

CHAPTER 3 – CONCEPTS PERTAINING TO OCCUPATIONAL SAFETY AND HEALTH HAZARDS

3.1 INTRODUCTION

Challenges faced by the Malaysian Army are not only directly due to the complexity of the profession itself in term of its roles and task accomplishment. These challenges are also directly related to the changes in the social, economic political and the rapid changes in technological advancement of equipment and weaponry. All these changes had affected the working condition and the environment of Malaysian Army. It is always our constant interest to look into this working condition and environment that will affect the occupational safety and health hazards (OSHH) of the personal in the army. OSHH is a reality that may create anxiety or even fear to the people in the organisation if they are not controlled effectively. This chapter intends to address the sources and nature of the OSHH in the Malaysian army, in view of the changes in the working condition in the environment.

3.2 CHANGES IN THE ARMY

One of the most significant changes faced by the Malaysian army today is related toward developing itself into an effective and credible conventional force from counter insurgency warfare forces. At this juncture, all level of management in the army is re-aligned to obtain this objective. In view of this requirement, the army is constantly facing the changes in term of the introduction of new equipment, personal and establishment of new unit. Some of these changes include the introduction of Starburst Missile,

Hugglund, Korean Infantry Fighting vehicle (KIFV), Multi-Purpose Grenade launcher and the establishment of Army Air Wing Unit.

Another important aspect of the changes is the expanding role and scope of duty of the army internally and externally. A commitment of our army to the United Nation Peacekeeping Mission and observers in various countries are some example of the expanding role externally. The extreme cold weather in Bosnia and extreme hot temperature in Kuwait are some of the acclimatisation problem faced by the soldiers.

Basically, the army will constantly undergo changes. One of the most important factors that created these changes is due to the changing of the strategic environmental situation. Some of the changes in the strategic environmental situation that had affected the army are as follow.

- a. The surrender of the Communist Party of Malaya and also the end of Cold War.
- b. Overlapping claims of territory between Malaysia and neighbouring countries.
- c. Regional military co-operation.
- d. Malaysian government commitment in the settlement of conflicts and disputes around the world.

The other reason for these changes is due to the advancement of technology. The latest state of the art in the new weapon system, information system, training system has caused the army to update their military

hardware and software. The rapid changes in these technologies have caused the army to update herself in the weapon system. This advancement is required in order to cope with the expanding role and duty of the army. The constant growth of Malaysian economy has increased the financial allocation for the army to procure the new equipment. Furthermore, the government policy in downsizing the army from 120000 personnel to 80000 personnel will definitely give an impact to the structure and technology. This policy will cause the army organisation to flatten. To ensure efficiency and effectiveness of a downsizing organisation, some form of automation must be introduced into the army system.

3.3 SOURCES OF OSSH IN THE ARMY

The source and agent of the OSSH in the army vary substantially according to their Corps, nature of work, equipment used, climate condition and hazardous exposure to the substances used in the operation. For the purpose of this study, we have divided the various OSSH that occurs in the army system into ten categories. Figure 3-1 illustrates the health hazards categories to the soldier.

3.3.1 Acoustic Energy

Acoustic energy is energy containing, producing and arising from actuated by, or related to or associated with sound (National Safety Council, 1992). The potential energy is normally transmitted through the air and interacts with the body to cause lost of hearing or damage to internal organ. Some examples of acoustic energy are the sounds created by the impulse

noise of small arm firings, blasts over pressure by mortar and artillery fires and noise created by engine and helicopters' rotors.

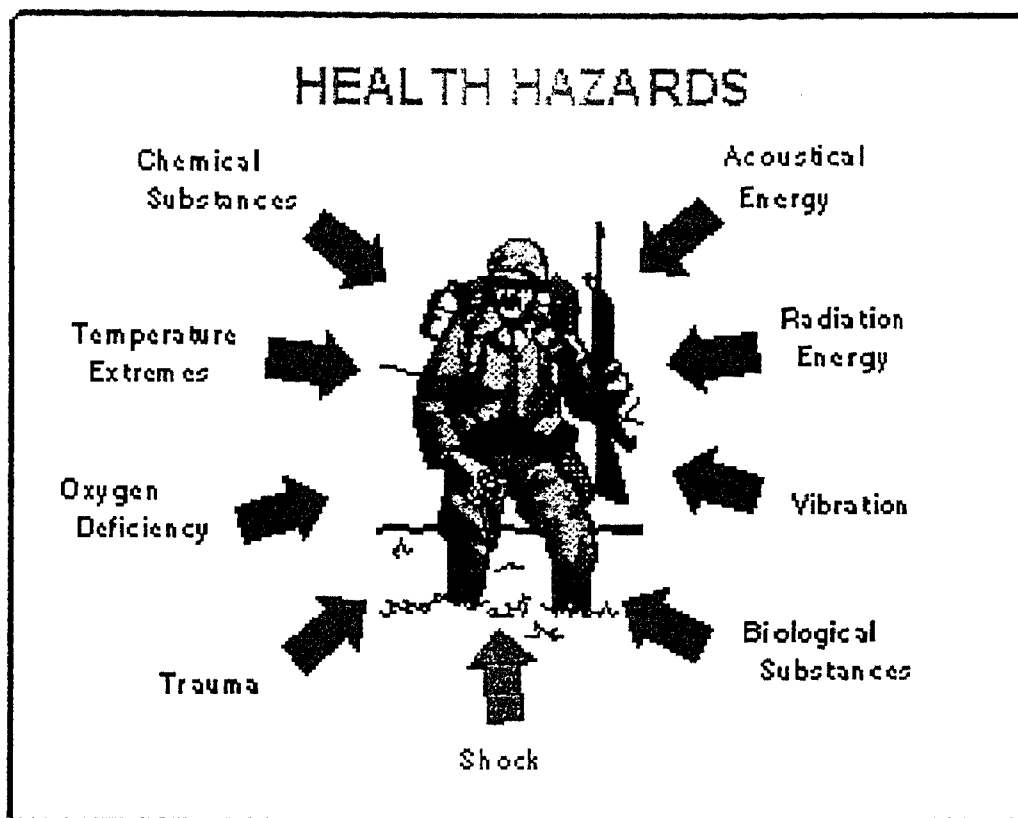


Figure 3-1 Health Hazards Categories to Soldier

An example of acoustic energy is a firing of 155-mm and 105-mm gun by artillery battery. This large calibre gun, when fired produced a blast over pressure (impulse noise level) in excess of the allowable limit. The gun crew subjected to this blast could suffer permanent hearing loss. The gun crew and soldiers in immediate firing areas are exposed to the risk of hearing lost from the noise generated by the gun firing. The gun crew needs to wear a properly fitted earplug. Soldiers in immediate proximity of the artillery firing should

wear properly fitted hearing protection. The soldiers need to understand the failure to use the proper earplug could result in permanent hearing loss.

3.3.2 Temperature Extreme

In dealing with temperature extremes, we are primarily concerned with the effect of heat and cold environment. Heat injury are caused by task (work rate, load; terrain), environmental conditions (temperature, humidity, solar energy, wind) and human factors (fitness, hydration, rest, nutrition, health and acclimatisation). The most common heat injuries are heat cramps, heat exhaustion and heat stroke. Some examples of temperature extreme in the Army that can contribute to heat injuries shelters, vehicles and clothing which limit ventilation and reduce the soldier's capability to release heat and maintain a normal body temperature.

Cold injuries are also a product of task environmental condition and human factors. The Malaysian Battalion (Malbatt) serving for peacekeeping mission at Bosnia Herzegovina commonly experiences this. The cold injuries that are commonly suffered by Malbatt are frostbite and immersion foot. Inadequate shelters, cold-weather clothing and vehicles are the most common cause of this OSHH to occur.

Another example of the heat extreme is the turret mounted on high-mobility multipurpose armour vehicles. The gunner normally operates from inside the turret and driver operates from the driver compartment. The heat generated from the outside environment can cause potential heat stress to the soldier in the vehicles. Both the gunner and the driver become very

uncomfortably hot during the firing. During weapon firing, the temperature inside the vehicles will increase. Since actual firing mission may take hours, the associated heat load on the gunner and driver may be well in excess of acceptable levels.

3.3.3 Physical Trauma

Cumulative trauma disorder (CTD) is illnesses caused by repeated trauma to arms and hands from shoulder to fingers (National Safety Council p.21). These disorders involve the soft tissues (tendons and muscles) or the nervous system. CTD can be caused by repetitive motion, forceful exertions, awkward postures, mechanical stress and vibration level of hand tools. Some of the examples of physical trauma in the Army are the impacts of the body from heavy objects, forceful works in the long periods. The most common example of CTD injuries are back injuries, carpal tunnel syndrome (numbness, tingling, pain, nerve disorder) wound, leg and limb fractures.

3.3.4 Vibration

Vibration can be described as contact of a mechanically oscillating surface with human body (National Safety Council p. 117). It occurs primarily in operating hand held equipment or weapons that vibrate through a workplace. The major health problems associated with the use of vibrating tools are peripheral vascular or neural disorders of fingers and hands, circulatory disorder, bone and joint disorder and muscle degeneration. It also can occur on whole body from riding in vehicles over the rough terrain. The whole body vibration health effect is primarily associated with back injuries,

abdominal pain, urinary difficulty, headaches, visual disturbances and loss of balance. Most Army all-terrain vehicles create some whole-body vibration. An example of this vehicle is the Korean Infantry Vehicle (KIV). KIV is a lightweight all terrain vehicle capable of high-speed, cross-country travel with high manoeuvrability and agility. The vehicles serve as weapons or communications platform and carrier for anti-armour, reconnaissance and other mission that required speed, agility and all terrain capability. The OSHH due to whole-body vibration as a significant health hazard. Vehicle crew members may suffer kidney and back injuries attributable to vibration sustained.

3.3.5 Shock

Shock is the general term used to describe rapid and violent application force to the human body. These applications of force are normally characterised by short duration and high magnitude and result in acute non-penetrating physical injury. The most common injuries that occur in the Army operation include head and chest injury, spinal column fractures and broken bones. The two most common occurrences of shock in the Army are weapon recoil and opening of the parachutes.

The assault personnel parachute was developed for use in low-attitude tactical assault airborne operations. The parachute was designed to lower the rate of decent and reduce the potential for injuries upon landing. The primary health hazard associated with this parachute operation is shock to the neck

due to rapid deceleration when the parachute opens and the impact of velocity upon landing.

3.3.6 Occupation Stress

A stress is any force that puts a psychological or physical factor beyond its range of stability, producing a strain within individuals. Stress is likely to occur constitute a threat to individual. A threat can cause a strain because of what it signifies to the person (European Foundation For Improvement of Living and Working Conditions, 1996 p.5). Whenever a person is subjected to stress a series of hormonal reactions take place. The heart rate will increase in order to pump more oxygen around the body, muscle tension increase and blood sugar is release to fuel the exercise muscles. Stress is clearly part of the human condition and everybody needs a certain amount of stress to remain healthy and alert.

The effects of stress in the Army system are due to the mental and physical characteristics. During wartime, the exposure to battle condition may result into combat stress. In the past wars, it was revealed that there was one combat stress casualty for every four wounded in action and one for every three wounded during lengthy periods of intense combat. During combat, stress built up in each soldier as well in the unit as a whole. The greatest stress occurs when you are facing the enemy.

However during peacetime, the Army personnel face similar stresses as those in any large industrial organisation. They worry about demanding superiors, promotion, lack of skill, heavy workload, family problems and

serious financial difficulty. Nevertheless, the Army life is often tougher with extended duty around the clock and prolongs operations or exercises. Training in the Army, demand soldier to be in good physical and mental condition. Moral and disciplinary problems show behaviour of reflecting personal under stress. Cases such as malingering, absenteeism, alcohol abuses, vandalism and criminal activities may indicate personal unable to cope with stress.

Meanwhile, the peacekeeping environment, such as Malbat serving in Somalia, Bosnia, Namibia and Cambodia present stress and mental health hazard unique in nature. According to studies conducted by psychologists of US Army, soldiers who served in peacekeeping, peace enforcement, and humanitarian assistance operation experience stress that are different from those traditional combat operations. This difference are due to ambiguity of role, uncertainty of rule of engagement, uncertain duration of deployment, sense of risk, hardships and extreme weather condition. The most crucial reasons were the life-threat from the unpredictable armed civilian and the uncharted mine. According to this study, more research is needed to determine the long-term effect of peacekeeping assignments on military personal and design appropriate pre-deployment training and to measure the effectiveness of critical incident stress (APA news Release, 1996).

3.3.7 Radiation Energy

Radiation energy is normally divided into two types, ionising and non-ionising radiation. Ionising radiation has sufficient energy to ionise molecules

in matter, disrupting chemical structures and possibly leading to cell damage. The principal health effects of concern are cancers, genetic alteration, and birth defects. Common example of radiation hazards include certain medical diagnostic equipment such as X-ray equipment, radar transmission, radio transmission and electronic counter measure transmission. The primary type of radiation concern to the army is radio frequency radiation (RFR). RFR hazards are primarily confined to heating of body tissue, burns and electrical shock hazards from the equipment that generates the microwave radiation. RFR is used primarily, in communication, surveillance, fire control, target acquisition. Common examples of Army equipment using RFR include radar, radios, and electronic warfare equipment. The primary health concern are exposure to RFR during tactical operation, field maintenance and depot level maintenance activities. The exposure to the RFR should not exceed the radiation protection guide (RPG). Exposure exceeding the RPG may cause health hazard to human being.

3.3.8 Oxygen Deficiency

Oxygen deficiency is technically the reduction of the concentration of oxygen in the air below the normal concentration of 21 percent. The primary health effects of concern are shortness of breath, impaired vision and loss of co-ordination and judgement. At very low oxygen concentrations, human being will lose consciousness and may cause death due to suffocation. Common examples of condition that create oxygen deficiency include high altitudes, confine spaces that are poorly ventilated or displacement of oxygen

by other gases like carbon monoxide. The confined space of tank needs to be tested for the presence of toxic substance and the oxygen content must be determined before allowing personnel to enter the area. Personnel required to enter an enclosed compartment or space with less than 19.5 % oxygen content must wear approved breathing apparatus, such as fresh air hood mask or self-contained breathing apparatus. These apparatus are commonly used for fire fighting in a confined space.

3.3.9 Biological Substances

This hazard encompasses the concern of diseases caused by pathogenic organisms and their toxins and enzymes. Generally, those concerned with the issues of waste disposal, food handling, and personal hygiene. This hazard occurred mostly during prolonged operations and exercises in the jungle where there is no proper disposal of waste products and water supply.

3.3.10 Chemical

The primary concern relates to exposure to hazardous chemicals used in developing and operating Army Systems. Exposures occurred from inhalation, ingestion and direct contact with these chemicals, which may exist as solids, liquids, gases, vapours, mists, fumes or smoke. Common occurrences include exposure of chemical elements from ammunition and explosives, combustion products from weapon firing or engine exhaust, chemicals contained in smoke screens, vapour from paints, coating battery acid and exposures associated with maintenance activities. One example of this

hazard is the firing of Starburst Missile. The Starburst missile is a man-portable, shoulder missile for anti-air point defence. By its design this weapon can be fired from enclosed positions, from foxholes or from positions in open terrain. When this weapon is fired from an enclosed position it may cause adverse effect to the skin and respiratory tract.

3.4 OSHH LAW

The Occupational Safety and Health Act 1994 was passed by Parliament on 25 Feb. 1994 to ensure as far as possible every persons at work in the nation are safe and working in a healthy condition to preserve and protect the human resource. However, nothing in this Act is applicable to personnel in the Armed Forces. Although this Act is not applicable to the Armed Forces, most of its provisions can be use for the guideline to control and reduce the OSHH in the Armed Forces. The provision in this Act had stipulated the following objectives:

- a. To secure the safety, health and welfare of persons at work against risks to safety or health arising out of the activities of persons at work;
- b. To protect persons at a place of work other than persons at work against risks or safety or health arising out of the activities of person at work;
- c. To promote an occupational hazard environment for persons at work which is adapted to their physiological and psychological needs;

d. To provide the means whereby the associated occupational safety and health legislation may be progressively replaced by a system of regulations and approved industry codes of practice operating in combination with the provisions of this Act designed to maintain or improved the standards of the safety and health.

(Laws of Malaysia Act 514,1996)

This Act also spelt out the general duty of employers to their employees to ensure, so far as is practical, the safety, health and welfare at work of all his employee. The duty extends include the following particulars:

- a. The provision and maintenance of plants and systems of work that are, so far as is practicable, safe and without risks to health;
- b. The making of arrangements for ensuring, so far as practical, safety and absence of risks to health in connection with the use or operation, handling, storage and transport of plant substances;
- c. The provision of such information, instruction, training and supervision as is necessary to ensure, so far as is practical, the safety and health at work of his employees;
- d. So far as practical, as regards any place of work under the control of the employer or self-employed person, the maintenance of it in a condition that is safe and without risks to health and the provision and maintenance of the means of access to and egress from it that are safe and with such risks;

e. The provision and maintenance of a working environment for his employees that is, so far as is practicable, safe, without risk to health, and adequate as regards to facilities for their welfare at work.

(Laws of Malaysia - Act 514, 1996)

This Act requires every employer to prepare a written statement of his general policy with respect to the safety and health at work of his employees. The employer must ensure that the organisation and arrangement are made to carry out that policy and to bring notice to his entire employee. Both the employers and the employees have responsibilities and rights under the Act. Employers are required to provide a safe working place free from OSHH and the employees are required to take reasonable care for their own safety and health and of other persons who may be effected by his acts or omission at work. For example, to wear and use at all times any protective equipment or clothing provided by employer for purpose of preventing risks to his safety and/health.

3.5 CONCLUSION

Like many other professions, the Army system has the OSHH that can be a threat to the personal health. The OSHH in the Army system covers a wide range of hazards which can be summarised into acoustic energy, temperature extreme, physical trauma, vibration, shock, occupational stress, oxygen deficiency, biological and chemical effects. However, there are not many scientific researches being carried out in the Amy to study the extent of these OSHH. The expanding role of the army in meeting the global

peacekeeping operation, the use of the state of the art weapon system and the overall focus of the Army to become a credible force in the future will change the working condition and environment of the Army considerably. Although the Occupational Safety and Health Act 1994 is not applicable to the army, every effort must be accomplished to fulfil the provision in the act. Due consideration to control and reduce the OSHH must be programmed to ensure healthy working environment in the Army. This issue will be discussed further in the subsequent chapters of this paper.