Review article on

Health issues in apparel industry

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Abstract

This paper present the health issues in apparel industry due to heat and noise problems. In the apparel industry workers faces the mental and physical problem such as skin rashes, heat illness, heat cramps, heat exhaustion, heat stroke etc due to hot work environment which decreases the productivity and efficiency of workers.

Here also mentioned the ACTU (Australian Council of Trade Unions) Guidelines for Working in Seasonal Heat and ISO Standards for the Human Thermal Environment.

Introduction

Ergonomics is the study of the relationship between a person and their work environment. The objective is to adapt the workplace for the worker in order to decrease the risk of health problem and improve the link between the worker and their environment.

In India, the readymade garment industry had its beginning during the first half of the 20th century and has witnessed impressive growth during the last four decades. It is reported to be the second highest contributor to India's export basket, after 'gems and jewelry. There are around 70,000 garment manufacturing units in the country providing employment to more than 3 million persons.

The work environment in a majority of these units is unsafe and unhealthy. These include poorly designed workstations, unsuitable furniture, lack of ventilation, inappropriate lighting, excessive noise, insufficient protection from dangerous chemicals, insufficient safety measures in fire emergencies and lack of personal protective equipment. People working in such poor or substandard environment are prone to occupational diseases.

In this article I discuss about health issues due to temperature, noise and bad ventilation system of work environment in apparel industry.

Health Problems Caused by Hot Work Environments

When the air temperature or humidity rises above the optimal ranges for comfort, problems can arise. The first effects are subjective in nature - they relate to how you feel. Exposure to more heat stress can cause physical problems which impair workers' efficiency and may cause adverse health effects.

Table 1: Problem and Symptoms Caused by Hot Temperatures

Temperature Range (°C)		Effects
20 - 27°C	Comfort Zone	Maximum efficiency
As temperature increases	Discomfort: • Increased irritability • Loss of concentration • Loss of efficiency in mental tasks	Mental Problems
	Increase of errors: • Loss of efficiency in skilled tasks • More incidents	Pyscho-physiological problems
	Loss of performance of heavy work: • Disturbed water and electrolyte balance • Heavy load on heart and circulation • Fatigue and threat of exhaustion	Physiological problems
35 - 40°C	Limit of high temperature tolerance	

(Source:-http://www.ccohs.ca/oshanswers/phys_agents/heat_health.html)

Some of the problems and their symptoms experienced in the temperature range between a comfortable zone (20C - 27°C) and the highest tolerable limits (for most people) are summarized in Table 1.

In moderately hot environments, the body "goes to work" to get rid of excess heat so it can maintain its normal body temperature. The heart rate increases to pump more blood through outer body parts and skin so that excess heat is lost to the environment, and sweating occurs. These changes impose additional demands on the body. Changes in blood flow and excessive sweating reduce a person's ability to do physical and mental work. Manual work produces additional metabolic heat and adds to the body heat burden. When the environmental temperature rises above 30°C, it may interfere with the performance of mental tasks.

Heat can also lead to accidents resulting from the slipperiness of sweaty palms and to accidental contact with hot surfaces. As a worker moves from a cold to a hot environment, fogging of eye glasses can briefly obscure vision, presenting a safety hazard.

Several studies comparing the heat tolerances of men and women have concluded that women are generally less heat tolerant than men. While this difference seems to diminish when such comparisons take into account cardiovascular fitness, body size and acclimatization, women have a lower sweat rate than men of equal fitness, size and acclimatization. Laboratory experiments have shown that women may be more tolerant of heat under humid conditions, but slightly less tolerant than men under dry conditions.

Physiological effect due to heat stress:

When the body is exposed to more heat than it can cope with, this leads to heat stress. The body tires to cope mainly by evaporation - sweating. As the temperature in the work environment increases, so too does the body's temperature. This triggers sweating and a

flow of blood to the skin where it can be cooled by evaporation. Excessive sweating leads to loss of water from the body, dehydration and loss of salt, resulting in potentially serious health effects.

Possible consequences of excessive heat:

1. **More Prone to accidents:** due to reduced concentration; slippery, sweaty palms; increase of discomfort of some personal protective gear, resulting in reduced protection and unsafe conditions, etc

2. **Skin Rashes:** "prickly heat"

3. **Heat Illness:**

Heat Cramps: Muscle spasms as a result of heavy sweating without restoring the body's salt/water balance.

Heat Exhaustion: Dehydration following heavy sweating causes clammy, moist skin, weakness and fatigue, nausea, vomiting, headache and giddiness. Reduced blood flow to the brain may lead to fainting.

Heat Stroke: Hot, dry skin and rapidly rising body temperature can lead to collapse, loss of consciousness, convulsions, even death

4. **Aggravation of other medical conditions and illnesses:** e.g. high blood pressure or heart disease due to increased load on the heart

5. **Aggravation of the effects of other hazards**: through interaction with other workplace hazards such as noise or exposure to toxic substances heat can compound their effects

6. **Reproductive Disorders**: may affect sperm count or the health of the foetus.

Who is at risk?

Workers in a variety of occupations may be exposed to heat stress. For example, working in any, or a combination of, the following conditions:

- outdoor workers - such as construction and building workers, gardeners, etc

- particularly during summer months;

- Occupations where there are plant or processes which generate radiant heat. These include: bakeries, kitchens, laundries, foundries, boiler rooms, and

steelworks and in other manufacturing processes. Workers in these industries become "acclimatized" (that is used to) to these conditions to a certain extent;

- occupations such as those in building and construction;
- hot, stuffy, and poorly ventilated buildings; and
- Working in vehicles.

ACTU Guidelines for Working in Seasonal Heat

Working in seasonal heat presents particular health and safety hazards; this may be influenced by a number of risk factors. Over 45% of respondents to the 1997 ACTU National Survey on Stress at Work reported that they were experiencing 'uncomfortable temperatures' at work. While State OHS Authorities have produced guidelines and information on working in hot conditions, there are no regulatory OHS standards for working in seasonal heat. These Guidelines are designed to assist health and safety representatives and union delegates to identify, assess and control the hazards of working in seasonal heat.

ISO Standards for the Human Thermal Environment

ISO 7243 was first published in 1982 as part of a series of related standards for the assessment of the effects of thermal environments on people. It should be considered in terms of how it relates to those other standards. The collection of ISO (International Organization for Standardization) standards and documents, concerned with the ergonomics of the thermal environment, can be used in a complementary way to provide an assessment methodology. The subject is divided into three principal areas (hot, moderate and cold environments) and remaining standards are divided into human reaction to contact with solid surfaces, supporting standards and standards concerned with specific populations and areas of application.

For the assessment of hot environments a simple method based on the WBGT (wet bulb globe temperature) index is provided in ISO 7243. If the WBGT reference value is exceeded, a more detailed analysis can be made (ISO 7933) involving calculation, from the heat balance equation, of sweating required in a hot environment and predicted heat strain. If the responses of individuals or of specific groups are required (for example in extremely hot environments) then physiological strain should be measured (ISO 9886). ISO 7730 provides an analytical method for assessing moderate environments and is based on the Predicted Mean Vote and Predicted Percentage of Dissatisfied (PMV/PPD) index, and on criteria for local thermal discomfort. If the responses of individuals or specific groups are required, then subjective measures should be used (ISO 10551).

ISO TR 11079 provides an analytical method for assessing cold environments involving calculation of the clothing insulation required (IREQ) from a heat balance equation. This can be used as a thermal index or as a guide to selecting clothing. ISO work on

contact with solid surfaces is divided into hot, moderate, and cold surfaces and standards are in final stages of development (ISO 13732 Parts 1, 2, and 3).

Supporting standards include an introductory standard (ISO11399) and standards for estimating the thermal properties of clothing (ISO 9920) and metabolic heat production (ISO 8996). Other standards consider instruments and measurement methods (ISO 7726) and standards concerned with vocabulary, symbols and units (ISO 13731), medical screening of persons to be exposed to heat or cold (ISO 12894) and a standard that considers the responses of disabled persons (ISO TR 14415). Standards under development include ISO 14505 Parts 1, 2, and 3 for the assessment of vehicle environments; ISO 15265, concerned with the combined stress of environmental components (including thermal); a standard (ISO 15743) concerned with working practices in cold environments; and a standard providing an overall philosophy of application including risk assessment (ISO 15742).

Oxygen deficiency

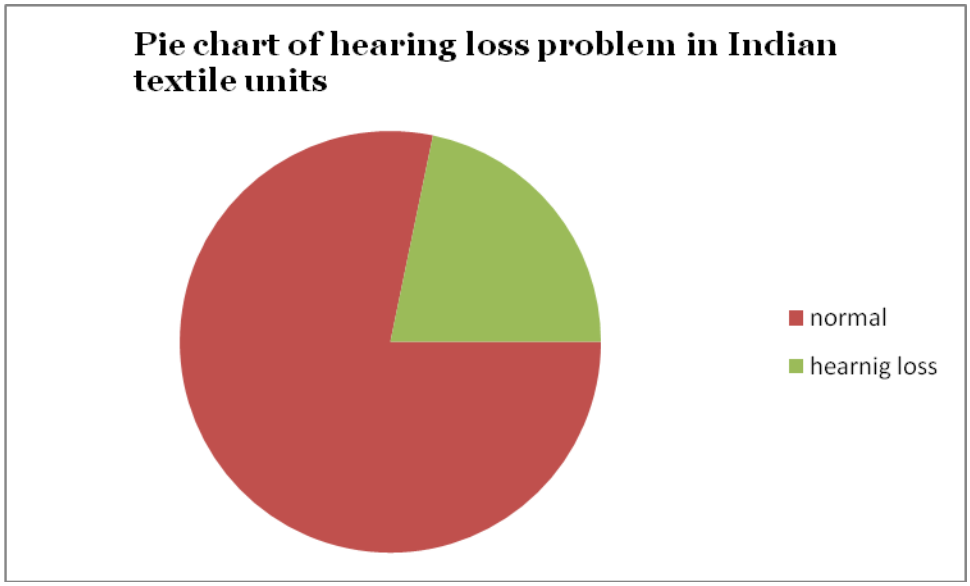
The oxygen concentration in air at normal atmospheric pressure is around 21% and is considered safe between 19.5% and 23.5%. However, work activity such as that found in controlled atmosphere rooms for the long-term storage of fruit can change the oxygen concentration.

Controlled atmosphere storage is used to slow the deterioration and maintain the quality of apples and pears for year-round marketing. Atmosphere control may be achieved by a combination of fast cooling, temperature control and control of oxygen and carbon dioxide levels in a gas-tight cool store. Typically, controlled atmosphere rooms may have oxygen levels around 2%. This atmosphere is immediately dangerous to life.

Exposure to noise:

High levels of noise have been observed in most of the units engaged in the textile industry, particularly those in developing countries. In the long run, exposure to high noise levels has been known to damage the eardrum and cause hearing loss. Other problems like fatigue, absenteeism, annoyance, anxiety, reduction in efficiency, changes in pulse rate and blood pressure as well as sleep disorders have also been noted on account of continuous exposure to noise. Lack of efficient maintenance of machinery is one of the major reasons behind the noise pollution in a majority of the units. Though it causes serious health effects, exposure to noise is often ignored by textile units because its effects are not immediately visible and there is an absence of pain.

A study of 77 employees in textile mills in Nagpur was conducted by Ruikar MM, Motghare DD and Vasudeo ND. This study revealed that 76.6% of the employees were at risk for developing noise-induced hearing loss. The study of Indian textile units by R. Steinberg, J. Hannak and K. Balakrishnan indicated that 21.3% of the workers studied suffered from noise-induced hearing loss.



Based on the study of Indian textile units by R. Steinberg, J. Hannak and K. Balakrishnan

Important of occupational health and safety

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

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.

Conclusion

Hot work environment and high noise is cause of mental stress and physical problem in apparel industry. This paper focus on types of disease and problems due to hot work and high noise environment here present a pie chart sawing the noise problem in Indian textile unit.

In this paper at some point you will find relation of hot environment to other industry. Here is also about the guidelines and ISO standard for hot work environment and process for control of hot work environment problem and noise problem.

References:

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Image Courtesy:

1. wiego.org