

OCCUPATIONAL, HEALTH SAFETY AND ENVIRONMENT IN TEXTILES

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INTRODUCTION

Textile is one of the oldest industries on the face of this world. It is as old as human civilization and is growing every other day. Textile products are a basic human requirement next to food. The textile chain from seed cotton to cotton-based textile and clothing manufactures has special importance for developing countries. Most of the cotton is produced and manufactured in the south of globe including China, India, and Pakistan. In Pakistan Textile industry is the dominant manufacturing sector as cotton has played catalytic role in growth. Pakistan has large textile industry which supports million of people directly or indirectly. The significance of Textile industry in Pakistan's economy can be gauged from the fact that it contributes more than 52% to the total export earnings of the country, and its share in GDP is 8.5% and employed 38% of total labor force. At present there are registered 521 units (50 composites and 471 spinning units) presently, the industry consists of large-scale organized sector and a highly fragmented cottage / small-scale sector. The down stream industry (Weaving -Finishing -Garment - Towels & Hosiery), with great export potential, is mostly in the unorganized sector.^{1,2,3}

Due to increased labor wages, growing competition in international market, survival for Pakistan Textile industry is becoming difficult. For survival it is necessary that productivity must be increased. To improve productivity it is necessary to give due consideration to working condition. As according to Maslow's Hierarchy of Needs, the second layer of needs is concerned with one's safety, such as protection from danger. If this layer of need is followed, motivation of worker can be increased.⁴ Productivity of any organization can be improved either by increasing the resources or by improving the use of existing resources. So by improving work environment, one can increase productivity. The work environment includes all factors that affect the workplace and job performance even though they may not be directly involved in the operation itself. To maintain social and economic development, a healthy productive worker is very critical. Occupational health is an important strategy not only to ensure health of workers, but also to contribute productivity, quality of products, work motivation, job satisfaction and thereby overall quality of life or society.⁵

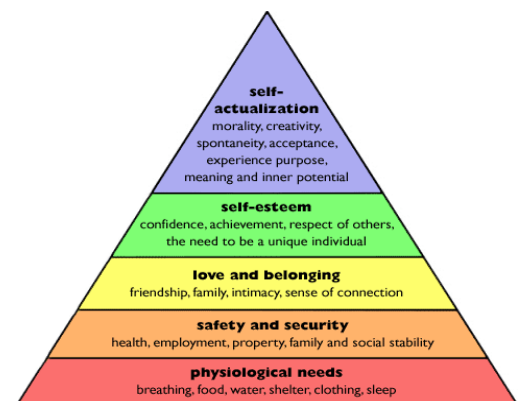


Figure1: Maslow's Hierarchy of Need

Definition of Occupation Health and Safety:

The definition of occupational health was adopted by the joint ILO/WHO (International labor organization/ World health organization) in 1995.⁶

“The promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention among workers of adverse effects on health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of workers in an occupational environment adapted to physiological and psychological capabilities; And to summarize, the adaptation of work to man and of each man to do his job”.

And

The definition of Occupational hazards “Source or situation with a potential for harm in terms of injury or ill health, damage to property, damage to the workplace environment, or a combination of these”

According to ILO, every year more than 2 million people die from occupational accidents or work-related diseases. By conservative estimates, there are 270 million occupational accidents and 160 million cases of occupational disease. Occupational injuries alone account for more than 10 million Disability –Adjusted Life Years.(DALYs) The occupational safety conditions vary enormously between countries, economic sectors and social groups. Deaths and injuries take a particularly heavy toll in developing nations, where large numbers of people are engaged in hazardous activities such as agriculture, textile, construction, logging, fishing and mining. Developing countries have more fatal accidents than industrialized nations. People in developing countries bear more than 80 % of the global burden of occupational diseases and injury. The ILO estimate is really just the tip of iceberg, because the numbers of work-related diseases in developing countries are much higher in reality than the numbers that are reported. Due to occupational risks number of problem arises like for workers ,the pain and suffering of the injury or illness; the loss of income; the possible loss of a job; health-care costs and for employer,payment for work not performed; medical and compensation payments; repair or replacement of damaged machinery and equipment; reduction or a temporary halt in production; increased training expenses and administration costs; possible reduction in the quality of work; negative effect on morale in other workers. Poor health and safety conditions in the workplace can also result in poor public relations.

Types of Occupational Hazards:

Common workplace hazards are categorized in six groups: ⁷

1. Mechanical hazard (confined space, equipment related injury,
2. Physical hazard (Noise, vibration, Lighting, Electricity)
3. Biological hazards(Bacteria,Virus,Tuberculosis)

DALY is a composite measure that combines the numbers of years lived with a disability and the number of years lost to premature death.

4. Chemical hazards (Acids, Base, heavy metals, fire hazards, Particulates (dust/ fiber material)
5. Psychosocial hazards (Stress, violence)
6. Ergonomic issues (material handling, machine design, personal factors)

Condition of OEHS in Pakistan:

The incidence of occupational diseases and injuries is very high in Pakistan because thousands of workers are routinely exposed to hazardous technologies. The introduction of hazardous technologies in industry and agriculture has resulted in high accident rates, occupational diseases, and unhealthy working environments. These injuries in the workplace are really tragic. Poor working conditions of any type have the potential to affect a worker's health and safety. No data about occupational health and safety (OHS) are available in Pakistan because the majority of accidents are not reported to the Labor Department. Pakistan has poor occupational safety and health legislation and infrastructure to promote it. Government data in 2007 show 534 industrial accidents occurred in factories registered under the Factories Act 1934. But actual figures are definitely more than that because a majority of accidents are not reported to the regulatory agencies. The regulatory agencies do not have an effective enforcement policy nor strict requirements for reporting injuries and illness at workplaces.

Table 1: Industrial accidents in Factories Registered under Factories Act-1934

Accident	2003	2004	2005	2006	2007
Total	354	404	415	625	534
Fatal	32	34	38	91	159
Serious	103	68	101	139	130
Minor	219	302	276	395	245

Source: Labor Division

Table 2: Percentage distribution of employed persons 10 years of Age and over suffered occupational Injuries/diseases By Area, Sex and Provinces 2008-2009

STATUS OF INJURIES / DISEASES	ALL AREA			RURAL			URBAN		
	TOTAL	MAL E	FEM ALE	TOTAL	MA LE	FEM ALE	TOT AL	MAL E	FEM ALE
1	2	3	4	5	6	7	8	9	10
PAKISTAN	100	78.8	21.17	69.97	52.0	17.9	30.03	26.7	3.28
INJURIES / DISEASES	2.71	2.48	0.23	2.18	1.96	0.22	0.53	0.52	0.01
NONE	97.29	76.3	20.94	67.79	50.1	17.68	29.5	26.2	3.26
PUNJAB	58.96	44.6	14.32	42.2	30.1	12.07	16.76	14.5	2.25
INJURIES / DISEASES	1.5	1.34	0.16	1.22	1.06	0.15	0.29	0.28	0.01
NONE	57.46	43.3	14.16	40.98	29.0	11.91	16.47	14.2	2.24
SINDH	25.05	21.0	4.04	14.5	11.2	3.27	10.55	9.78	0.77
INJURIES / DISEASES	0.95	0.89	0.06	0.74	0.69	0.05	0.2	0.2	0.01
NONE	24.1	20.1	3.98	13.76	10.5	3.22	10.35	9.58	0.77
NWFP	11.76	9.39	2.37	9.94	7.76	2.17	1.82	1.63	0.19
INJURIES / DISEASES	0.23	0.22	0.01	0.2	0.19	0.01	0.03	0.03	
NONE	11.52	9.17	2.35	9.74	7.57	2.16	1.79	1.6	0.19
BALUCHISTAN	4.23	3.79	0.45	3.33	2.95	0.39	0.9	0.84	0.06
INJURIES / DISEASES	0.02	0.02		0.02	0.02		0.01	0.01	
NONE	4.21	3.77	0.45	3.32	2.93	0.39	0.9	0.84	0.06

Source: Labor division

Condition of OEHS in Pakistan Textile Industry:

Hazards in the workplace are often caused by the use of materials, tools, machinery and chemicals. The textile sector which demonstrates the largest manufacturing activity in Pakistan, is known to display poor and even hazardous working conditions. Even the

organized sector is found to be no exception to this sorry state of affairs. The textile worker faces a variety of problems. A survey in 1999 by the Centre for the Improvement of Working Conditions and Environment (CIWCE) based in Lahore found industry lacks basic hygiene facilities, has inadequate exhaust filters, fire prevention and medical facilities (even first aid), emergency transport, waste disposal services, and hazard warning signs. New chemicals have increased the ratio of accidents. Most workers are illiterate and do not know what protective measures should be adopted for their jobs. This results in an increasing toll of work related accidents and diseases.

First there is the problem of safety with many machines around that are often unguarded, Lack of adequate safe-guards is the major characteristics of numerous work places in Pakistan, as well as the risk of fire with so much combustible material in the workplace.

Second, Air contamination in industrial workplace can be hazardous, because they may be flammable, toxic or irritating .Air contamination includes gases, dust and smoke .In spinning and weaving industry cotton dust leads to many health hazards in majority of textile workers like byssinosis, cough and bronchial asthma.⁹ In spinning for converting fiber into yarn, no. of foreign contents are removed from it. In weaving industry fiber fly liberated by the friction of weft

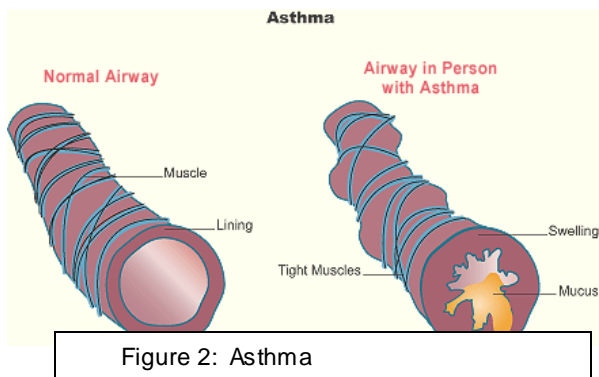


Figure 2: Asthma

thread against the guide eyes and the tensioners and of the warp ends against the drop wire, healds and the reed, increase the dustiness in the weave room. Settle on the machine, mixed with lubricants may have an adverse effect on the m/c performance, the fabric quality and create problem for workers. These are highly prevalent in mills of developing countries such as Ethiopia, Sudan, Egypt, Central Africa and to a lesser extent, in South

Africa, India and China ¹⁰. In these countries sickness absence due to respiratory problems has also been reported to be high. In developed countries, however modern mill engineering and dust control measures have kept respiratory problems significantly low. Even, where the dust concentration is low, the well being of workers can be affected by other contaminants of cotton. For example, ocular and nasal irritations in workers in spinning mills of cotton have been reported. Exposure to cotton dust, acids, caustics, or by working in dyeing and printing area in the textile industry have risk of nasopharyngeal cancer (NPC) in this cohort.¹¹ In local weaving industry the infrastructure is highly un-hygienic. The rooms are not constructed according to health view point; these are overcrowded, poorly ventilated and badly lighted rooms. There are no concepts of dedusting /ventilation system in such industries. As a result workers suffer from allergies, skin rashes and other skin diseases.^{12, 13} Proper Lighting systems

Dust is airborne solid particles that ranges from 0.1 to 25 microns, Dust above 5 microns in size do not usually airborne so it cannot be inhaled.

is very essential to prevent a worker from any eye diseases. Good illumination also helps in attaining high efficiency in production.

Occupational problems related to children work in carpet making. They are subjected to skeletal deformities, ergonomic, eyesight and health problems due to exposure of toxic chemicals. The squatting working position causes deformed or serious crippling arthritis of the knee and permanent deformities of fingers. Eyesight disorders occur due to constant close attention to the point of weaving.¹⁴In a study conducted in weaving industry in Faisalabad, indicates that 30% workers suffer eye sight problem.¹⁵

Excessive occupational exposure to noise results in a well recognized occupational hearing loss and now is taken as a global problem .Noise is another factor which affects productivity. Effect of noise on the human beings have been studied since long and all medical authorities agree that excessive and protracted industrial noise cause: ' Fatigue, irritation, general depression, high blood pressure and inability to concentrate. Pulse, stomach contractions, rate of breathing, strength of grip, reaction times and psychological intelligence are like wisely affected. Above all repeated exposure to loud industrial noise may cause temporary or permanent deafness (noise induced hearing loss).Because of the harmful effects of noise on the operatives, a drop in efficiency, higher absenteeism rate, cause accidents by interfering with communication and warning signals, increased errors and low occupancy result. In textile mills this problem is frequent. The problem is more acute in spinning and weaving factories where older equipments is present because it operates much higher level of sound than does new , poor design and construction and crowding of the workplace. The most important cause of hearing impairment in Pakistan is noise and the major sources of noise are the industries.¹⁶ In Pakistan there is no well defined and comprehensive regulations except Pakistan National Environmental Quality Standards (PEQS) which are meant only for motor vehicle noise and allow the maximum permissible noise emission limit of 85dB (A).¹⁷ In a study conducted in weaving industry in Karachi where 248 workers exposed to noise. Result showed that noise level in these industries was 88.4-104 db (A) with mean noise level 95, 3 db (A) which is much higher than permissible noise level recommended by OSHA i.e 85 db (A).It was also observed that working experience of more than 10 years and overtime create this situation more drastic.¹⁸Hearing damage could occur when exposed to noise above 85 dB(A) (or decibels). While lower intensity noise also causes irritation and stress and reduces human efficiency. The noise below the 80dB cause only negligible changes in the hearing even after long term exposure of several years. 80dB-110dB, hearing defects with part of personnel, after some years.110dB-130dB, leads hearing defects with all operator during 2-3 years.130dB-----
----- Threshold of pain.^{19,20}

The following chart gives recommended limits of noise exposure for the number of hours exposed

Table 3: Permissible Noise exposure

No. of hours exposed	Sound level dB
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

Source: Table G-16, 40 CFR 1910.95(a)

Exposure of workers to the electrical current with the knowledge of the hazards and without the knowledge of hazards is another threat. Many workers get into trouble as they are unaware of the fact that the place where they are working has the electrical current involved and that may make them suffer at any time. Many workers are unaware of the potential electrical hazards present in their work environment, which makes them more vulnerable to the danger of electrocution.²¹

Another hazard in textile industries is Ergonomic disorders (Musculo-skeletal disorders (MSDs), Cumulative-trauma-Disorders (CTDs) etc). Ergonomics is the interaction of worker and their work environment. In sort ,it is ``Adjustment of Man & Machine``.It improve the human efficiency and productivity. Back pain is major problem in weaving and sewing industries. All forces which come down the spine compresses discs and as a result of continuous squeezing they can rupture and bulge causing severe pain. Most back injuries are built over a long period of time by repetitive pounding on discs caused by improper methods. After sometime some minor lift can produce such rupture. With regard to disability, WHO found that 37% of all back pain is attributed to nature of work. CTD is another problem which is common in apparel industry. It is basically injuries that overtime cause pain in body parts. It occurs due to awkward body position or postures, repetitive motion etc.^{22,23,24} In a study conducted in weaving industry of Faisalabad , 76% of workers have to work for 8 to 12 h in standing position that is why 18% of respondents got joint pain. Long hours of static work with awkward posture at

traditionally designed looms can cause high prevalence of musculoskeletal disorders (MSDs) among weavers.²⁵

Notwithstanding this serious lack, yet another dimension of the labor market issue in Pakistan is, the longer working hours. One-third of the employers in Pakistan are found to be working more than standards working hours. Lack of job satisfaction, insecurity, poor interpersonal relations, work pressure, ambiguity, etc²⁶

A Short Study:

A study was conducted in the mills at Lahore- Sheikhpura road. These were weaving mills and each mill consisted of average work strength of 400 workers. We selected 4 mills randomly keeping in view that the selection must be considerate of the fact that mill must be at least six years old. 40 workers from each mill were selected randomly. The workers were selected on the basis of their work experience in the mill. I conducted a study among them in order to know their knowledge about OHS. The groups included people from work experience of one year to five years respectively. Each group from a mill consisted of ten people, so we asked the questions from all members of a group. The questions were

- Question A: During the work, do they use masks?
- Question B: During the work, do they use ear plugs? If yes, for how long they have been using them
- Question C: Do they know what are the exit points in case there is an emergency
- Question D; Do they know what kind of safety equipments are in the mill and how they are needed to operate them, for example fire extinguishers, alarms etc

Table 4 : Distribution of the respondents according to facilities provided them in weaving industry

	Team A		Team B		Team C		Team D	
	Yes	No	Yes	No	Yes	No	Yes	No
Question A	0 %	100 %	0 %	100 %	1%	99 %	5 %	95 %
Question B	7 %	93 %	10 %	90 %	15 %	85 %	25 %	75 %
Question C	25 %	75 %	50 %	50 %	70 %	30 %	90 %	10 %
Question D	2 %	98 %	5 %	95%	10 %	90 %	15 %	85 %

Team A is team where group members are working for last four years and except from knowledge of emergency exit there information stands very poor. Team D is the team who is working in the mill for last 4 years; now the results show that team D has got the best of knowledge there and the group having the best knowledge does not look that good on the picture.

Laws and Regulations on OHS:

Prior to World War 1, workers were often considered replaceable. After the WW, labor shortage occurred, some workers' rights are considered, but improvement of working conditions was still needed to be focused. The fire in Triangle Shirtwaist (New York City) in 1911 was the most important event leading to the regulation of occupational safety. 146 workers died from fire in the upper part of this "fireproof" building, Fire exits were inadequate or locked. Many victims jumped to their deaths. The Triangle Shirtwaist Fire probably was the most important event leading to the regulation of occupational safety. Similarly, in the construction of the Hawks Nest tunnel near Gauley Bridge, West Virginia, in 1930 caused massive exposures to silica dust. At least 476 men died and 1500 disabled by silicosis. This was America's worst industrial disaster.^{27, 28}

Occupational Safety and Health Administration (OSHA) was established in 1970, It is a federal agency that develops and enforces health and safety standards for the workplace. OSHA standard regulates a wide range of factors from permissible limit of noise to design of equipment. Occupational Health and Safety Assessment Specification (OHSAS) is an international standard giving requirements related to health and safety management systems in order to enable an organization to control its risks and improve its performance. It is applicable to any organization from all types of business sectors and activities. Certification against OHSAS 18001 is intended to help organizations to control occupational health and safety risks. It is aimed at the way a company has control over, and knowledge of, all relevant risks resulting from normal operations and abnormal situations.^{29, 30}

Pakistan was one of the founding members of WTO. After the 2005, world became open for every country, quota system has been finished. Due to globalization of trade, several organizations are now extremely environment-conscious, and strict about adherence to international labour, health and safety standards.³¹ In accordance with the WTO regime, foreign investors and importers would require compliance of the local industry with international standards, such as International Organization for Standardization (ISO). But there is little effort on the part of the government of Pakistan to develop a comprehensive environmental health and safety law. An overview of current laws/regulations related to occupational safety and health shows that there are several laws on the book, such as Factories Act, 1934; Provincial Factories Rules; Hazardous Occupations Rules, 1963; Mines Act, 1923; West Pakistan Shops and Establishments Ordinance, 1969; Provincial Employees Social Security Ordinance, 1965; Workmen's Compensation Act, 1923 and Dock Laborers Act, 1934. The current regulations are, however, fragmented and there is no single comprehensive piece of legislation dealing with occupational safety and health. There is no formal legislative process for setting up new standards, codes of practice and occupational exposure limits. Whatever exists on the book is frequently hampered with repeated martial laws. The current outdated Factories Act, established in 1934, requires only a very basic level of safety and health measures. It regulates certain occupations as hazardous, and contain special provisions to regulate the working conditions in those occupations. The health and safety measures prescribed in most of the above laws have not kept pace

with the rapidly changing times. Many of the sectors with grave OHS hazards (and most workers anyway) are not covered by these laws such as agriculture, construction and informal/self-employed are not even covered under any law. . They contain very few technical standards. There are no guidelines for minimum qualifications or employment of health and safety professionals in the industry. Furthermore the occupational exposure limits (OELs) now common all over the world are still missing from Pakistan's laws. These laws must be thoroughly revised and updated. In 2001, the government announced a Labor Policy Initiative and proposed to create a National Occupational Safety and Health Council (NOSHC) to review and update the existing laws. However, none of that has materialized yet. Such negligence on the part of the government and the lack of realization by the local industry could cost the country billions in international trade.³²

Suggestions/Recommendation:

The lack of formal education, absence of a national focal institution for providing training and advisory services, lack of strict requirements by the enforcement agencies for authentic data collection and reporting, lenient enforcement of the law, lack of technically qualified personnel for inspection services that can recognize and evaluate occupational hazards, lack of Inter-agency coordination at the government level, inadequate funding for OSH programs and limited expertise at the policy making level, as well as illiteracy of the workforce is some of the handicaps which have inhibited growth of safety culture. In Pakistan there is no trend to facilitate the workers neither from the Pakistani Government nor from the owners of any textile industry. We should revise our policies and educate our big and small entrepreneurs regarding different compliance requirements to the Textile industry. There must be established policies binding the owner of the textile industry to educate the workers regarding health and environmental protection. Most of the diseases and health problems found in textile industry can be avoided by proper precautions and care. Maximum effectiveness of OHS systems requires the inclusion and meaningful participation of employees in implementation and maintenance of procedures and processes. At least two percent of income from every industry should be spent to provide OSH protection.³³ Some other suggestion regarding occupational safety is:

1. General house keeping must be maintained.
2. Halls and exits must be kept clear of obstructions for safe and rapid evacuation in case of fire or other emergencies.
3. Work place must be equipped with fire detectors and alarm systems
4. Fire extinguishers must be placed in or accessible to all exits.
5. Hazardous and combustible materials used in the production process are not stored in the dormitory or in buildings connected to sleeping quarters.



Figure 3: Personal Protective Equipment

6. Fire drills should be conducted at least every six months.
7. The temperature in the work place should be appropriate.
8. Gloves and proper uniform must be given.
9. Air plugs are to be used in high sound areas like in weaving shed. Engineering controls should be used to reduce noise exposure before using ear protection and rotation.
10. Masks are to be used in spinning weaving and processing industry for protecting from cotton dust and chemicals.
11. written and accessible information regarding OHS
12. Work area light intensity must be adequate.
13. Warning signs in local language.
14. Tool / machine design to fit to work. Design Ergo tools/ ergo friendly tools : Tools which reduce the stresses or problems resulting in CTD's.

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