. However, many employers have implemented draconian absence policies which make no distinction between absences for genuine illness and absence for inappropriate reasons. As a result, many employees feel obliged to come to work while ill, and transmit communicable diseases to their co-workers. This leads to even greater absenteeism and reduced productivity among other workers who try to work while ill.

- ***Allergic alveolitis:*** The term allergic alveolitis / extrinsic allergic alveolitis refers to a group of lung diseases resulting from exposure to dusts of animal and vegetable origin. The name, although complicated, describes the origin and the nature of these diseases. The dust particles must be five microns or smaller to get into the alveoli. Extrinsic allergic alveolitis, once a person is sensitised, can show three different types of responses; acute (intense) response, sub-acute (recurrent) response, and chronic (long-term) response. The acute attack is triggered by heavy exposure to dust. It starts with fever, muscular aches and a general, unwell feeling or malaise. These symptoms are accompanied by tightness in the chest, a dry cough, and shortness of breath. The sub-acute response occurs most frequently in people exposed to relatively low levels of dust. It is marked by cough, shortness of breath, sweating, sore throat, headache, and nausea. The chronic response develops after persistent acute attacks and recurrent sub-acute responses. It is marked by increasing shortness of breath, occasional fever, loss of weight, and general lack of energy. The victim suffers permanent lung damage and, in the worst cases, death may occur.

- ***Alopecia:*** Partial or complete hair loss.

- ***Asphyxia:*** **Asphyxia** or **asphyxiation** is a condition of severely deficient supply of oxygen to the body. In the absence of remedial action it will very rapidly lead to unconsciousness and death. Asphyxia is the same as suffocation. It comes from the Greek roots a-, "without" and sphuxis, "pulse, heartbeat". Anoxia means the pathological state in which tissues do not get (enough of) oxygen. Technically, it is a condition of impaired gas exchange which leads, if persistent, to hypoxemia and hypercapnia; process is identified by foetal acidosis (as measured in umbilical arterial blood), which reflects the degree of anaerobic metabolism required during periods of hypoxia or increased oxygen demand.

- ***Atrophy: Thinning*** of the top two layers of skin, the dermis and epidermis, causing a depression in the skin. Also known as aging, discoid lupus erythematosis lichen sclerosis et atrophicus, morphea, radiodermatitis, striae, steroid side effect.

- ***Bone necrosis:*** Bone necrosis/Ischemic bone necrosis/ avascular necrosis are diseases resulting from the temporary or permanent loss of the blood supply to the bones. Without blood, the bone tissue dies and causes the bone to collapse. If the process involves the bones near a joint, it often leads to collapse of the joint surface. This disease also is known as osteonecrosis, aseptic necrosis, and ischemic bone necrosis.

- ***Brucellosis: Brucellosis*** (**Undulant fever** or **Malta fever**) is an infectious disease caused by the *Brucella* bacteria, which induces inconstant fevers, sweating, weakness, anorexia, headaches, depression and muscular and bodily pain. The popular name of the condition is originated due to the inconstance (or undulance) of the fever, which rises and falls constantly. Brucellosis is named after its researcher David Bruce. The disease is transmitted either through contaminated or untreated milk (and its derivates) or through direct contact with infected animals, which may include sheep,

pigs, goats, cattle, camels, bison, and other ruminants. This also includes contact with their carcasses.

- ***Dead hand/ White finger:*** Vibration-Induced White Finger (VWF), also known as "Dead Finger" or "Dead Hand" is the result of impaired circulation (poor blood supply in the fingers, caused by the prolonged use of vibrating tools. VWF may appear after only several months on the job, or may not appear until twenty to forty years on the job.

  The longer a person uses a vibrating tool, and the faster the tool vibrates, the greater the risk of health effects. The length of the initial symptom-free period of vibration exposure (i.e., from first exposure to the first appearance of a white finger) is known as the latent interval. It is related to the intensity of the vibration - the shorter the latent period, the more severe the resulting VWF if vibration exposure continues. The technical name for VWF is Raynaud's Syndrome of Occupational Origin.

- ***Epithelioma:*** A benign or malignant tumour derived from epithelium.
- ***Erythema***: In medicine, this term is applied to redness of the skin due to blood vessel distension.
- ***Gangrene:*** Death of tissue, usually due to loss of blood supply.
- ***ILO:*** The International Labour Organisation (ILO) was founded in 1919 and is a UN agency, located in Geneva, Switzerland, bringing governments, workers and employers together to promote decent work and social safety nets. This is mainly achieved by setting and supervising international labour standards in the form of conventions and recommendations. The ILO plays an extraordinary role in the multilateral efforts to secure human rights and was the first to bring the subject of human rights to the world. The ILO has 175 member countries, represented by workers, employers and governments. It is the only international agency in which non-governmental sectors of society participate fully with government. The ILO has a special programme about child labour, called The International Programme on the Elimination of Child Labour (IPEC).

- ***Industrial hygiene:*** Science and art devoted to the anticipation, recognition, evaluation, prevention, and control of those environmental factors or stresses arising in or from the workplace, which may cause sickness, impaired health and well being, or significant discomfort among workers or among citizens of the community.
- ***Keratosis:*** Keratosis or actinic keratosis is a precancerous skin growth usually caused by sun exposure. Also called keratosis - actinic (solar), solar keratosis, sun - induced skin changes – keratosis. Actinic keratosis occurs most commonly in fair skin, especially in the elderly and in young individuals with light complexions. The growths occur in sun-exposed skin areas. The growths begin as flat scaly areas that later develop a hard wart like surface. They are classified as precancerous growths. If left untreated, approximately 10 per cent of actinic keratoses develop into squamous cell carcinoma.
- ***Occupational disease:*** Disease or disability resulting from conditions of employment (usually from long exposure to a noxious substance or from the continuous repetition of certain acts.
- ***Occupational Hazards:*** An occupational exposure the worker has that is greater than a normal physical danger by the very nature of the work in which the worker is engaged.
- ***Occupational Health:*** Occupational health is the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs. (ILO/WHO 1950)
- ***Oedema:*** Oedema (edema) is a build-up of excess fluid in the body tissues. If the fluid is in the tissue under the skin it leads to a puffy, shiny appearance and a doughy feel. Most commonly, oedema is seen in the ankles or legs, as the fluid is gravity-dependent. Oedema is not a disease in itself. Rather, it is a clinical sign which may be associated with an underlying medical problem. Oedema occurs when the body's normal balance of fluid intake and output is disturbed.

- ***Peritoneum:*** It is the large membrane in the abdominal cavity that connects and supports internal organs. It is composed of many folds that pass between or around the various organs.[3]
- ***Pleura:*** The pleura is a sac which contains the lungs as well as a thin membrane known as the mesothelium, which secretes a vital fluid that enables the lungs to expand and contract during the breathing process.[4]
- ***Polycythemia:*** It is an increase in the red cell mass of the blood. This is seen as an increase in PCV, haemoglobin concentration and RBC count. Absolute polycythemia results from increased bone marrow production of RBCs and may be primary, as with polycythemia vera or myeloproliferative disease, or secondary to hypoxia and renal disease. Absolute polycythemia must be distinguished from relative polycythemia that occurs with dehydration (high plasma protein), hypovolemia (low plasma protein), shock or splenic contraction (normal plasma protein).
- ***Pulmonary tuberculosis:*** It is the infection of the lungs by Mycobacterium tuberculosis. The usual course of untreated disease is tuberculous pneumonia, formation of tuberculous granulation tissue, caseous necrosis, calcification, and cavity formation. It may spread to other lung segments via the bronchi, or to other organs via the blood or lymph vessels. Symptoms may include weight loss, lassitude and fatigue, night sweats, and wasting, with purulent sputum, hemoptysis, and chest pain.
- ***Respirable dust:*** It refers to those dust particles that are small enough to penetrate the nose and upper respiratory system and deep into the lungs. Particles that penetrate deep into the respiratory system are generally beyond the body's natural clearance mechanisms of cilia and mucous and are more likely to be retained.

[3] http://www.britannica.com/EBchecked/topic/452096/peritoneum
[4] http://www.maacenter.org/mesothelioma/pleural.php

- ***Safety:*** It is the condition of being protected against failure, damage, error, accidents, or harm. Here protection involves both causing and exposure. It can include physical protection or that of possessions. Safety is often in relation to some guarantee of a standard of insurance to the quality and safe function of a thing or organisation. It is used to ensure that the thing or organisation will do only what it is wanted to do. Safety is the state of being safe.

- ***Telangiectasias*:** They are small enlarged blood vessels near the surface of the skin, usually they measure only a few millimetres. They can develop anywhere on the body but commonly on the face around the nose, cheeks and chin. These are actually developmental abnormalities but can closely mimic the behaviour of benign vascular neoplasms. They may be composed of abnormal aggregations of arterioles, capillaries, or venules.

- ***WHO:*** The World Health Organisation (WHO) is an agency of the United Nations, acting as a coordinating authority on international public health, headquartered in Geneva, Switzerland. WHO was established by the UN on April 7, 1948. The WHO inherited much of the mandate and resources of its predecessor, the Health Organisation (HO), which had been an agency of the League of Nations.

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