

Introduction

- Workers represent half the world's population and are the major contributors to economic and social development.
- Their health is determined not only by workplace hazards but also by social and individual factors and access to health services.

- The first written discussions specifically directed toward matters of occupational safety and health were those of Paracelsus, in the fifteenth century.
- In the early eighteenth century, Bernadino Ramazzini wrote the first text on occupational medicine, *De morbis artificum diatriba*, and he is generally regarded as the "father of occupational medicine."
- Ramazzini wrote about the health hazards for dozens of occupations ranging from ditch diggers to tailors, from religious activities to those quite secular.
- In the United States, in the early twentieth century, Dr. Alice Hamilton became the first woman physician appointed to a faculty position at Harvard University, where she worked at the School of Public Health promoting safe and healthful work practices in the United States.
- She has been recognized as the leader of the occupational medicine movement in the United States, which came relatively late compared with that in Europe.

- Occupational hazards cause or contribute to the premature death of millions of people worldwide and result in the ill health or disablement of hundreds of millions more each year.
- The burden of disease from selected occupational risk factors amounts to 1.5% risks of the global burden in terms of DALY.
- The World Health Report 2002 places occupational risks as the 10th leading cause of morbidity and mortality.
- Almost 22.5 million DALY and 699,000 deaths are attributable to these risk factors. According to the Report, work related injuries cause nearly 310,000 deaths each year, and nearly 146,000 deaths are attributable from the region remains largely uncharacterized.

- Member countries of South East Asia Region have witnessed major occupational health problems highlighted by the Bhopal disaster in India and the Kader Toy Factory fire in Thailand.
- However, workers of the region are exposed to a wider range of occupational hazards including chemical, physical and biological hazards as well as inadequate ergonomics practice and high psychosocial stress.
- Most of the countries in the Region are in the process of rapid economical development, a process that potentially amplifies the pre-existing traditional risks and introduces new occupational risks in the region.
- Thus, occupational health is of major concern in the South East Asia Region of WHO with a work force of about 500 million persons.

Definition

- Since 1950, the [International Labour Organization](#) (ILO) and the [World Health Organization](#) (WHO) have shared a common definition of occupational health.

What is occupational health and safety?

Occupational health & safety is a discipline with a broad scope involving many specialized fields. In its broadest sense, it should aim to:

- promoting and maintaining the highest degree of physical, mental and social well-being of workers in all occupations;
- preventing adverse effects on workers' health caused by their working conditions;
- protecting workers from risks resulting from factors adverse to health;
- placing and maintaining workers in an occupational environment adapted to physical and mental needs;
- adapting work environment suitable for humans.

In other words, occupational health and safety encompasses the **social, mental and physical well-being of workers**, that is the “whole person”.

Successful occupational health and safety practice requires the collaboration and participation of both employers and workers in health and safety programs, and involves the consideration of issues relating to occupational medicine, industrial hygiene, toxicology, education, engineering safety, ergonomics, psychology, etc.

Why is occupational health and safety important?

- Work plays a central role in people's lives, since most workers spend at least eight hours a day in the workplace, whether it is on a plantation, in an office, factory, etc. Therefore, work environments should be safe and healthy. Yet this is not the case for many workers.
- Every day workers all over the world are faced with a multitude of health hazards, such as:
dusts; gases; noise; vibration; & extreme temperatures.

Occupational health and safety officers' duties:

- Occupational health and safety officers promote health and safety procedures in an organization.
- They recognize hazards and measure health and safety risks, set suitable safety controls in place, and give recommendations on avoiding accidents to management and employees in an organization.

So, is there anything wrong with occupational health?

- Unfortunately some employers assume little responsibility for the protection of workers' health and safety.
- In fact, some employers do not even know that they have the moral and often legal responsibility to protect workers.
- As a result of the hazards and a lack of attention given to health and safety, work-related accidents and diseases are common in all parts of the world.

Safety Professionals in the USA

- The main tasks undertaken by the OHS practitioner in the USA include:
- Develop processes, procedures, criteria, requirements, and methods to attain the best possible management of the hazards and exposures that can cause injury to people, and damage property, or the environment;
- Apply good business practices and economic principles for efficient use of resources to add to the importance of the safety processes;

- Promote other members of the company to contribute by exchanging ideas and other different approaches to make sure that every one in the corporation possess OHS knowledge and have functional roles in the development and execution of safety procedures;
- Assess services, outcomes, methods, equipment, workstations, and procedures by using qualitative and quantitative methods to recognize the hazards and measure the related risks
- Examine all possibilities, effectiveness, reliability, and expenditure to attain the best results for the company concerned (Board of Certified Safety Professionals, 2006, “

Knowledge required by the OHS professional in USA

include:

- Constitutional and case law controlling safety, health, and the environment .
- Operational procedures to plan/ develop safe work practices .
- Safety, health and environmental sciences.
- Design of hazard control systems (i.e. fall protection, scaffoldings).
- Design of recordkeeping systems that take collection into account, as well as storage, interpretation, and dissemination.
- Mathematics and statistics.
- Processes and systems for attaining safety through design (Board of Certified Safety Professionals, 2006).

Some skills required by the OHS professional in the USA

- Understanding and relating to systems, policies and rules •
- Holding checks and having control methods for possible hazardous exposures •
- Mathematical and statistical analysis •
- Examining manufacturing hazards •
- Planning safe work practices for systems, facilities, and equipment.
- Understanding and using safety, health, and environmental science information for the improvement of procedures • Interpersonal communication skills (Board of Certified Safety Professionals, 2006)

National implementing legislation

- In the [European Union](#), [member states](#) have enforcing authorities to ensure that the basic legal requirements relating to occupational health and safety are met.
- In 1996 the [European Agency for Safety and Health at Work](#) was founded.
- Member states of the [European Union](#) have all transposed into their national legislation a series of directives that establish minimum standards on occupational health and safety.
- These directives (of which there are about 20 on a variety of topics) follow a similar structure requiring the employer to assess the workplace risks and put in place preventive measures based on a hierarchy of control. This hierarchy starts with elimination of the hazard and ends with [personal protective equipment](#).

In the United States

- the Occupational Safety and Health Act of 1970 created both the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA).
- OSHA, in the U.S. Department of Labor, is responsible for developing and enforcing workplace safety and health regulations.
- NIOSH, in the U.S. Department of Health and Human Services, is focused on research, information, education, and training in occupational safety and health

- OSHA have been regulating occupational safety and health since 1971.
- Occupational safety and health regulation of a limited number of specifically defined industries was in place for several decades before that, and broad regulations by some individual states was in place for many years prior to the establishment of OSHA.

Identifying Safety and Health Hazards

The terminology used in OSH varies between states, but generally speaking:

- A [hazard](#) is something that can cause harm if not controlled.
- The outcome is the harm that results from an uncontrolled hazard.
- A [risk](#) is a combination of the probability that a particular outcome will occur and the severity of the harm involved.

- In the context of OSH, “harm” generally describes the direct or indirect degradation, temporary or permanent, of the physical, mental, or social well-being of workers.
- For example, repetitively carrying out [manual handling](#) of heavy objects is a hazard.
- The outcome could be a [musculoskeletal disorder](#) (MSD) or an acute back or joint injury.
- The risk can be expressed numerically (e.g. a 0.5 or 50/50 chance of the outcome occurring during a year), in relative terms (e.g. "high/medium/low"), or with a multi-dimensional classification scheme (e.g. situation-specific risks).

Hazard Assessment

- Hazard analysis or hazard assessment is a process in which individual hazards of the workplace are identified, assessed and controlled/eliminated as close to source (location of the hazard) as reasonable and possible.
- As technology, resources, social expectation or regulatory requirements change, hazard analysis focuses controls more closely toward the source of the hazard. Thus hazard control is a dynamic program of prevention.
- Hazard-based programs also have the advantage of not assigning or implying there are "acceptable risks" in the workplace.

- A hazard-based program may not be able to eliminate all risks, but neither does it accept "satisfactory" -- but still risky—outcomes.
- And as those who calculate and manage the risk are usually managers while those exposed to the risks are a different group, workers, a hazard-based approach can by-pass conflict inherent in a risk-based approach.

Risk assessment

- Modern occupational safety and health legislation usually demands that a [risk assessment](#) be carried out prior to making an intervention.
- It should be kept in mind that risk management requires risk to be managed to a level which is as low as is reasonably practical.
- This assessment should:
 - Identify the hazards
 - Identify all affected by the hazard and how
 - Evaluate the risk
 - Identify and prioritize appropriate control measures

- The calculation of risk is based on the likelihood or probability of the harm being realized and the severity of the consequences.
- this can be expressed mathematically as a quantitative assessment (by assigning low, medium and high likelihood and severity with integers and multiplying them to obtain a risk factor, or qualitatively as a description of the circumstances by which the harm could arise.
- The assessment should be recorded and reviewed periodically and whenever there is a significant change to work practices

- The assessment should include practical recommendations to control the risk.
- Once recommended controls are implemented, the risk should be re-calculated to determine if it has been lowered to an acceptable level.
- Generally speaking, newly introduced controls should lower risk by one level, i.e., from high to medium or from medium to low.

Common workplace hazard groups

1- Mechanical hazards.

By type of agent:

- [Impact force](#)
- [Confined space](#)
- [Slips and trips](#)
- [Falling on a pointed object](#)
- [Compressed air/high pressure](#)
- [Entanglement](#)
- [Equipment](#)-related injury

• *By type of damage:*

- [Crushing](#)
 - [Cutting](#)
 - [Friction](#) and [abrasion](#)
 - [Shearing](#)
 - [Stabbing](#) and [puncture](#)

Falling down

- The construction industry accounted for 67% of all fatalities to workers as a result of falling from a height in 2002/2003.



- In the period, 2002/2003 the total number of reported major injuries to employees was 28,426. This represents a slight increase from 28,011, the corresponding period in 2001/2002.
- Falls from a height accounted for 14% (3,880) major injuries in 2002/2003, compared with 15% (4,066) in 2001/2002.
- The number of major injuries to the self-employed from falling from a height in 2002/2003 was 376, compared with 356 in 2001/2002, an increase of 6%.

- Ladders accounted for the greatest number of major injuries to employees due to high falls (40%) and low falls (30%) in 2002/2003.
- The construction industry accounted for 35% (1503) of all major injuries to workers as a result of falling from a height in 2002/2003.
- In 2002/2003 falling from height accounted for 30% of all major injuries to employees in the construction industry, 14% in extractive and utility supply and 16% in agriculture.

2- physical hazards .

- Noise
- Vibration
- Lighting
- Barotrauma (hypobaric/hyperbaric pressure)
- Ionizing radiation
- Electricity
- Asphyxiation
- Cold stress (hypothermia)
- Heat stress (hyperthermia)

Electrical injuries

- **Injuries from artificial electricity have been reported for almost 300 years. The first recorded death caused by electrical current from an artificial source was reported in 1879, when a carpenter in Lyons, France.**
- Electrical burns account for 4% to 6.5% of all admissions to burn units in the United States and for approximately 1000 fatalities per year in the United States.

- Census of fatal occupational injuries (CFOI) data show that 2,287 U.S. workers died and 32,807 workers sustained days away from work due to electrical shock or electrical burn injuries between 1992 and 1998.
- Overall, 44% of electrical fatalities occurred in the construction industry.
- Contact with overhead power lines caused 41% of all electrical fatalities.

- Electrical shock caused 99% of fatal and 62% of nonfatal electrical accidents. Comprising about 7% of the U.S. workforce, construction workers sustain 44% of electrical fatalities.
- Power line contact by mobile equipment occurs in many industries and should be the subject of focused research. Other problem areas are identified and opportunities for research are proposed.
- Impact on Industry: Improvements in electrical safety in one industry often have application in other industries.

3- Biological hazards: include

- Bacteria
- Virus
- Fungi
- Blood-borne pathogens
- Tuberculosis

Tuberculosis

- Case counts: 13,299 TB cases were reported to CDC from the 50 states and the District of Columbia
- (DC) for 2007, representing a 3.3% decrease from 2006
- Twenty-one states reported increased case counts from 2006 .
- California, Texas, New York, and Florida accounted for 48% of the national case total .

- For the fourth consecutive year, Hispanics (29%) exceeded all other racial or ethnic groups, with the largest percentage of total cases
- For the first time, Asians (26%) matched non-Hispanic blacks or African-Americans (26%). as the second largest racial or ethnic group.
- Blacks or African-Americans born in the United States represented 45% of TB cases in U.S.- born persons and accounted for approximately 18% of the national case total.
- Asians born outside the United States represented 43% of TB cases in foreign-born persons and accounted for approximately 25% of the national case total .

4- Chemical hazards .

- include:

Acids

Bases

Heavy metals

Solvents

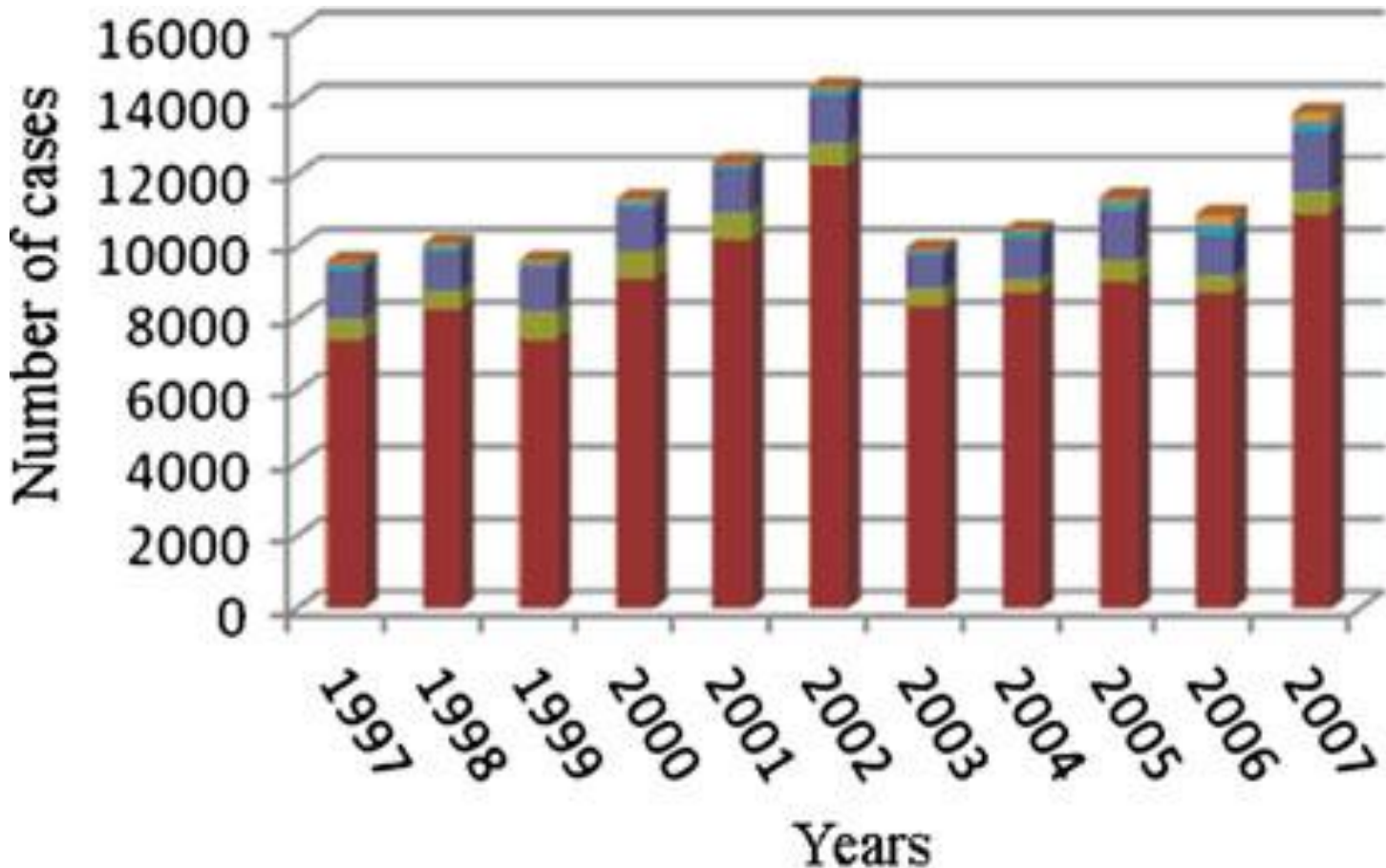
Particulates

Fumes (noxious gases/vapors)

Highly-reactive chemicals

Fire, conflagration and explosion hazards.

Incidence of occupational diseases in a recent 10-year period in China



- Occupational skin diseases
- Chronic poisoning
- Noise deafness
- Acute poisoning
- Pneumoconiosis

Occupational poisoning

- In China, Occupational poisoning accidents represented a large proportion (13–20%) of occupational diseases.
- From 1991 to 2006, the total number of occupational poisonings was 38,412.
- The numbers of chronic and acute occupational poisonings were 16,930 and 21,482, respectively.

- According to the data from the Ministry of Health of The People's Republic of China (PRC) in 2007, there were 600 cases of acute chemical poisoning accounting for the third largest proportion (4.2%) of occupational diseases, while there were 1638 cases of chronic occupational poisoning (11.26%), which followed pneumoconiosis, as the second most common occupational disease.

Pneumoconiosis

- In China, the number of workers exposed to silica containing dusts was estimated to be as high as 12 million .
- Pneumoconiosis has been the most serious and preventable occupational disease for a long time.
- In recent years, new cases were estimated at 12,000–15,000 annually, representing 70–80% of the total number of cases of reported occupational diseases.

- The cumulative number of confirmed pneumoconiosis cases recorded in China between 1949 and 2008 reached 638,234.
- Most of the cases were found in coal-mining industries, followed by the construction materials manufacturing industry, the metallurgical industry, non-ferrous metal industries, and machinery industries (Zhang, 2010).

5- Psychosocial issues include

- Work-related stress, whose causal factors include excessive working time and overwork .
- Violence from outside the organisation .
- Bullying, which may include emotional and verbal abuse
- Sexual harassment
- Burnout
- Exposure to unhealthy elements during meetings with business associates, e.g. tobacco, uncontrolled alcohol

- In 1986, the National Institute for Occupational Safety and Health (NIOSH) listed psychological disorders among the ten leading work-related diseases and injuries among U.S. workers.
- Psychosocial hazards, however, have received scant attention among safety and health pros over the past decades. This is mainly because most pros focus on controlling physical, chemical and biological hazards in workplaces.



Burnout

- The issue of occupational stress and burnout have received increasing research attention.
- Given the amount **of time people spend on work-related activities and** the central importance of work to one's sense of identity and self-worth, it is not surprising that occupational stress is regarded as a central area of study.