

Country Profile on Occupational Safety and Health in Pakistan



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Summary

This study was undertaken to produce a country profile on Occupational Safety and Health in Pakistan. Various Government institutions were visited in Pakistan to collect the data and concerned officials were interviewed. A survey of occupational safety and health to 50 industries was conducted in Punjab province, Pakistan to find out the existing status of OSH in paints manufacturing, shoes manufacturing, surgical instruments manufacturing and furniture industries.

While going through the legislation in Pakistan on OSH, it is found that it lacks in many ways. For example Factories Act 1934 is not applicable to the enterprises employing less than ten workers. It does not give coverage to the workers in the agriculture sector, informal/house-based and seasonal workers. Whereas the role of inspecting staff of Labour and Human Resource department should not be only prosecuting but to give an advisory services to the management as well.

Majority of the workforce in Pakistan is illiterate and not trained in occupational safety and health. Moreover OSH is not included in any curricula in Pakistan. The number of occupational health physicians and nurses is far less compared to the total workforce in Pakistan. This means that occupational health system is not established in the country.

Although OSH conditions in export oriented industries (sports goods, surgical instruments manufacturing and textile industries) is encouraging but generally they are poorly organised in most of the industries.

Survey in 50 industries revealed that working conditions and environment in small industries are poor compared to medium sized industries. Moreover the industries studied have taken no effective control measures.

With the arrival of new Labour Policy 2002 (first after 1972), it is hoped that Pakistan will focus on dignity of labour, strengthening bilateralism, elimination of animosity and antagonism by fostering a trust relationship between employer-employee and promoting social dialogue. The change in existing labour legislation (as proposed in Labour Policy 2002) will help to solve the long awaited questions such as coverage of workers in agriculture and informal sector and home-based workers and establishment of National Tripartite Occupational Safety and Health Council.

There is a great need for the industries to improve the status of Occupational Safety and Health in Pakistan in order to meet the emerging challenges of globalisation and to compete in the international market.

1. Introduction

The diseases and accidents at work remain one of the most appalling tragedies of modern industrial age and a sheer form of economic waste. The incidence of occupational diseases and injuries is still very high all around the world. According to the ILO estimates (1999), over one million work-related deaths, about 250 million occupational accidents occur annually and hundreds of millions of workers suffer from workplace accidents and occupational exposure to hazardous substances worldwide. The situation in many developing countries like Pakistan is even more grave due to a number of factors like illiteracy, lack of education, inadequate medical facilities, lack of reliable information and data of fatal accidents and injuries suffered by workers each year.

Healthy workers are productive workers with high morale and better productivity. The introduction of modern and hazardous technologies in the industries has resulted in high rates of accidents, occupational diseases and unhealthy working environment. As most of the workforce in Pakistan is illiterate, most of them do not know the protective measures to be adopted in their jobs. This results in mounting toll of work related accidents and diseases, resulting in loss of valuable working hours in case of industry and livelihood in case of self-employed workers. Pakistan lags in the enabling legislation in the field of occupational safety and health, the infrastructure to promote and enforce occupational safety and health are inadequate. A large proportion of workforce is employed in the informal and unregulated sectors of economy such as agriculture, construction and small sized enterprises. Some segments of the workforce especially the women and children are even more vulnerable as they are largely employed in the informal sector and agriculture, with little or no access to basic occupational health services.

Pakistan like many developing countries, is undergoing a transitional phase in its economy. Globalisation of world trade is bringing new challenges in the field of occupational safety and health. The state owned enterprises and monopolies are being dis-invested and privatised. Despite the slow growth in the formal industrial sector during the last few years, the informal and service sectors are growing at a rapid pace. The mounting inflation, high rate of population growth and unemployment are forcing the children and women into the job market. Most of the workforce is not prepared to cope with the hazards posed by the modern technologies and processes. The legislation concerning occupational safety and health needs updating. The country lacks the basic infrastructure and qualified personnel for providing occupational safety and health services to the workforce.

The basic idea of this report has been taken from People and Work, Research Reports 44, Work and Health Country Profiles, Finnish Institute of Occupational Health, Helsinki, Finland 2001 [1]. The second chapter gives basic information about Pakistan in terms of area, economy and labour force etc. Health care systems and legislation and coverage of OH&S are discussed in the next chapter. Chapter 4 deals with human resources in OH&S. Indicators of occupational safety and health outcomes are discussed in chapter 5. Chapter 6 concerns about the consumption of chemicals in Pakistan. A study regarding country profile on occupational safety and health was undertaken in the province of Punjab, Pakistan in 2001. In this regard a survey in 50 medium sized industries was carried out. Four different types of industries were selected in the survey, namely:

1. Paint Manufacturing Industries.
2. Shoes Manufacturing Industries.

3. Surgical Instruments Manufacturing Industries.

4. Furniture Industries.

Chapter 7 deals with this survey in 50 industries in the province of Punjab, Pakistan. In chapter 8 some recommendations are suggested which if adopted may reduce the mounting toll of accidents and occupational diseases in Pakistan.

Although this study was carried out in Punjab province, but a similar kind of industries/processes and conditions prevail throughout Pakistan.

2 Basic Information on Pakistan

2.1 Area and Population

The Islamic Republic of Pakistan emerged as an independent state on 14 August 1947. It comprises four provinces: Punjab, Sindh, Northwest Frontier and Baluchistan, besides the Federally Administered Tribal Areas. Islamabad is the federal capital. Over 97 % of the population are Muslims. Pakistan's current population is 140.5 millions (population density 164 per Km²), almost 2.3 % of the world's population, making it the 7th most populous country in the world. [2] Each year, another 3.2 million people are added to this number. If this rate continues, Pakistan's population would reach 222 million by the year 2020. Such a high growth rate coupled with the country's weak socio-economic profile would render all efforts towards development futile. It would also contribute significantly to raising the proportion of the population below the poverty line. Although Family Planning Programmes have been pursued in the country but frequent changes in strategies and inconsistent political support have acted as a hindrance in their successful implementation. The urban/rural population break-up reveals that one in three persons live in urban areas as the share of rural population has declined by 4.2 %, from 71.7 percent in 1981 to 67.5 percent in 1998. The share of the urban population has accordingly increased from 28.3 percent in 1981 to 32.5 percent in 1998. Urdu is the national language of Pakistan and official language is English.

Pakistan covers an area of 796,095 sq. km. lying between latitude 24 degree and 37 degree North and longitude 62 degree and 75 degree East. The country borders Iran on the West, while India in the East, Afghanistan in the North and Northwest and the Peoples Republic of China in the Northwest to Northeast.

Table 1. Population statistics of Pakistan in 1998 [2,3,4]

Population (million)	130.57
Men (%)	51.9
Women (%)	48.1
Labour force (million)	38.63
Employed (million)	36.36
Men (%)	NA
Women (%)	NA
Unemployed (million)	2.28
Live births per 1000 population*	33.8
Deaths per 1000 population*	8.9

NA-Data not available

2.2 Economy

The persistence of large fiscal and current account deficits and the associated build up of public and external debt have been the major source of macroeconomic imbalances in Pakistan during the 1990s. Failures in enhancing revenues consistent with growing expenditure requirements on the one hand, and the stagnation in exports and decline in other foreign exchange inflows, far short of foreign exchange payment requirements on the other, have exacerbated macroeconomic imbalances over time. These imbalances vitiated a stable macroeconomic environment. Growth was impeded and poverty increased in Pakistan in the 1990s. Such imbalances cannot be sustained indefinitely, and the longer they persist, the greater the subsequent adjustment needed. Furthermore they usually manifest themselves in high inflation and periodic balance of payments crises. The Government of Pakistan is of the view that if these are left uncorrected, the worsening macroeconomic imbalances would lead to higher accumulation of debt, a loss of national sovereignty, an uncertain environment for investment and jeopardising the prospects for sustaining high growth [4]. The Government believes that Pakistan's economic problems are structural in nature and the objectives of sustaining high growth, low inflation, and external payments viability cannot be achieved without removing structural bottlenecks. It is with this in view that a series of structural reform measures were initiated during the current fiscal year such as tax reforms, trade and tariff reforms, deregulation and privatisation, financial sector reforms, improving governance, fiscal transparency and poverty alleviation programme. Like the stabilization effort, this has been recognized as the appropriate policy to take Pakistan towards higher levels of sustainable growth in medium term.

Table 2. Selected economic indicators of Pakistan [2]

Gross national product (GNP) per capita (in US \$)	\$ 460
Gross domestic product (GDP) per capita (purchasing power parity in US \$) (2000 estimated)	\$ 2000
GDP produced by agriculture, fishing, forestry, livestock's (1999-2000) %	25.9 %
GDP produced by industry (1999-2000) %	25 %
GDP produced by services (1999-2000) %	49.1 %

The major export commodities of Pakistan are cotton, synthetic textiles, fish, leather, rice, wool and carpets and sports goods. These categories of exports, on average, accounted for around 88 % of the total exports in the decade of 1990's. Among these categories, cotton group alone contributed on average 60.3 % to total exports in this period, followed by leather (7.9 %), synthetic textiles (6.5 %) and rice (5.7 %). These four items together accounted for 80.4 % of total export earnings. Furthermore almost all the export earnings of cotton group have originated from textile and clothing. Such a high degree of concentration of exports in few items is a major source of instability in export earnings. A poor cotton crop can seriously affect total export proceeds, as it has been observed several times during the decade.

In 1999-2000 Pakistan imported mainly machinery excluding transport equipment (13.9 %), petroleum and products (27.2 %), chemicals excluding fertilisers (17.5 %), edible oils (4 %) and transport equipment (5.5 %).

2.3 Labour Force and Employment

On the basis of estimated population of 140.5 million for mid-year 2001 and participation rate of 29.4 percent, as per Labour Force Survey 1997-98, the total labour force in Pakistan comes to around 38.8 million. Distribution of labour force for the years 1995-2001 by rural/urban areas is given in Table-3 and Fig-1

Table. 3 Rural-Urban Labour Force [2]

Year	Population (Mid Year)	Labour Force		Rural		Urban	
		Million	Annual % Change	Million	% Share	Million	% Share
1995	122.4	31.8	-	22.2	70.0	9.6	30.0
1996	125.4	32.6	2.5	22.7	69.6	9.9	30.4
1997	128.4	34.6	6.2	24.1	69.7	10.5	30.3
1998	131.5	36.4	5.1	25.7	70.8	10.6	29.2
1999	134.5	37.2	2.3	26.2	70.4	11.0	29.6
2000	137.5	38.0	2.2	26.6	70.0	11.4	30.0
2001	140.5	38.8	2.2	27.0	69.5	11.8	30.5

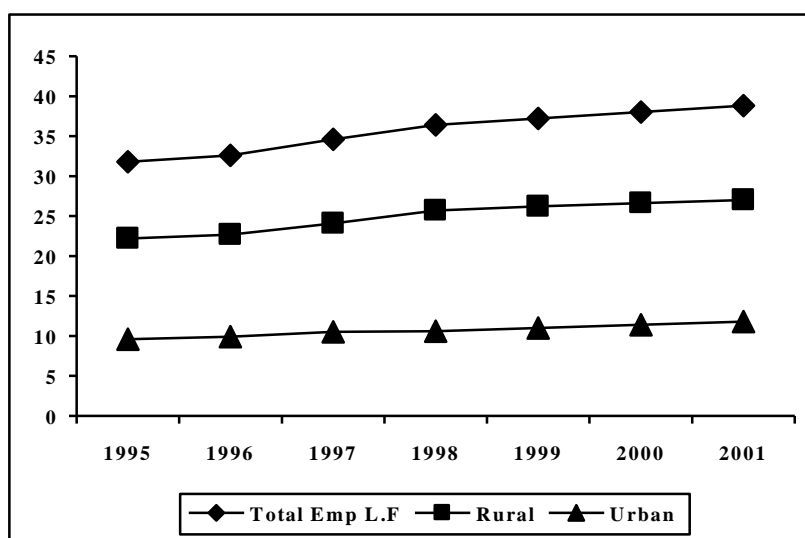


Fig 1 Employed Labour Force by Area (Million) [1]

Out of 33.6 million of total employed labour force in Pakistan in the year 1995, 69 % worked in rural areas while 31 % worked in urban areas. Table 3 shows that during the last three years (1999-2001), annual change in the total employed labour force remains the same (around 2.2 %). Although the total employed labour force in Pakistan has increased from 33.6 million in 1995 to 41.2 million in 2001; the percentage share of rural and urban labour force remains almost at the same level (Table 3 and Fig 1). This is because of the agriculture sector being the largest employer. On the other hand the growth of industry in the last couple of years remains stagnant.

2.4 Labour Force Participation Rate

In Pakistan Labour force participation is estimated on the basis of Crude Activity Rate (CAR) and Refined Activity Rate (RAR). The CAR is the percentage of labour force in total population and the RAR is the percentage of labour force in population of persons 10 years of age and above. According to the Labour Force Survey 1997-98, the overall labour force participation rate (CAR) was 29.4 percent (30.6 percent in rural areas and 27.0 percent in urban areas), while the CAR was 27.5 percent in 1994-95. It increased to 28.7 percent in 1996-97 and to 29.4 percent in 1997-98. Similarly RAR was 41.2 percent in 1994-94 but increased to 43.0 percent in 1996-97, and to 43.3 percent in 1997-98.

Labour force participation rate differs between rural and urban areas. In rural areas, the participation rate is higher as agriculture is more of a family occupation than mere work. Women's participation rate is lower than men's due to cultural taboos and non-availability of suitable job opportunities. The crude and refined labour force participation rates by area and sex for 1994-95, 1996-97 and 1997-98 are given in the Table 4.

Table. 4 Labour Force Participation by Area and Sex [2]

(No in millions)

Year	Crude Activity Rate (CAR)			Refined Activity Rate (RAR)		
	Pakistan	Rural	Urban	Pakistan	Rural	Urban
<u>1994-95</u>						
Both Sexes	27.5	28.0	26.1	41.2	43.1	37.0
Male	45.9	46.0	45.7	69.1	71.3	64.3
Female	7.6	8.7	4.9	11.4	13.2	7.0
<u>1996-97</u>						
Both Sexes	28.7	29.4	27.1	43.0	45.1	38.9
Male	47.0	47.2	46.5	70.0	71.8	66.5
Female	9.0	10.5	5.9	13.6	16.3	8.4
<u>1997-98</u>						
Both Sexes	29.4	30.6	27.0	43.3	46.4	37.7
Male	48.0	48.4	47.1	70.5	73.4	65.2
Female	9.4	11.5	5.3	13.9	17.4	7.4

2.5 Employment Situation

Employed labour force is defined as all persons of ten years of age and more who worked for at least one hour during the reference period and were either "paid employees" or "self employed". Based on this definition the total number of employed in the labour force in 2001 were 38.8 million as against 31.8 million in 1995. The total number of employed persons in urban areas has increased from 11.4 million in 2000 to 11.8 million in 2001. Similarly, rural employment increased from 26.6 million in 2000 to 27.0 million in 2001. From 1999, employment has increased at an annual average rate of 2.2 percent.

The number of employed labour force is quite low due to the following reasons:

1. The number of workers indicates only that ratio wherein 10 or more workers are employed in a factory registered under the Factories Act 1934.
2. This number does not include the number of workers employed in the industrial concerns having less than 10 workers including petrol pumps, restaurants, small scale workshops, auto workshops and informal sector.
3. Pakistan is an agro-based economy and a great number of agriculture workers are related to this sector. For example over 47 % share of the workforce has been taken by the agriculture sector, which is not in the purview of Labour and Human Resources department (Table 5).
4. Self employed workers are not covered.
5. There is no proper reporting system in the country.

2.6 Employed Labour Force by Sectors

Changes in the growth pattern of the economy have brought corresponding changes in the employment structure in Pakistan. The agriculture sector is still the largest employer and employs 47.2 percent of the total employed, although its relative share is on the decline. On the contrary, the relative share of the employed labour force in the services sector has increased from 15.0 percent in 1995 to 16.2 percent in 2001; while the share of trade sector has decreased from 14.6 percent in 1997 to 13.9 percent in 2001. The manufacturing, construction and transport sectors absorbed 10.2 percent, 6.3 percent, and 5.5 percent respectively in 2001, compared to 11.2 percent, 6.8 percent and 5.7 percent respectively in 1997. Employed labour force by sectors for 1995, 1997 and 2001 along with sectoral shares is presented in Table 5.

Table 5. Employed Labour Force by Sectors [2]

(No. in millions)

Sector	1995		1997		2001	
	No.	% share	No.	% share	No.	% share
Agriculture	14.9	46.8	15.3	44.1	18.3	47.2
Manufacturing and Mining	3.3	10.5	3.9	11.2	3.9	10.2
Construction	2.3	7.2	2.4	6.8	2.5	6.3
Wholesales and Retail Trade	4.6	14.5	5.1	14.6	5.4	13.9
Transport	1.6	5.1	2.0	5.7	2.1	5.5
Finance, community & Social Services	4.8	15.0	5.4	15.6	6.3	16.2
Others	0.3	0.9	0.7	2.0	0.3	0.7
Total	31.8	100.0	34.8	100.0	38.8	100.0

Table 6 reveals that major portion of the employed persons consists of skilled agricultural and fisheries workers. The share of this occupational group was about 36.8 percent in 1997 but this increased to about 40 percent in 2001. The next occupational group is elementary unskilled occupations. The share was 22.9 percent in 1997 but has declined to 20.1 percent in 2001. The share of craft and related trades workers group was 9.9 percent in 1997 but has increased to 12.7 percent in 2001. The plant and machine operator group shared 4.8 percent of employment in 1997 but the share of this group has declined to 3.7 percent in 2001. The share

of service and sales workers group and professional group have gone down from 7.8 percent in 1997 to 6.0 percent in 2001 and 3.5 percent in 1997 to 3 percent in 2001 respectively.

Table 6. Employment by Major Occupational Groups [2]

(No. in millions)

Major Occupational groups	1997		2001	
	No.	Percent	No.	Percent
Legislators, senior officers and managers	3.0	8.6	3.8	9.8
Professionals	1.2	3.5	1.2	3.0
Technicians and Associate Professionals	1.0	2.8	1.1	2.9
Clerks	1.0	2.9	0.7	1.8
Service workers and shop and market sales workers	2.7	7.8	2.3	6.0
Skilled agricultural and fishery workers	12.7	36.8	15.5	40.0
Craft and related trades workers	3.4	9.9	4.9	12.7
Plant and machine operators and assemblers	1.7	4.8	1.4	3.7
Elementary (unskilled occupations)	7.9	22.9	7.8	20.1
Total	34.6	100.0	38.7	100.0

3. Health

3.1. Health Care System

In Pakistan, though the health sector, both in qualitative and quantitative terms has expanded, yet the existing health system is not competent enough to provide adequate facilities for the growing population, such a sorry state of affairs can be attributed to some key issues, associated with the health sector from the very beginning. Paucity of funds, limited access to health services and their inadequacy, extreme poverty, ignorance and lack of awareness among the masses, and deficient health infrastructure have been identified as fundamental problems in the way of improving public health.

A high proportion of death rates characterise the disease pattern. i.e., infant mortality rate of 85 per 1000 live births and mortality rate under 5 of 126 per 1000 due to infectious, communicable diseases, malnutrition and generalised under nutrition. Similarly drug abuse has emerged as a public health problem while malaria and tuberculosis continue to be potential threats. Table-7 gives some health related indicators with comparisons for selected middle income economies [2,6].

Table 7. Selected Health Indicators-1999 [6]

Countries	Life expectancy at birth (Years)	Infant mortality rate per 1000	Mortality rate under 5 per 1000	Population growth (Annual %)
Pakistan	62.0	85.5	126.0	2.4
Bangladesh	60.7	61.2	89.0	1.6
Bhutan	61.5	58.8	NA*	2.9
China	70.1	30.2	37.0	0.9
India	63.2	70.9	90.0	1.8
Indonesia	65.7	41.9	52.0	1.6
Malaysia	72.3	7.9	10.0	2.4
Nepal	58.2	75.4	109.0	2.3
Philippines	68.9	31.5	41.0	1.9
Thailand	68.6	28.3	33.0	0.8
Sri Lanka	73.5	15.4	19.0	1.1

*NA- Not Applicable

Among these eleven countries, the life expectancy in Pakistan (62 year) is slightly better than Bangladesh (60.7 year) and Bhutan (61.5 year) and Nepal (58.2 year) but less than all other countries (Sri Lanka, Malaysia, China, Thailand, Indonesia and Philippines). Similarly both the infant mortality and mortality of under 5 years of age are the highest in Pakistan. Moreover, in rate of population growth, Pakistan is the second highest country (2.4 %) after Bhutan (2.9 %). These health indicators reflect the poor state of health services in Pakistan and suggest the urgent need to further expand them.

Table 8. Health Statistics [2]

Life expectancy (years) at birth (1999)	
Men	61
Women	63
Infant mortality rate (1997-98) per 1000	85.5
Maternal mortality rate, per 1000 live births (1997-98)	340
Population per physician (1999)	1500
Population per dentist (1999)	33600
Population per nurse (1999)	3700
Population per hospital bed (1999)	1500

Pakistan has an extensive health delivery system which is a mixture of government and private facilities distributed all over the country. The existing national network of medical services consists of 91823 doctors, 4175 dentists, 37623 nurses, 22528 paramedics, 5619 lady health workers and 93907 hospital beds [2]. Primary health care facilities are offered by 5171 basic health care units, 531 rural health centres, 856 maternity and child health care centres and 4635 dispensaries. The big hospitals mainly located in the urban areas of the country are 876. The population ratio coverage by one doctor works out to 1500 persons, per dentists 33600 persons, per nurse 3700 persons and per hospital bed 1500 persons, as can be seen in Table 8.

Traditionally, mother and child health has been the focus of the primary health care programme in Pakistan, as in many other developing countries. The preventive and curative

health needs of workers, especially in the informal sector, have been largely ignored. Many larger enterprises may have a dispensary to provide first aid, or even a small fully staffed hospital. Even here the emphasis is on treatment once an accident or disease has occurred, and there is usually no coherent programme of accident and disease prevention and health promotion.

Comparing the availability of doctors in the rural areas in the real life situation, most of the doctors are not willing to serve in rural areas, because the basic amenities are low and their salaries are reduced in rural areas as compared to the big cities/towns. In order to attract doctors for their services in rural areas, the Government has to introduce incentive oriented schemes so that population living in these areas also gets the better health facilities. Another point is that treatment in private hospitals/clinics is comparatively expensive for poor people or even for the middle class. On the other hand the services are available in the Government hospitals, but they also become expensive when the patients have to buy costly medicines themselves from the market.

3.2. Employees Social Security Institution

Introduction

Although workers can get treatment at Government hospitals or private hospitals/clinics nearby their workplaces, but medical care facilities to the secured workers and their family members including parents are provided through hospitals and dispensaries established by Employees Social Security Institutions. In Punjab province, which is the biggest province in Pakistan (population 73 millions as per population census 1998) medical care facilities to the workers and their families are taken care of by Punjab Employees Social Security Institution (PESSI) [7]. If we take a look at the background of PESSI it is so that Employees Social Security Scheme was first introduced in West Pakistan on March 1, 1967 under the provisions of Provincial Employees Social Security Ordinance 1965. On disbursement of one unit in 1970, the scheme started functioning on Punjab level and Punjab Employees Social Security Institution came into being. The main objective of PESSI is to provide comprehensive medical cover to the secured worker and their family members including parents and to provide financial assistance in case of sickness and employment injuries. The social security scheme is implemented on the basis of contributory principle, the main source of PESSI income is Social Security Contribution collected from the notified industrial and commercial establishments. PESSI has established 13 local offices at Divisional level headed by Directors and 14 sub-offices are to carry out survey of the Industrial and Commercial units, collection of Social Security Contribution, inspection of record of notified industrial/commercial units, payment of Cash benefits to the secured workers and provision of medical care to the workers and their family members.

Social Security Contribution Collection Procedure

The main source of income of PESSI is the Social Security Contribution which is collected under Section 70 of the Social Security Ordinance, 1965 from the employers of the notified industrial and commercial establishments at a rate of 7 % of the wages paid to their workers who are drawing wages upto Rupees 3000/- per month or Rupees 120/- per day. The workers once covered under this scheme remain secured even if their wages exceed Rupees 3000/- (US\$ 50/-) per month.

Medical Care Facilities

PESSI provides comprehensive medical cover to the secured workers and their families and dependent parents which includes consultation, indoor and outdoor treatments, emergency treatment in case of accidents and injury, prenatal and postnatal care. PESSI also provides diagnostic facilities and pathological examination through modern and sophisticated equipments installed in its medical units. Table-9 reflects facilities given to the secured workers by Social Security Scheme of Punjab province.

Table 9 Social Security Scheme at a Glance (Punjab Province) Year 2000 [7]

Notified Industrial and Commercial Establishments	27667
Secured Workers	517766
Dependants of Workers	3106596
Local Directorates	13
Sub-Offices	14
Hospitals	8
Mini Hospitals	5
Injury Treatment Centres	35
Social Security Dispensaries	131
Medical aid Posts	91
Ambulances	110
Specialists	122
Dental Surgeons	8
Medical Officers	539
Dispensers	925
Nursing Staff	369
Other Para Medical Staff	2529

3.3. World Health Report 2000-Health Systems: Improving Performance

In this report, health systems are defined as comprising all the organisations, institutions and resources that are devoted to producing health actions [8].

A health action is defined as any effort, whether in personal health care, public health services or through intersectoral initiatives, whose primary purpose is to improve health. The world health report 2000 presented for the first time an index of national health systems' performance in trying to achieve three overall goals: good health, responsiveness to the expectations of the population, and fairness of financial contribution. To assess overall population health and to judge how well the objective of good health is being achieved, WHO has chosen to use disability-adjusted life expectancy (DALE), which has the advantage of being directly comparable to life expectancy estimated from mortality alone and is readily compared across populations.

The Table 10 gives the data for health system attainment and performance in some selected WHO member states taken from the WHO report 2000.

Table 10. Indicators of health system attainment and performance in WHO Member States in 1997 [8]

Measure	Country	Rank
Health Level (DALE)	Pakistan	124
	Finland	20
	Nigeria	163
	Turkey	73
	Brazil	111
Health distribution	Pakistan	183
	Finland	27
	Nigeria	188
	Turkey	109
	Brazil	108
Level of responsiveness	Pakistan	120-121
	Finland	19
	Nigeria	149
	Turkey	93
	Brazil	130-131
Distribution of responsiveness	Pakistan	115
	Finland	3-38
	Nigeria	177
	Turkey	66
	Brazil	84-84
Fairness in financial contribution	Pakistan	62-63
	Finland	8-11
	Nigeria	180
	Turkey	49-50
	Brazil	189
Overall goal attainment	Pakistan	133
	Finland	22
	Nigeria	184
	Turkey	96
	Brazil	125
Health expenditure	Pakistan	142
	Finland	18
	Nigeria	176
	Turkey	82
	Brazil	54
Health system performance on level of health	Pakistan	85
	Finland	44
	Nigeria	175
	Turkey	33
	Brazil	78
Overall health system performance	Pakistan	122
	Finland	31
	Nigeria	187
	Turkey	70
	Brazil	125

3.4 Legislation and coverage of OH&S

In Pakistan, the occupational health and safety in different sectors is covered in various laws. There is no single comprehensive law covering occupational health and safety. The following pieces of legislation deal with different aspects of occupational safety and health in the whole country[9,10].

- Factories Act 1934
- Punjab Factories Rules 1978
- Sindh Factories Rules 1975
- North-West Frontier Province Factories Rules 1975
- West Pakistan Hazardous Occupations Rules 1963
- Mines Act 1923
- Provincial Employees Social Security (Occupational Diseases) Regulation 1967
- Workmen Compensation Act 1923 and Rules 1961
- Dock Labourers act 1934

Factories Act 1934:

This act consolidates and amends the laws relating to the regulation of labour in factories in the country. It includes preliminary including definitions, role of labour inspection, restrictions on the working hours, holidays with pay, special provisions for adolescents and children, penalties and procedure. This act also contains a chapter (Chapter III) on health and safety of workers and hygiene conditions at the workplaces. Chapter III of this act provide factory inspections, hygienic conditions (ventilation and temperature, dust and fumes, artificial humidification, lighting, overcrowding, drinking water, sanitary facilities), precaution in case of fire, machine guarding, pressure vessels, precautions against dangerous fumes, eye protection, safety of building, machinery and manufacturing process and so on (10).

Provincial Factories Rules (Punjab Factories Rules 1978, Sindh Factories Rules 1975, North-West Frontier Province Factories Rules 1975):

Three provinces of Pakistan Punjab, Sindh and North-West Frontier Province under the authority of "The Factories Act 1934" of Pakistan made their rules and regulation to govern labour legislation which are almost similar to each other. They provide detailed rules for factory inspections, certifying surgeons, hygienic conditions (ventilation, temperature, dust and fumes, artificial humidification, overcrowding, lighting, drinking water, sanitary facilities), role of the welfare officer, precautions against fires, machine guarding, pressure vessels, eye protection, dangerous fumes, working hours, notification and investigation of

accidents, and pay holidays and so on. In the end samples of official forms, contents of first aid boxes and report form for occupational diseases are attached as annexes).

West Pakistan Hazardous Occupations Rules 1963:

These rules issued under the authority of Factories Act 1934 prescribe medical certification and examination by certifying surgeons, prevention activities (exhausts, washing facilities, protective clothing), prohibition of employment (women, young persons) and the issuing of certificates of fitness in the case of dangerous jobs involving exposure to certain substances (lead, rubber, chromium, sodium, and potassium dichromate) and certain other dangerous operations (manufacturing of aerated waters spraying of cellulose solutions, sand blasting, generation of petroleum gas). One of the regulations the "West Pakistan Hazardous Occupations (Miscellaneous) Rules 1963 specifies a large number of processes (manufacturing, and/or utilisation of a large number of harmful or explosive substances) as hazardous under the meaning of the rules. It permits the Chief Inspector of Factories to declare other processes hazardous as well (12).

Mines Act 1923:

This act concerns the laws relating to the regulation and inspection of mines. Its contents include role of the chief inspector of mines and of inspectors, operation and management of mines, provision as to health and safety (powers of inspectors in the case of dangers arising to mine workers, accident reports, notice of occupational accidents, accident investigation) working hours, employment of women (prohibited in underground work) and children (absolutely prohibited to work in mines) and so on.

Provincial Employees Social Security (Occupational Diseases) Regulations 1967:

The Table 11 shows the inclusion of the following occupational diseases (as additions) in the schedule 3 of the Provincial Employees Social Security (Occupational Diseases) Regulations, which came into force in 1992 [11].

Table 11. Notified Occupational Diseases [11]

Sr. No	Name of Disease	Abbreviation	Occupation
1.	Occupational Asthma	Occ. Asth.	Cotton industry, Chemical industry involving fumigants.
2.	Occupational Cancer	Occ. Can.	Coal tar, Paint industry, Any other industry involving the risk.
3.	Pneumoconiosis	Pne	Coal mines etc, Any other industry involving the risk.
4.	Noise Induced Hearing Loss	NIHL	Textile mills, Sugar mills, Any other industry involving the risk.
5.	Chronic Dermatitis (Contact Dermatitis)	Ch. Dt. Cont. Dt.	Leather, Chemical, Rubber, Plastic industry, Any other industry involving the risk.

Dock Labourers act 1934:

The Directorate of Dock Workers Safety is responsible for ensuring the safety and health of dock workers employed at Karachi, Gwadar and Pasni seaports, through the practical enforcement of relevant provisions of the Dock Labourer's act.

Table 12 gives the definitions of some selected indicators of legislation and coverage of OSH. The statistics on ILO ratification and other indicators on coverage of OH&S are given in Table 13

Table 12. Indicators of legislation and coverage of OH& S [1]

Factor	Indicator	Definition of indicator	Unit
ILO ratification	Proportion of ILO conventions on OH&S ratified	Proportion of ILO conventions relevant to OH&S (N=20) which a country has ratified until present (scale 0-1 where 1 corresponds to 100 %)	-
Coverage of accidental insurance	Proportion of the employed covered by accident insurance	Proportion of the employed covered by compulsory or voluntary accident insurance including insurance against occupational diseases (scale 0-1 where 1 corresponds to 100 %)	-
Coverage of occupational health care	Proportion of the employed covered by occupational health services	Proportion of the employed covered by compulsory or voluntary occupational health services (scale 0-1 where 1 corresponds to 100 %)	-

Table 13. Statistics on legislation and coverage of OH&S

Factor	Country	Year	N	Value of indicator	Unit
ILO ratification	Pakistan	2000	1	0.05	-
	Finland	1999	16	0.8	-
Coverage of accidental insurance	Pakistan	2002		*	-
	Finland	1998		0.905	-
Coverage of occupational health care	Pakistan	2002	3200	0.16	-
	Finland	1997		0.87	-

* Data not known

Ref.: [1]

Comparing with developed countries, the coverage of accidental insurance in industries does not exist in Pakistan as such but the secured workers of registered industries are covered by Employees Social Security Institution. For example the coverage include injury benefits, sickness benefits, cash benefits, death grants, maternity benefits, disablement pension, disablement gratuity, survivor's pension and so on. The secured workers enjoy these benefits which are provided by Employees Social Security Ordinance (X) of 1965. Only 830 000

workers are secured in Pakistan under Social Security Institution Ordinance out of 20 million employed labour force. Agriculture labour force (18.3 million) is excluded from this figure, as agriculture sector is not in the purview of Labour and Human Resources department. Table 13 shows that occupational health care in Pakistan is quite poor as compared with Finland. Similarly ratification figure of ILO conventions on 20 important conventions related to OH&S is quite low as Pakistan has ratified only one convention in comparison to Finland's 16 out of 20.

4 Human Resources in OH&S

Ministry of Labour and Human Resources and Overseas Pakistanis, Government of Pakistan, controls the occupational safety and health activities. In provinces, these activities are controlled by provincial Labour and Human Resources departments. In Punjab province, which is the largest province in the country in terms of population and workforce, Labour and Human Resources department is essentially concerned with the promotion of healthy labour management relations for greater socio-economic progress. With this objective, the department not only protects the rights of workers but lays equal stress on their commitment to work [12].

Considering the importance of workers health and welfare, the Punjab Employees Social Security Institution (PESSI), established under the Labour and Human Resource Department, provides medical aid and various cash and other benefits in case of sickness, injury, death etc., to secured workers. The major functions of PESSI have been explained in Chapter 2. In the mining sector, the department is responsible for inspecting mines and ensuring scientific development of mines and safety of workers. It also undertakes other welfare measures for the miners and their families including housing, education and so on.

The department is also assigned the functions of establishing housing estates and development of plots for industrial workers and undertaking other measures for their welfare. Besides this, it also implements schemes for the education of workers' children. Other major functions of the department include education of child labour, and ensuring the rights of workers in accordance with national and international standards.

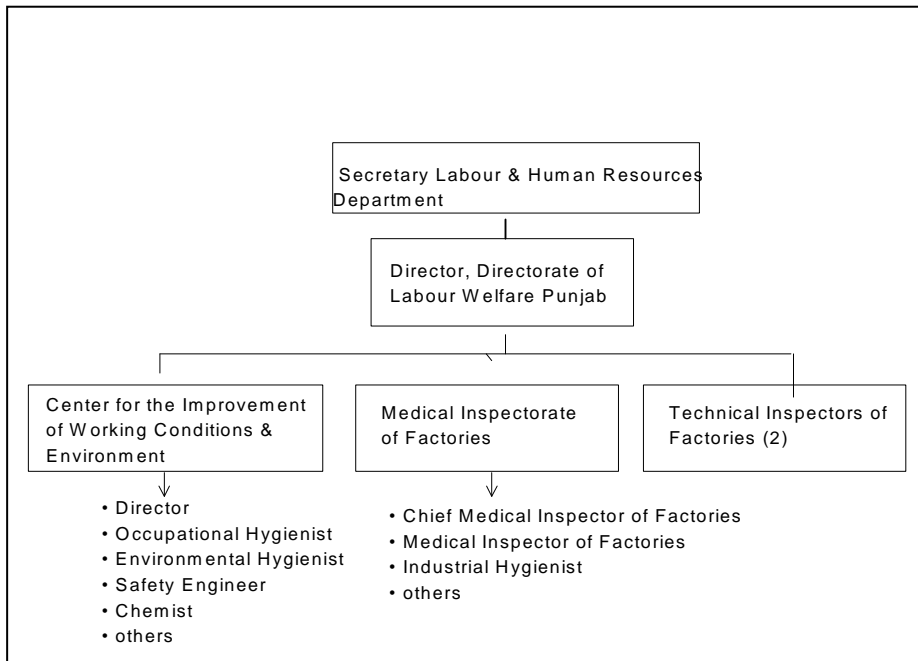


Fig. 2 Organizational chart concerning occupational safety & health in the Punjab Province

As it is clear from the Figure 2, Occupational Safety and Health activities in Punjab are governed by Directorate of Labour Welfare headed by Director Labour Welfare, Punjab who is working under the supervision of Secretary Labour and Human Resources department. As shown in the organisational chart, (Fig-2) three attached units are catering the activities of occupational safety and health on provincial level (Punjab province). They are Centre for the Improvement of Working Conditions and Environment, Medical Inspectorate of Factories and Technical Inspectors of Factories (two in number) working in the headquarters office of Directorate of Labour Welfare. All three units have their offices in provincial capital, Lahore.

Centre for the Improvement of working Conditions and Environment:

- Director
- Occupational Hygienist
- Safety Engineer
- Chemist
- Chief Medical Inspector of Factories
- Medical Inspector of Factories
- Industrial Hygienist
- others

The Centre for the Improvement of Working Conditions and Environment (CIWC&E) was established in Lahore by the Directorate of Labour Welfare, Punjab assisted by ILO/UNDP at a total cost of Rs. 33.38 million including a foreign exchange component of Rs 11.5 million (in the form of equipment, expert services and training of professional staff of the centre). The construction of the building was started in 1985 and was completed in 1988 when the Centre became operational. It is the pioneering institution in Pakistan with professionally trained staff, modern laboratories and facilities for providing OSH services to the industry.

Finnish Institute of Occupational Health (FIOH) Helsinki, Finland played a vital role in establishment of Centre for the Improvement of Working Conditions and Environment (CIWC&E) Lahore, Pakistan by providing technical expertise in OSH. A number of personnel from FIOH visited Pakistan as ILO experts on occupational safety and health during the project.

The principal aim of CIWC&E is to combat the safety, health and working environment in the industries in Punjab, and to create awareness and change of attitudes among the employers/workers regarding safety, health and working environment. Since it became

operational, the Centre for the Improvement of Working Conditions and Environment organised 135 training courses where over 2600 participants were trained. Among them include managers, Government agencies, OSH professionals, NGO's, trade unions and other concerned. A mobile training unit consisting of a van equipped with audio-visuals and training material was established in 1998. This unit travelled to the industrial units even the far flung areas of the Punjab province and conducted 435 one day workshops and trained over 9000 workers, supervisors and managers. Risk assessment surveys in 155 industries were conducted. Noise, dust and solvents exposure were studied in these surveys. Bimonthly English/Urdu newsletter (Safety, Health and Environment News) is a continuous feature of CIWC&E. A number of training and awareness materials were produced in the past five years keeping in view the requirements of typical workers, supervisors and managers in Pakistani industry. International chemical safety cards (ICSC's) in Urdu language were produced by the centre. The ICSCs have been developed by International Programme on Chemical safety (IPCS), a collaborative programme of WHO, ILO, ENEP and the European Union.

The information about the services and facilities offered by the CIWC&E are available on the Internet. The web address of CIWC&E is www.ciwce.org.pk

Medical Inspectorate of Factories:

This inspectorate is responsible for the inspection of health and safety conditions in the industries registered under Factories Act 1934. Chapter III of this act deals with occupational safety and health.

Technical Inspectors of Factories:

Two engineers are working as Technical Inspectors of Factories. Their job description is to inspect the registered factories under Chapter III of the Factories Act 1934 (some selected Rules).

Indicators of occupational health and safety personnel are defined in the table 14.

Table 14. Indicators of occupational health and safety personnel

Occupational health physicians	Occupational health physicians/1000 employed	Occupational health physicians (full time equivalents) per 1000 employed	/1000 employed
Occupational health nurses	Occupational health nurses/1000 employed	Occupational health nurses (full time equivalents) per 1000 employed	/1000 employed
Occupational physiotherapists	Occupational physiotherapists/1000 employed	Occupational physiotherapists (full time equivalents) per 1000 employed	/1000 employed
Occupational hygienists and hygiene assistants	Occupational hygienists and hygiene assistants/1000 employed	Occupational hygienists and hygiene assistants (full time equivalents) per 1000 employed	/1000 employed
Labour safety inspectors	Labour safety inspectors/1000 employed	Labour safety inspectors (full time equivalents) per 1000 employed	/1000 employed
Enterprise safety managers	Enterprise safety managers/1000 employed	Enterprise safety managers (full time equivalents) per 1000 employed	/1000 employed
Safety representatives of employees	Safety representatives of employees/1000 employed	Safety representatives of employees (full time equivalents) per 1000 employed	/1000 employed

Data in table 15 gives an idea of OH&S personnel in Pakistan and compared with Finland. The figures of occupational health physicians and occupational health nurses in Pakistan in column N are those who are working in Employees Social Security Institutions in the country. This institution is responsible for the medical care facilities of secured workers of registered establishments. These figures do not include other health personnel working in Government hospitals, dispensaries and clinics etc. The figures of dispensers and staff nurses (Pakistan) have been included in the column of occupational health nurses This data does not include the strength of personnel from Government hospitals, physicians and other staff of dispensaries/hospitals of factories and private clinics offering medical facilities to the workers in Pakistan. The total employed labour force in Pakistan is 38.8 million, out of which 18.3 million is working in agriculture sector. The agriculture sector is not included in the calculations of various parameters in Table 15 but rather it is based on 20 million workers employed in Pakistan. (38.8-18.3=20.5 million). For the ease of calculations a figure of 20 millions is chosen as total employed labour force in Pakistan.

Table 15. Statistics on occupational health and safety personnel [21,22]

	Country	Year	N	Value of indicator	Unit
Occupational health physicians	Pakistan	2002	1116	0.05	/1000 employed
	Finland	2000	885	0.40	/1000 employed
Occupational health nurses	Pakistan	2002	2050	0.10	/1000 employed
	Finland	2000	1692	0.76	/1000 employed
Occupational Physiotherapists	Pakistan	2002	25	0.001	/1000 employed
	Finland	2000	299	0.13	/1000 employed
Occupational hygienists and hygiene assistants	Pakistan	2002	32	0.001	1000 employed
	Finland	2000	150	0.07	/1000 employed
Labour safety inspectors	Pakistan	2002	160	0.008	/1000 employed
	Finland	2000	360	0.16	/1000 employed
Enterprise safety managers	Pakistan	2002	55	0.002	/1000 employed
	Finland	2000	10208	0.46	/1000 employed
Safety representatives of employees	Pakistan	2002	50	0.002	/1000 employed
	Finland	2000	13569	0.61	/1000 employed

Data on occupational health and safety personnel give a poor state of affairs in case of Pakistan comparing to Finland. For example, the value of indicator for occupational health physicians in Pakistan gives 0.05 compared to Finnish figure of 0.40. Similarly 0.10 value for occupational health nurses in Pakistan is seven times less compared to a value of 0.76 in case of Finland. Considering the total employed labour force in Pakistan (20 million), the number of occupational physiotherapists and occupational hygienists and hygiene assistants is too low. The reason is that no proper education is available for occupational hygienists in the country.

The term “enterprise safety managers” is not familiar in Pakistan. Only very few large sized enterprises have their own full time safety managers. At present the concept of workers’ safety or human safety rarely exist in this country. Nearly all the safety personnel who are looking after the so-called safety, health and environment departments are mainly concerned with the protection of site machines, or in other worlds they are interested in the protection of economic loss rather than human loss. During the surveys in large sized enterprises, when safety personnel were interviewed, they mainly emphasised on programmes related with

safety of site machinery etc. and none of them explained or described site occupational safety and health situations in the right manner. The reason being that not a single such professional is specifically qualified in occupational safety and health. Majority of them are mechanical, electrical, or chemical engineers having no or very little orientation in occupational safety and health. They have attended short orientation courses on safety, health and environment conducted by their concerns in Pakistan, mainly concerning to site safety. This situation exists only due to the reason that there is no Health and Safety At Work Act in Pakistan, so no qualified personnel are available and appointed for this purpose. Efforts are in process to make such an act in the country.

Safety representative of employees are appointed by the president of the labour unions or by the chief of CBA (Collective Bargaining Agency) of their factories. Most of them are illiterate or appointed just for political or morale support of labour unions working in that area. They do not have any concept of occupational safety and health and rarely been trained for the same. As a result they are quite ineffective in the execution of occupational safety and health programmes.

5. Indicators of occupational safety and health outcomes

5.1 Accidents at work

In Pakistan, under the rules (Factories Act 1934), there is a system according to which registered industrial establishments has to report all industrial accidents in their units to the Labour and Human Resources department on specified forms. However no seriousness has been seen to observe this practice. A list of industrial fatal accidents as well as serious and minor accidents can be seen in Table 16.

Table 16. Industrial accidents in Factories in Pakistan registered under Factories Act 1934 [4]

(Per 100,000 workers)								
Accident	1991	1992	1993	1994	1995	1996	1997	1998
Total	603	982	536	443	731	644	213	230
Fatal	15	17	34	14	18	21	18	17
Serious	17	74	114	56	53	91	26	40
Minor	517	891	388	373	660	532	169	173

Accidents at work receive a high priority worldwide. The fatal industrial accidents in Pakistan for the year 1998 in the above table give only a figure of 17 as reported in the Pakistan Statistical Yearbook 2001. But the real situation is different. For certain contemporary reasons the accidents either fatal or otherwise are not regularly reported in the industrial sector. For example under reporting, limited coverage by reporting and compensation schemes and so on. Since proper worker's insurance and compensation system is lacking in Pakistan, therefore comprehensive reporting system of industrial accidents could not be established. Moreover legislation regarding occupational safety and health is weak and outdated in the country. However, ILO has estimated a number of 7400 fatal accidents in Pakistan as against 72 reported to them (Occupational accidents, 2002 Asia according to ILO regions, ILO; Geneva,

Switzerland). The reporting figure of Pakistan in this document is far less compared to the estimation. Finland reported 65 fatalities to ILO and this figure is the same as ILO estimated.

6. Use of Chemicals in Pakistan

Of the total worldwide consumption of chemicals, about 80 % take place in the developed world. The remaining 20 % are consumed by the developing countries. However, recently the consumption in the developing countries has been on the increase and the trend is likely to continue in coming years. In terms of risks posed to the safety and health of workers and consumers and damage to the ecology, the developing countries are faced with more severe and complex problems due to general lack of awareness about the potential hazards of chemicals and lack of proper protective measures.

Like most of the developing countries, Pakistan needs a considerable amount of chemicals for its agricultural, industrial and other needs. The economy of Pakistan is based upon agriculture, therefore a huge amount of agrochemicals are required every year. As can be seen in Table 17, over 30 000 tons of pesticides were imported in 1996-97 but its import gradually decreased in the following years. This decline in imports of pesticides was due to the drought like situation prevailed in some parts of Pakistan. The drought situation not only worsened but affected the entire country during the year 2000-01 resulting in lower production of major crops such as cotton, rice, sugarcane and wheat in relation to last years (1999-2000) production level. The figures of 2000-2001 are provisional (from July-March). These import figures of pesticides do not contain the figures of local production/formulation of pesticides. Most of these pesticides are used on cash crops like cotton, and rice, vegetables and fruit crops. Pesticides pose a major threat to the health and safety of the agricultural workers as well as the ecology of the country. Each year hundreds of cases of poisoning by pesticides are reported in the press. Due to remote location of the victims and lack of communication facilities, hundreds more go unreported. The upto date official data on pesticides poisoning was not available due to lack of reporting system in the country.

Table 17. Import of Pesticides in Pakistan [2]

Fiscal Year	Import of Pesticides (Tons)
1996-97	30 855
1997-98	18 195
1998-99	17 913
1999-2000	19 148
2000-2001 P	16 402

Fiscal year (July-June); P Provisional, (July-March)

Industrial Consumption of Chemicals in Pakistan

The consumption of chemicals in Pakistan has been on the rise for the last few years, which can be seen in Fig 3. It gives six years import bill of chemicals and allied products, including dyes and colours, pharmaceuticals and chemical fertilisers. The volume of chemical imports (in terms of the cost incurred on imports) has shown a steep upward curve for the last four years, and is expected to rise even further in the coming years.

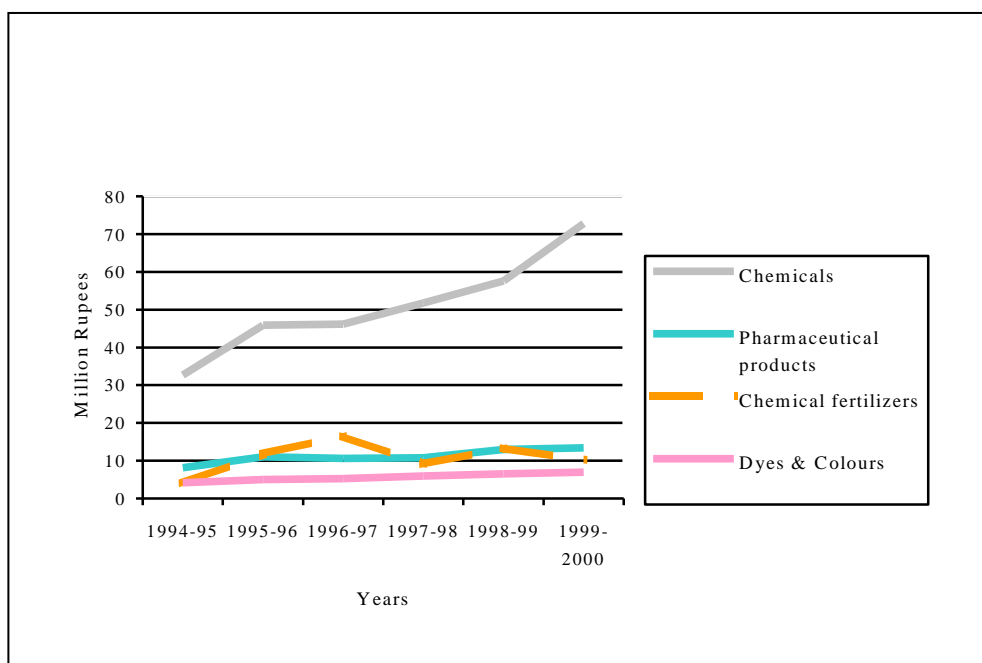


Fig 3 Import Trends for Chemicals & Allied Products (1994-2000)

7. Survey in Industries

Regarding country profile on occupational safety and health, a study was undertaken in the province of Punjab, Pakistan. A survey in 50 medium sized industries was carried out in 2001. Four different types of industries were selected in the survey, namely:

1. Paints Manufacturing Industries.
2. Shoes Manufacturing Industries.
3. Surgical Instruments Manufacturing Industries.
4. Furniture Industries.

A questionnaire ([13]) was modified containing multiple-choice as well as open-ended questions about the industries. The questionnaire used in the study is enclosed as annexe I. Following areas were covered in the questions.

- Basic information about the industry (including name, address, size and process detail).
- Age/gender distribution of the workers.
- Pattern of work (working hours, shifts, rest breaks, free days etc).
- Eating/washing facilities available to the workers.
- Information about the chemicals (including names, quantities used, labelling, methods of use for each chemical substance and waste disposal facilities).
- Occupational Hygiene controls adopted by the industries.
- Number of workers exposed to different chemicals (through inhalation, skin, and ingestion routes).
- Specific diseases mentioned by the workers or from the dispensary record, if available.
- Magnitude of fire, explosion and spill hazard.
- Emergency and other control measures available at the industries.

The classification of medium sized industries was done by the definition of factory provided under the Factories Act, 1934. This act, which regulates the work in the industrial enterprises including health and safety, working hours, child labour etc., defines a factory as “ any premises, including precincts thereof, where on ten or more workers are working, or were working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on [or is ordinarily carried on with or without the aid of power].

Those industries having a workforce 10-300 were included in the medium sized category. The cut-off number of 300 was fixed arbitrarily, as most of the industries listed in the directories in all four provinces of the country fell in this category. However six shoes industries were also selected having workers over 300. Only workers related to production/manufacturing were included for determining the size of the industry.

A walk through survey of each industry was carried out during which the hazards and their magnitude were assessed. The workers and supervisors were also approached for information about any specific problems, hazards, occupational accidents or diseases, which might have happened in the industry. The chemical handling, storage and disposal practices were observed.

7.1. A Profile of Medium Sized Industries

A total of 12 paints manufacturing, 14 shoes manufacturing, 13 surgical instruments manufacturing and 11 furniture industries were visited.

6690 workers were employed in all 50 industries. The distribution of the workforce in different types of industries can be seen in Table 18. The figure of workers employed in the Shoes industry is high because few big shoes industries in the country employ high number of workers from over 400 to over 900 workers.

Table 18. Workforce Pattern in Different Industries

Type of Industry	No. of Industries Covered	No. of Workers by Type of Industry
Paints Industry	12	544
Shoes Industry	14	4253
Surgical Instruments Industry	13	878
Furniture Industry	11	1015
Total	50	6690

Fig. 4.shows that about 50 % of the surveyed factories employed workers in the range of 10 to 50 workers, whereas six factories (shoes factories) employed over 300 workers.

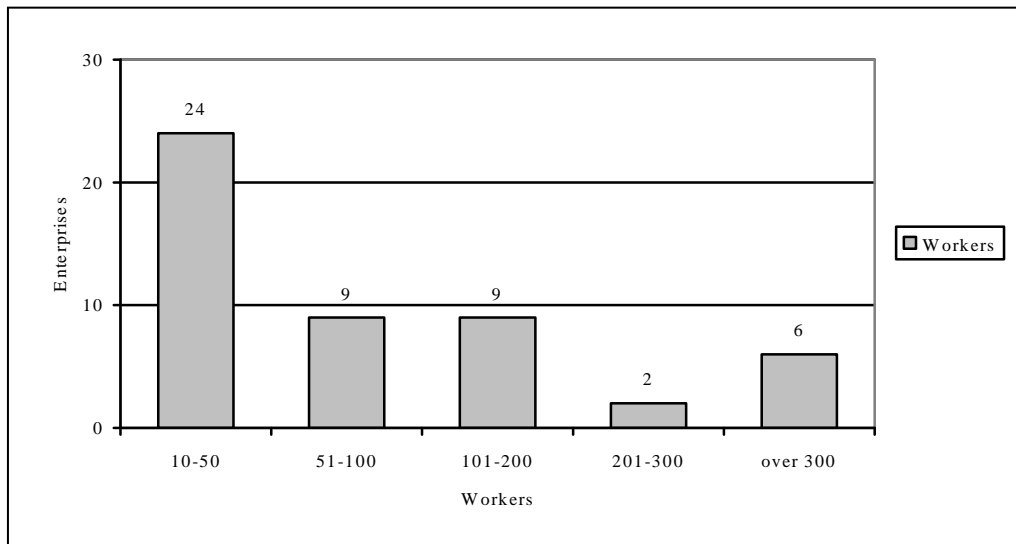


Fig 4 Distribution of Enterprises by Number of Workers

Apart from the packaging section of few surgical, paints and shoes manufacturing industries, women were not found to be working in the surveyed industries. It does not mean that women do not have participation in the labour force of the country. They constitute a considerable portion of workforce in certain sectors of economy, especially in agriculture and household based enterprises, particularly in carpet weaving, stitching and handicrafts manufacturing and so on.

Out of 50 industries, two shoes manufacturing plants work in three shifts, one paint manufacturing unit work in two shifts, all 47 remaining enterprises of different types work in one shift. However, the number of shifts may increase in some instances when the factories have extra orders to finish in a stipulated time.

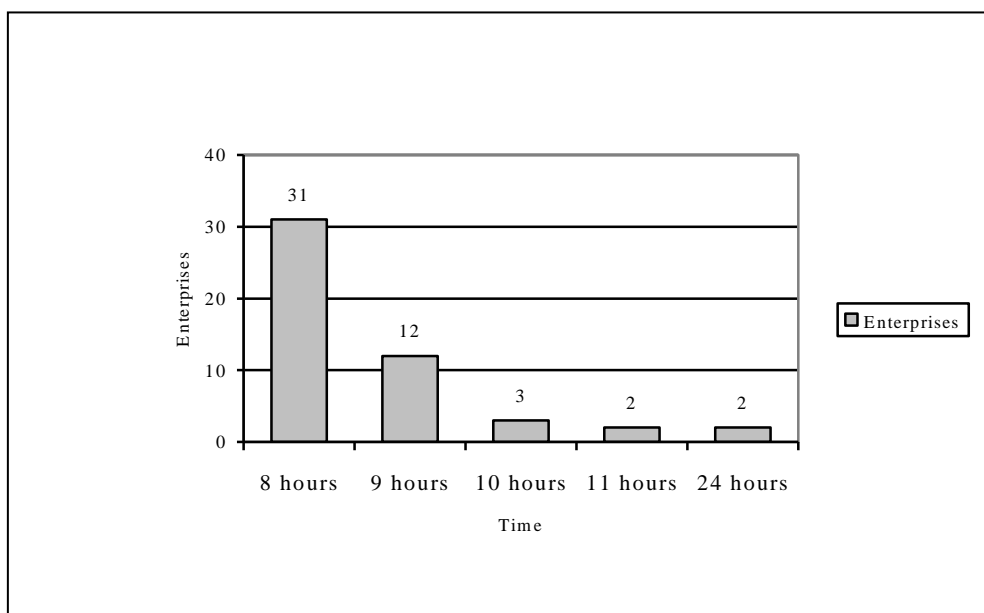


Fig 5 Work Routine

As presented in the Fig. 5. Distribution of industries by number of workers, almost one third of the enterprises observed an 8 hours workday, while 24 % of the industries (12 industries) observed 9 hours workday. Only 2 shoes industries were running round the clock. This means that shoes industries had three shifts of 8 hours each.

30 % of the premises in the surveyed industries could be described as dirty, 17 % industries were categorised as having good housekeeping, while 18 % were at normal level. The general housekeeping in most surgical instrument industries, some shoes, and paint industries were observed as good, while it was graded as bad in four furniture/woodworking industries (out of 11 surveyed).

All 13 units of surgical instruments industries have their own eating facilities by providing canteens at their premises. The workers of five paints units used to go to the nearby eating places in the vicinity for lunch/eating purposes. Similarly two shoes industries out of 14 did not have eating facilities at their premises. Four out of 11 furniture industries were lacking eating facilities at their premises.

All the surveyed industries had their own washing and sanitation facilities for their workers. Soap and clean towels were provided and kept available for workers free of cost at wash basins.

Under the rules, the industries have to report an accident happened in their work site and to keep accident/illness record. But the survey reveals that only multinational companies and large industries kept the record. Most of the medium sized factories could not show the accident record, though they claimed to maintain the same.

7.2 Chemical Hazards by Type of Industries

Now we will look into the chemical usage, handling, storage, disposal, occupational hygiene controls, and health problems of the workers encountered in four different types of industries surveyed in the study. The information given here is based on the data collected during the visits of industries and the observations made during the walk through surveys. Wherever known the exact quantities of chemicals used by the industries have been given, otherwise the types of chemicals used by the industries are given. The lists of chemicals given hereunder may not be comprehensive, as some of the chemicals might have been overlooked by the employers/managers while giving details.

Paints Manufacturing Industries:

Twelve Paint industries were visited in the province of Punjab employing workers in the range of 10 to 206. A list of chemicals used in these industries is given Table-19. A range of chemicals used per month (minimum to maximum) by industries is given under Quantities consumed. The list of chemicals may not be complete, as some of the chemicals might be overlooked.

Table 19. Chemicals used in Paints Industries

Chemicals	Quantities Consumed on Monthly Basis	
	Minimum	Maximum
Methyl ethyl ketone	200 l	10 000 l
Xylene	1 000 l	17 000 l
Mineral turpentine	1 000 l	90 000 l
Resins	400 l	20 000 l
Pigments	200 kg	8 000 kg

The maximum figures of quantities consumed as shown in the Table 21 are from a multinational company functioning in Pakistan. The other figures are from medium sized factories functioning in the province of Punjab. Out of 12 Paints industries surveyed, five industries produced decorative paints while others produced varieties of decorative, automotive, industrial and refinish paint products. The processes in small industries (employing workers 10 to 18) were mixture of manual work and mechanical and automated as well. On the other hand, medium sized factories were mostly mechanical and equipped with automated plants.

In general, the major hazards associated with the paint manufacture involve materials handling, toxic, flammable or explosive substances, and physical agents such as electric shock, noise and heat. Chemical hazards include exposure to toxic dusts such as lead chromate pigment, which can occur during weighing, filling of mixer and mill hoppers, operations of unenclosed equipment, filling of powdered paint containers, cleaning of equipment and from spills of containers. A variety of volatile solvents are used in paint and coating manufacture, including aliphatic and aromatic hydrocarbons, alcohols, ketones and so forth. Precautions include enclosure of process equipment, local exhaust ventilation for thinning and can filling operations and respiratory protection and confined-space procedures for cleaning vessels. Flammable solvents, combustible powders (especially nitrocellulose used in lacquer production) and oils are all fire or explosion risks if ignited by a spark or high temperatures. Sources of ignition can include faulty electric equipment, smoking, friction, open flames, static electricity and so on. Oil soaked rags can be a source of spontaneous combustion. Precautions include bonding and grounding containers while transferring flammable liquids, grounding of equipment such as ball mills containing combustible dusts, ventilation to keep vapour concentrations below the lower explosive limits, covering containers when not in use, removal of sources of ignition and good housekeeping practices [23].

Shoes Manufacturing Industries:

Shoes industry is widely spread in the country for the need of local population, but especially in cities like Lahore, Multan, Sialkot (in Punjab province) and Karachi (in Sindh province) the industries are dealing in export of shoes as well. A total of 14 shoes industries were visited in the province of Punjab, employing workers from 42 to 945.

A list of chemicals used in shoes industries is given in Table 20. A range of chemicals used per month (minimum to maximum) by different industries is given under Quantities consumed. The list of chemicals may not be complete, as some of the chemicals might be overlooked due to one reason or the other. The usage of various chemicals differs in industries depending on the types of shoes manufactured.

Table 20. Chemicals used in Shoes Industries

Chemicals	Quantities Consumed on Monthly Basis	
	Minimum	Maximum
Methyl ethyl ketone	200 l	3 500 l
Ethyl acetate	40 l	700 l
Toluene	60 l	700 l
Latex	308 l	1900 l
Polyurathanes	400 kg	27 000 kg

The intensive use of flammable liquids constitutes a considerable fire hazard, and widespread use of presses and assembling machines has introduced an increased risk of mechanical accidents into shoes industry. The main health hazards are toxic solvents, high atmospheric dust concentrations, ergonomic risks and noise from the machines. Organic solvents can cause acute and chronic effects on the central nervous system. Good general ventilation and exhaust ventilation at the point of origin of the vapours should be provided to maintain concentrations well below maximum permissible levels. The fire risk will also be diminished if these levels are observed [23].

Surgical Instruments Industries:

The surgical instruments manufacturing industries are located in the city of Sialkot and its ancillary areas. It has been nearly hundred years that the people of this region are manufacturing surgical instruments. The industry has transformed from a very small level and low technological base to a highly sophisticated level. The surgical instruments manufacturing has come a long way, from repair of ordinary scalpels and scissors to the manufacturing of complicated surgical instruments. The skill in the industry has reached a stage where it has enabled the industry to manufacture nearly 10,000 different types of surgical instruments.

Initially the industry started manufacturing very few basic instruments to cater to the needs of the local hospitals. In the late 1940's the industry got some export orders from Egypt and Afghanistan worth a few thousand US dollars. Currently more than 95 % of the instruments manufactured in Sialkot are exported to other countries. The surgical instruments sector, if considered as a sub-sector of the light engineering sector; contributes about 70 % of the total exports of this sector.

There are about 2500 large, medium and small sized manufacturing units within the industry. Some of the units have in-house facility to perform all the processes. Some smaller units specialise in a distinct process and work as sub-contractors for the industry. The surgical instruments industry provides employment to about 50,000 skilled and semi-skilled workers. The production of the industry can be broadly classified into two categories, disposable instruments and the reusable instruments. The largest market for Pakistani disposable instruments is USA. Majority of the reusable instruments manufactured in Sialkot is exported to the European countries. The main raw material stainless steel sheets were cut, forged and stamped into different shapes, and sizes. Semi-finished instruments were hand filed, ground on abrasive wheels, electropolished, degreased, inspected and packed. Main exposures of organic solvent (trichloroethylene) were found in the process of ultrasound cleaning in the baths of trichloroethylene. Other exposures were seen during the filing and grinding to the steel dust. Some workers were exposed to cutting oils through the skin. A list of chemicals used in surgical instruments manufacturing industries is given Table-21. A range of chemicals used per month (minimum to maximum) by industries is given under Quantities consumed.

The list of chemicals may not be complete, as the managers while providing these information might overlook some of the chemicals. A total of 13 surgical instruments industries were visited in the Sialkot region in the study employing 28 to 150 workers.

Table 21. Chemicals used in Surgical Instruments Industries

Chemicals	Quantities Consumed on Monthly Basis	
	Minimum	Maximum
Trichloethylene	70 l	2 000 l
Acids (sulphuric acid, nitric acid, citric acid, chromic acid)	*	*
Cutting oils	*	*
Emery sand	*	*

* Quantities not told

Furniture industry is widely spread throughout the country. A large number of small sized enterprises are located in the rural areas catering to the dowry and other needs of local population. Moreover medium sized industries are mostly located in cities making a variety of furniture items. The workers applied glues, different colours and varnish coatings by rags. Some sections of the industries having open sheds, thus facilitating the drying of items on which coatings of varnish or spirit were applied. The waste, generated as wood shavings, powder and soaked rags in plants, were used as fuel by some workshops or the households. The workers' exposure to potentially toxic chemicals seemed high especially due to unhygienic eating, drinking and smoking practices observed in some plants.

A list of chemicals used in furniture industries is given in Table 22. A range of chemicals used per month (minimum to maximum) by different furniture industries is given under Quantities consumed. The list of chemicals may not be complete, as some of the chemicals might be overlooked due to one reason or the other. A total of 11 furniture industries were visited in the province of Punjab, employing workers from 10 to 181.

The International Agency for Research on cancer (IARC) has classified wood dust as a human carcinogen (IARC 1995) [14]. The emphasis of the present study was on the solvent's exposure, but generation of wood dust at the workplaces and to prevent workers from wood dust exposure need special attention.

Table 22. Chemicals used in Furniture Industries

Chemicals	Quantities Consumed on Monthly Basis	
	Minimum	Maximum
Methylated spirit	40 l	1 000 l
Glues (formaldehyde and casein based)	6 kg	700 kg
Thinner	50 l	100 l
Lacquers	80 l	100 l
Lakh grains(a tree gum)	12 kg	300 kg
Paints	40 l	150 l
Colours	6 kg	10 kg

Many woods are hazardous, especially tropical hardwoods. Types of reactions can include skin allergies and irritation from the sap, wood dust, or sometimes the wood, as well as conjunctivitis, respiratory allergies, hypersensitivity pneumonia and toxic reactions.

Inhalation of hardwood dust is associated with a particular type of nasal and nasal sinus cancer (adenocarcinoma). Precautions include avoiding use of sensitising woods for people who have a history of allergies, or for objects where people would be in frequent contact with the wood, and controlling dust levels by using local exhaust ventilation or wearing a toxic-dust respirator [23].

7.3 Safety and Health Hazards and Control Measures adopted by the Industries

The focus of this study was to explore the risks posed by the usage of chemicals to the health and safety of the workers, ecological problems created by these industries and the measures already adopted by them to combat these problems. General observations on chemical safety problems and control measures are explained hereunder:

Labelling of Chemicals

While legislation exists for adequate labelling of pesticides and drugs sold in the country, no provisions have been made for the labelling of industrial chemicals. As a result the containers of the chemicals rarely, if ever, bear the labels in Urdu language. In the survey, it was noted that Shoes and Surgical instruments manufacturing industries were using chemical containers bearing labelling of chemicals and some indication of the contents inside. Whereas it was observed that four paints and five furniture industries were using containers without proper labelling. Even where a label was provided on the containers, in most cases it was in a foreign language most often in English and sometimes in German, Chinese, UK or French. It was observed in two paints and six shoes industries that were using some containers of chemicals bearing labels in national language (Urdu) as well. This state of affairs does not bode well in a country where literacy rate is very low and most workers and common citizens cannot read even the national language, what to speak of foreign languages. It is strange that even chemicals made in Pakistan rarely bear markings in Urdu. The lack of proper labelling can result in some mishaps but the issue has not been given due attention. In many cases containers meant for one chemical are used again for other chemicals exacerbating the risks to the safety and health of users, who sometimes get inadvertently exposed. It was also observed in some cases that the labels, even if present on the containers, did not have any information about the ingredients of the product, the basic safety and health precautions and emergency procedures to be adopted. In some cases the labels were simply the commercial names of the products stencilled on the containers.

Storage and Handling of Chemicals

In most of the factories visited in the survey, only enough chemicals were stored at the premises. Only large industries stored large quantities of chemicals and other raw materials (in hundreds or thousands of tonnes). Some large industries used pumping and other mechanical means to transfer the chemicals within the industries. In some cases containers of chemicals were lifted on shoulders and poured in the mixing tanks. Two paints and five shoes industries were having large stores for the storage of raw materials in big quantities.

Occupational Hygiene Controls

As shown in the Fig 4 almost 50 % of the surveyed factories employed workers in the range of 10 to 50 workers. Such industries adopted very few engineering and other occupational hygiene controls. Most factories did not have adequate local exhaust, forced or natural ventilation. While many industries had adopted isolation by keeping different types of

operations in different rooms, thus avoiding unnecessary exposure to workers, none had considered substitution of hazardous processes or chemicals. In the survey proper personal protective equipment (PPE) were rarely seen being used in most industries. Only two paints, five shoes and six surgical instruments industries were observed where workers used some PPE in their work. All other industries were lacking these facilities. The cost of such equipment was mentioned as a barrier to their use. Moreover lack of awareness/education and proper training of how to use personal protective equipment among the workers were the factors for not using PPE at work. Even the managers of small industries were not familiar with the use of personal protective equipment. Fire fighting facilities in most factories were in sorry state of neglect. Similarly first aid, emergency treatment of workers, transport in case of emergency, waste disposal and warning signs in most industries can be described as inadequate

None of the industries surveyed in the study had regular air monitoring and biological monitoring facilities to assess the risk situations. Table 23 reflects activity standards of control methods adopted to use in this study.

Table 23. Standards of Control Methods

Activity	None	Available but inadequate	Adequate
Air monitoring	No facility available	Some air monitoring is done in the past but on irregular basis, and conducted by other agencies/private consultancies	Regular air monitoring is done by direct reading instruments like detector tubes etc. available in the factory
Biological monitoring	No facility available	Some biological monitoring is done in the past on irregular basis conducted by other agencies/private consultancies	Regular monitoring/measure ment of a substance, its metabolite or its effects in body tissues, fluids or exhaled air of exposed workers. All these facilities available at factory level
Waste disposal	Control measures are poor	Some controls exist for disposal of harmful wastes or trash/effluents. Controls exist but are ineffective in methods of collection and disposal	Waste disposal hazards are identified and effectively controlled. Air/water pollution potential is minimal
First aid	First aid boxes not seen in factories	First aid boxes are available but not in sufficient number and/or their contents are not in order as per local rules	Sufficient first aid boxes are available according to the size of the factory and their contents are in order according to

			the legal requirement
Emergency treatment of workers	No worker is trained in First aid treatment	Very few workers have working knowledge of First aid treatment	The factory has a doctor or nurse in a dispensary at the premises, and a sufficient number of workers (according to the size of factory) are properly trained in First aid treatment
Transportation in case of emergency	No ambulance in the range of 20 km and no sufficient number of factory owned or private cars available in the premises	No ambulance available within 20 km range, but vehicles (factory owned or private cars) or pickup available in case of emergency	Ambulance is available within 20 km range. Plus factory owned vehicle/cars are available in the premises
Fire fighting facilities	Facilities not available or do not meet the requirement as per local rules	Insufficient numbers of fire extinguishers and/or fire hoses are provided	Sufficient number of fire extinguishers and/or fire hoses is provided. A fire crew is organised and trained in emergency procedures and in the use of fire fighting equipment
Social security compensation	No such system is working in the factory at all	The employer is not paying contribution (for all his workers) to the Punjab Employees Social Security Institution (PESSI), and as a result his all workers are not getting cash benefits and other medical care facilities from PESSI hospitals/dispensaries	The employer is regularly paying contribution to the Punjab Employees Social Security Institution a fixed sum per worker according to the Provincial Employees Social Security Ordinance 1965. And the secured workers are enjoying cash benefits and medical care facilities in social security hospitals/dispensaries
Warning signs	No warning signs seen in the factory	Insufficient number of warning signs seen in the factory	Sufficient number of different warning signs are seen in various sections of the factory

Figures 6 to 9 represent the situation of control measures taken by four different types of industries. It is evident from Figures 6 to 9 that surveyed factories totally lacked air monitoring and biological monitoring facilities, except for one multinational paint factory who did air and biological monitoring of their workers but it was inadequate and done on irregular basis. Transportation in case of emergency was available and adequate in all surveyed factories, as ambulances were available within 20 km range and also factory owned vehicles were available at their sites.

Figure 6 shows that 70 % of paint industries had poor control measures for waste disposal. Whereas 70 % of these industries lacked facilities like first aid and emergency treatment of workers. This means that no first aid boxes were seen in 75 % of paints industries. Similarly not even a single worker was trained in first aid treatment in 70 % of surveyed paint industries. Only 25 % of these industries had adequate facilities of first aid and emergency treatment of workers. Only one multinational industry (8%) of the twelve surveyed paint industries had adequate fire fighting facilities. 66 % had inadequate fire fighting facilities, while the remaining 26 % lacked such facilities. This situation can be dangerous in terms of human loss and loss of the property. As per Employees Social Security Ordinance 1965, an employer has obliged to pay a fixed sum (7% of gross wage) per worker to the Provincial Employees Social Security Institutions. But the practice is that employers of small enterprises do not pay their contribution for all workers. In fact they hide some of their workers on the papers. As a result a significant number of workers could not enjoy facilities offered by this ordinance. Only four, out of twelve paints industries, were found to have adequate system of social security compensation. An inadequate compensation system was available to 40 % of the paints industries while 34 % had no social security compensation system for their workers. The situation of warning signs was quite poor because 70 % of the paint industries did not bother to affix warning signs at their workplaces. Sufficient number of warning signs were affixed at appropriate places in one multinational paint industry while situation of 25 % industries were regarded as inadequate in terms of warning signs.

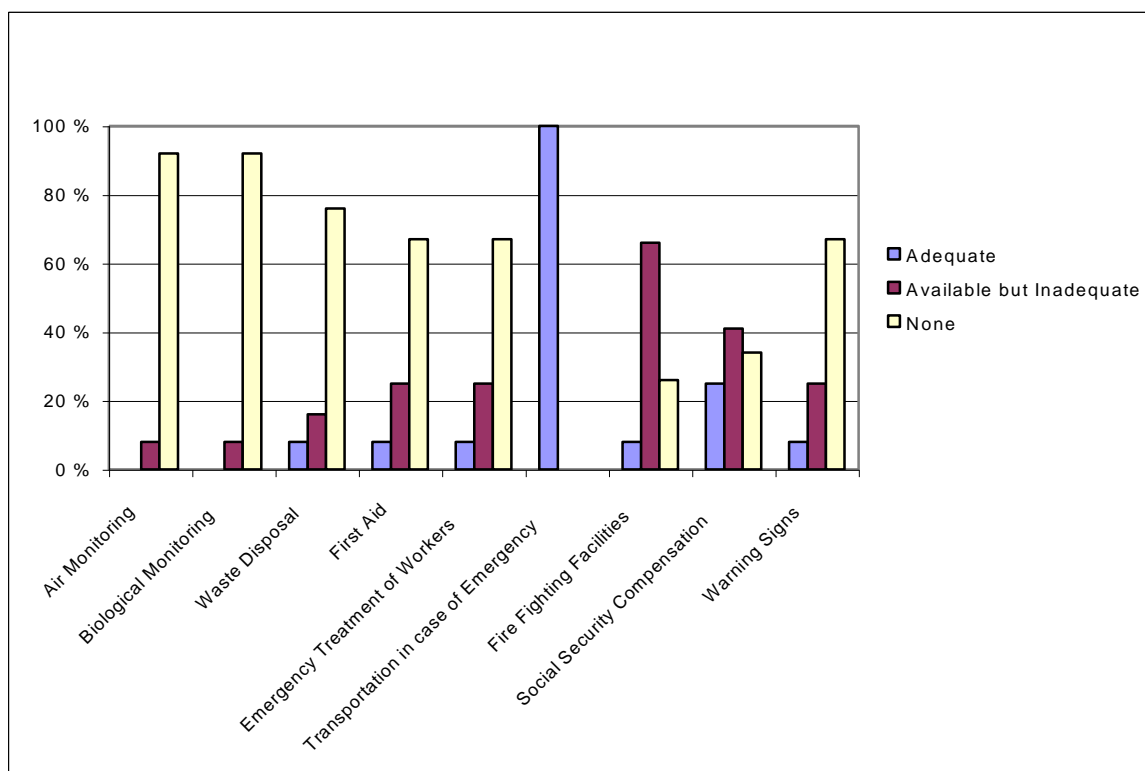


Figure 6. Controls Adopted by Paints Industries (Total 12 industries)

Figure 7 reflects the control measures adopted by 14 shoes industries. It is clear that not even a single industry adopted control measures of air monitoring and biological monitoring at their workplaces. 36 % of the surveyed industries had adequate waste disposal facilities while 64 % had some waste disposal control but it was ineffective and inadequate. 20 % of the industries observed adequate facilities for first aid and emergency treatment of workers at their sites. Whereas these facilities were available to 43 % of the surveyed shoes industries but the contents of first aid boxes were not sufficient as per local rules and very few workers were trained on first aid treatment. Transportation in case of emergency was available in all industries as ambulances were available within 20 km range and factory and factory owned vehicles/cars were available at premises, so that they can be used at an emergency situations to transport sick/injured workers to the nearest dispensary/hospital. Figure 7 shows that 21 % of shoes industries had adequate fire fighting facilities while remaining 79 % had insufficient number of fire extinguishers and fire hoses as per local regulations. Social security compensation was provided to the workers by 64 % of surveyed paint industries. 36 % had inadequate facilities against social security compensation. The situation of warning signs placed at appropriate places was encouraging in shoes industries where 42 % had adequate warning signs facilities. While 58 % had insufficient number of warning signs facilities.

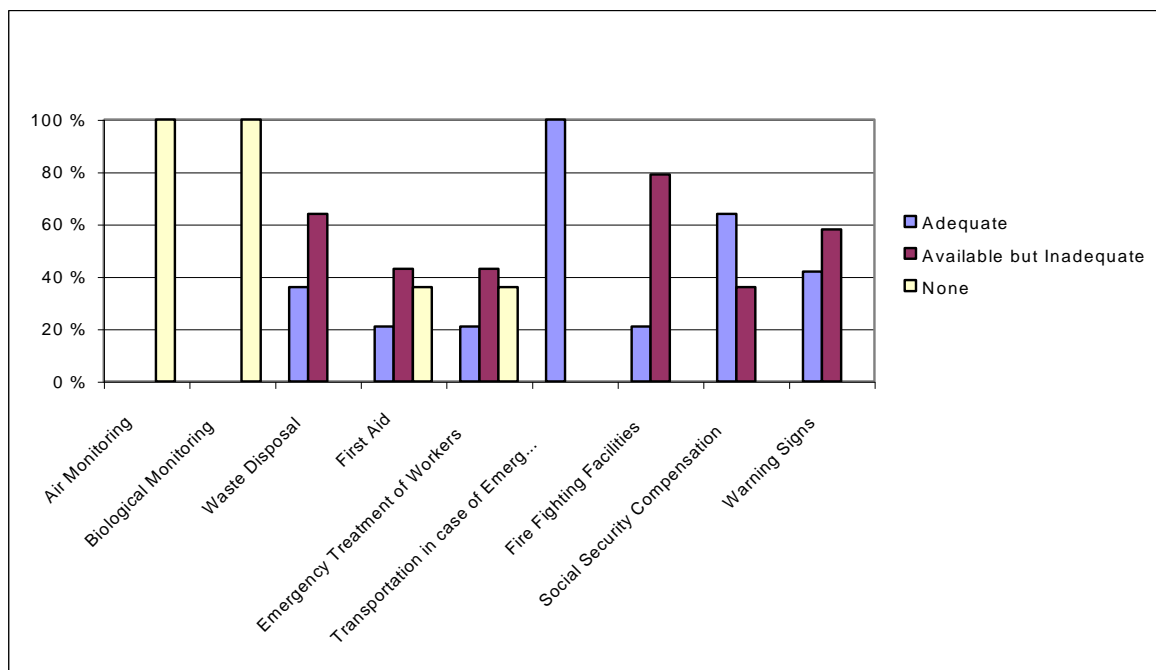


Fig 7 Controls adopted by Shoes Industries (Total 14 industries)

Figure 8 shows various control methods adopted by 13 surgical instruments industries. Only 23 % of these industries conducted air monitoring by Government and private agencies but only on some occasions when the management intended to get SA 8000 certification. None of the industry had facilities of biological monitoring. Only 30 % industries had adequate facilities for waste disposal, while 70 % provided some disposal for harmful waste and trash/effluents but controls were ineffective in methods of collection and disposal. The situation of first aid in four out of thirteen (30 %) surveyed industries was adjudged adequate while remaining 70 % had inadequate first aid facilities. The figure 8 indicates that three out of thirteen industries had a dispensary at the premises and some workers were trained in the first aid treatment whereas 77 % had inadequate facilities for emergency treatment of

workers. As was the case in other industries, transportation in case of emergency was available to all surgical instruments industries. Fire fighting facilities in 30 % industries were regarded as adequate while 70 % had some facilities but number of fire extinguishers and fire hoses were not sufficient compared to the size of plants. The situation of social security compensation was encouraging as 77 % of surgical instruments industries complied with the Provincial Employees Social Security Ordinance 1965. The situation of 23 % these industries were regarded as available but inadequate. Sufficient number of warning signs were placed at appropriate places in about half of surgical instruments industries and half had inadequate facilities of warning signs.

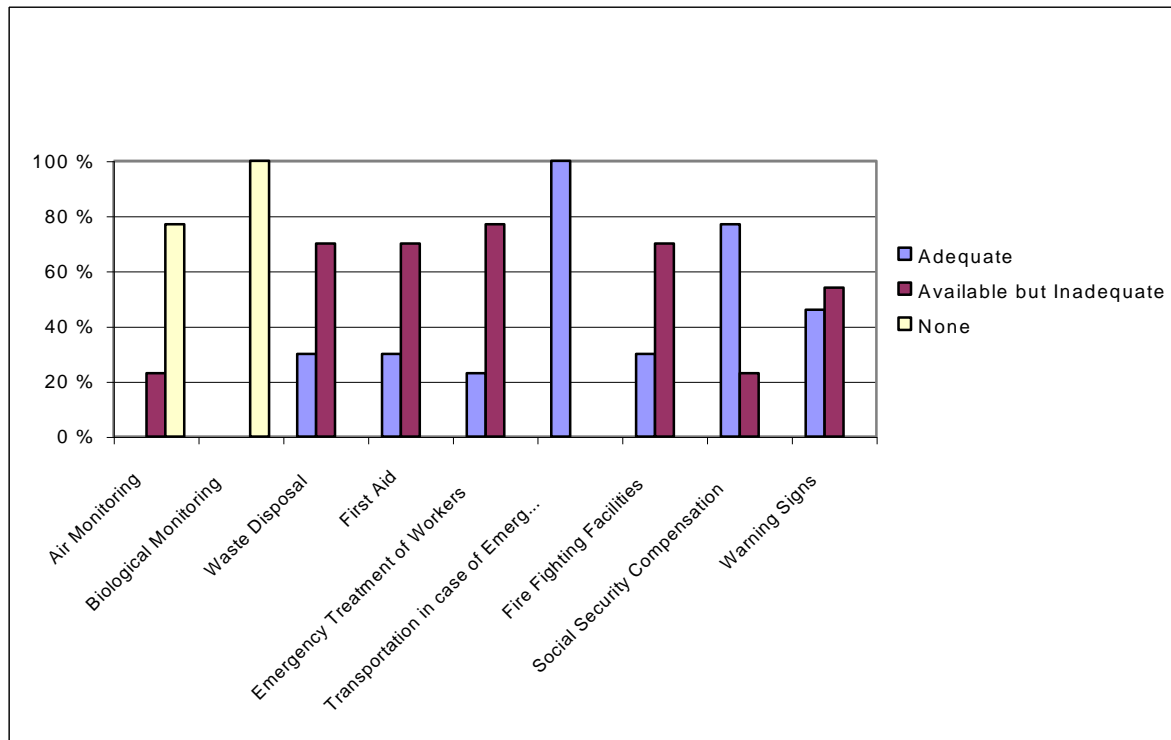


Fig 8 Controls adopted by Surgical Instruments Industries (Total 13 industries)

Figure 9 explains the control measures adopted by eleven furniture industries. If we compare Fig 6 to Fig 9, it become clear that the control measures adopted by furniture industries were poor compared to other three types of industries. For example no controls were available for air monitoring, biological monitoring and waste disposal. First aid facilities were not seen in over 50 % of the surveyed industries. Only two out of eleven industries had adequate first aid facilities. Over 80 % of furniture industries had no facilities for emergency treatment of workers. Fire fighting facilities were not seen in 82 % industries. The remaining 18 % had inadequate fire fighting facilities. Fig 9 shows that 55 % industries had no social security compensation at all, while 45 % had this system to some of their workers. Warning signs were not seen in 55 % industries. 18 % industries were provided sufficient number of various warning signs at appropriate places, whereas 27 % had inadequate facilities of warning signs.

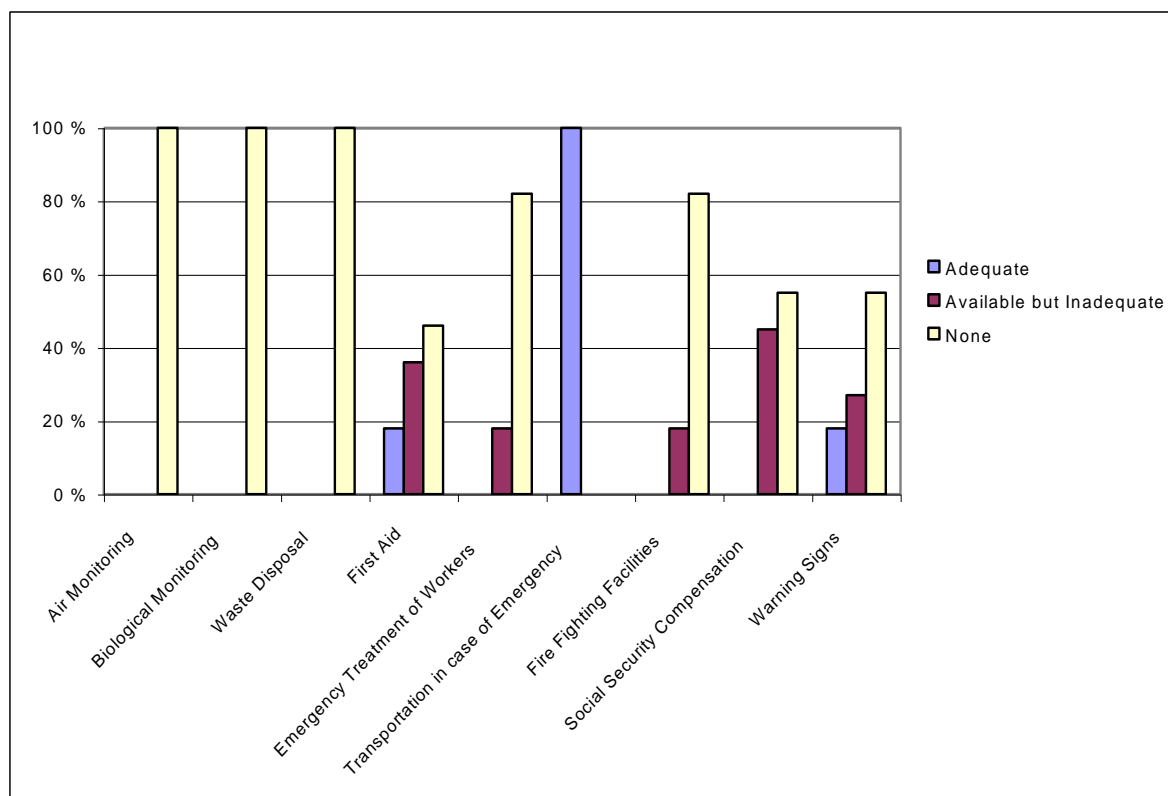


Fig 9 Controls adopted by Furniture Industries (Total 11 industries)

8. Recommendations

Pakistan has formulated a new Labour Policy (as the first after 1972), which will guide administrative, legal and judicial actions of government, employers and workers in realising labour rights, and their welfare alongwith promotion of social justice [24]. Such collective commitment to equity is necessary to achieve and sustain rapid growth in a globalised economy. The existing labour legislation in Pakistan is overlapping in its coverage in several areas and anomalous in definitions and scope. The variety and complexity of labour laws has contributed adversely to industrial relations system. Therefore rationalisation/consolidation of the existing law was needed. It is proposed in the Labour Policy 2002 to simplify and consolidate these laws into following six laws:

1. Industrial Relations Ordinance
2. Conditions of Employment Ordinance
3. Wages Ordinance
4. Human Resource Development Ordinance
5. Occupational Safety and Health Ordinance
6. Labour Welfare and Social Protection Ordinance.

Occupational Safety and Health of labour is given highest priority in the new Labour Policy [24]. A law covering all workplaces will be enacted and a National Tripartite Occupational Safety and Health Council will be established to meet the objective of providing adequate safety and ensuring compensation to workers. This council will be responsible to set OSH standards and review them periodically to make the same upto date to meet the needs of the industry. Other important aspect of this policy is to benefit workers in the agriculture and informal sector and home- based workers. An inter-ministerial committee shall be constituted

to formulate a package of labour welfare measures for the employees in the agriculture sector. Currently the labour in the informal and home-based sector is not covered by any labour legislation in Pakistan. The present labour policy aims at gradual extension of coverage of labour welfare laws to the workers of the informal/home-based sector. Similarly seasonal workers, which are generally not benefitted from labour welfare laws, will also be provided the coverage of relevant laws.

From the findings of the study it is evident that grave chemical problems are encountered in the surveyed industries. The problems seem more acute in smaller industries. A practical and multi pronged approach is being suggested, which if adopted may reduce the mounting toll of accidents. These recommendations are given below:

The Legislative Action

The legislation does exist in Pakistan in the form of Factories act 1934. However this document has undergone only minor revisions since then. It also has the usual lacunae, such as not being applicable to establishments employing less than ten workers. Chapter III of the Factories act 1934 relates to the health and safety. The present legislation related to the control of chemical hazards at the workplaces and OSH in general need thorough revision. This legislation cannot cope with the problems presented by the modern day processes. Most of the occupations declared "Hazardous" under the Factories Rules are no more relevant these days. Much more hazardous processes can be found in the industry. While the use of pesticides is regulated by legislation, the use of toxic and sometimes carcinogenic chemicals goes on in the industry freely. A full chapter in the Factories Act needs to be adopted dealing with the chemical hazards. A mechanism for the adoption of occupational exposure limits for certain hazardous chemicals should be prescribed. Small sized enterprises using chemicals should also be brought in the ambit of legislation.

Any legislation, until is backed up by professional and technical implementing agencies, will remain ineffectual. The present institutional framework in all the provinces needs strengthening by inducting professionally competent manpower and by bringing in necessary equipment. Strong interaction between the personnel in such institutions and the field inspecting staff of the labour department is essential for meaningful implementation of the chemical safety related legislation and occupational safety and health in the country.

Training and Education

There is a shortage of qualified manpower in the field of occupational safety and health in the country. This gap can be filled in by introducing the component of occupational safety and health, especially chemical safety in the syllabi of the technical and professional courses related to the engineering and medical subjects. Also the students at the school level need to be told of basic principles of chemical safety, so they may avoid unnecessary hazards during day to day life and a safety culture can be promoted in the country. Besides the technical manpower, the non-technical target groups including workers, supervisors, managers, factory inspectors and decision-makers from the public and private sectors need basic training in the occupational safety and health.

OSH Training to the Medical Doctors

This aspect of training is very important because the doctors in Pakistan do not have enough education/training facilities on occupational health and safety. Information on occupational

diseases is also lacking in the country. The development of a mechanism to identify prevailing occupational diseases is crucially important in promoting preventive measures. The training of medical doctors who would be involved in the diagnosis of occupational diseases (for example doctors employed by Employees Social Security Institutions in the whole country) has to be widely organised. There has been continuing efforts for the training and education of occupational physicians in the European Union countries [19]. Similar efforts can be started in Pakistan keeping in view of local situations.

Workers' Right to Know

There are certain areas in which Government of Pakistan can move fairly rapidly. Following the lead of the pharmaceutical industries and pesticides business, which provides comprehensive information in the local language to the consumers of their products, suppliers of chemicals, both national and international, must clearly label all their products, and submit a material safety data sheets (MSDS) in the local language. In case of multinationals, the original MSDS can also be submitted along with the translation. This is feasible because, while the end users of many hazardous chemicals like benzene may be scattered and even poorly documented, the manufacturers and suppliers are generally limited, and can be held responsible for providing complete information to their customers. This would thus be a logical and enforceable first step in disseminating information about chemical hazards to the workplaces. The larger the plant and the more highly educated the workforce, the earlier chemical hazards will be identified by management, safety and health professional, and the workers themselves. This knowledge would then be expected to diffuse down at least to some extent to other workers in the same occupation who work in smaller plants. MSDS would also be a reference source to primary health care providers looking after workers and their families who are often otherwise unable to access information regarding the health hazards of chemicals their patients are exposed to.

Occupational Hygiene Programmes

At present there is no feasible system of exposure monitoring in most of the industries in Pakistan. There is a need to frame legislation so that a periodic monitoring of work environment in industries could be introduced. This will help in recognizing and evaluating various hazards present at the workplaces, and to recommend the appropriate control methods to the industrial establishments. In the absence of a strong legislative framework, other incentives will have to be given. For many export oriented manufacturers, such as carpets and surgical instrument industries, these are already in place in terms of orders received only if industries comply with certain minimum standards like minimum age of employee, minimum wage, conditions and environment of work, and so on [15]. This interest and activism on the part of consumers can and must be encouraged, not just at the international level, but also at the national, regional, and local level.

Concerning to the substitution of hazardous chemicals at the workplaces, the management of the factories should try to substitute hazardous chemicals to less hazardous chemicals [18].

The management of factories should start to conduct risk assessment surveys in order to find out different safety, health and environmental problems faced by their industries. As a result their working conditions and environment will be improved [20]. Recently a similar approach has been used in some surgical instrument industries in Sialkot, Pakistan, but the reason was to get their plants SA 8000 certified. This was done because of the requirements of their foreign buyer's. The thinking of the local businessmen has to change if they want to provide safe working conditions and environment to the workers.

Role of Employers' and Workers' Organisations

Employers' and workers' organisations can play an important role to improve the safety, health and working conditions and environment. For example, the Malaysian Employers' Federation (MEF) in 1996 has recruited a specialist in occupational safety and health in order to reinforce its functions to assist its members. In 1997, The Employers' Confederation of Thailand (ECOT) established a new committee on OSH and environment and recruited a staff member responsible for the activities under the committee. The Mongolian Employers Federation (MONEF) launched OSH training programme based on the ILO WISE approach in 1998. Workers organisations in China and Vietnam have extensive training programmes [16]). Moreover the workers unions should include safety as a bargaining issue in the charter of demands. They should not demand compensation for dust, fumes or heat, but they should demand to remove or reduce the physical and chemical hazards through risk assessment. Safety should be given importance over wages, daily allowances or bonuses. The workers organisations should establish safety structure within unions, educate themselves and their members, and find active members who can visit the workplaces, and talk to workers about health and safety problems and hazards [17].

Improvement in Compilation of Statistics and Analysis

Statistics on occupational accidents and diseases are the basis for priority setting for preventive actions as well as for concrete programmes for identified sectors. It should be done in close linkage among workmen compensation and social security schemes and other related institutions. The concerned authorities should do proper entries of occupational accidents and diseases in the labour force surveys.

Export of Hazards

There has been a growing trend for transfer of hazardous technologies or processes to the developing countries. The processes no more feasible in the developed countries, due to high cost of environmental and safety and health measures, are shifted to the developing countries. Similarly some chemical substances banned in the developed world are exported to the developing countries. The solution of such problems need a concerted effort at the international level making it impossible to transfer hazards from one country to the other.

Setting up of National OSH Training Mechanisms

Training of managers, supervisors, workers and inspectors of factory inspectorates is the most important aspect in the promotion of occupational safety and health. Such training should be available throughout the country. This is possible only when there is enough legislation to support the activities. For example in Thailand, the safety officer training has been organised as a key legal obligation of employers with 100 or more workers. Though Centre for the Improvement of Working Conditions and Environment (CIWC&E) in Lahore played an important role in promoting OSH training in the country, it cannot organise all the necessary training in Pakistan. To do so CIWC&E should be strengthened to recruit more qualified personnel, construction of auditorium and hostel facilities at their site and more technical equipment to support the activities. Other possibility is that private sector could be considered. For example the setting up of a semi-Governmental body, such as Korea Occupational Safety and Health Agency (KOSHA), National Institute for Occupational Safety and Health (NIOSH) in Malaysia, and Japan Industrial safety and Health Association (JISHA)

could provide a strong basis for the establishment of a training institutions' network [16]. In Pakistan chamber of commerce and industry can play an important role in this regard.

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Questionnaire

RISK ASSESSMENT OF CHEMICALS

1. General Information

1.1 Name of factory:

1.2

Address:

1.3 Telephone number and
fax:

1.4 Contact
Person:

1.5 Date of
visit:

1.6 Year of
operation:

1.7 Types of
operation:

1.8 Raw materials: _____

1.9 Processing aids (intermediates): _____

1.10

Products: _____

1.11

Bye products: _____

1.12 Please describe the process in few lines:

1,13 Number of workers: Male Female Total

1.14 Working hours:

Start Time	Finnish Time	Break if any	No. of free days per week

(First column only if there is no shift work)

1.15 Where do the workers eat (please tick the relevant box)

- At the premises
 In a nearby restaurant
 At the canteen of enterprise
 Other arrangements (Please describe)

1.16 Where do the workers go for toilet/washing?

- At the premises
 In a nearby premises
 Other arrangements (Please describe)

1.17 How do you describe the general housekeeping and storage?

- Good
 Dirty
 Normal

1.18 Please describe special problems of storage and housekeeping: _____

1.19 About accident and illness record:

- Are accidents reported Yes No

How individuals report an accident?

1.20 Whether personal protective equipment (PPE) used

- Yes
 No

Which kind of PPE are used

- Local Imported

Do you have training system in the use of PPE?

- Yes No

If yes, please describe _____

-Do you have facilities available at your factory for the maintenance of personal protective equipment?

- Yes No

If yes, please describe _____

1.21 Any methods employed for solid, liquid or gas waste disposal:

2. Information about chemicals and their hazards

2.1 List of chemicals used in the enterprise

(Please continue on a separate page, if space provided is insufficient)

Name of chemical (from container or other source)	Ingredients (from container or other source)	Is label provided on container		If yes in which language?	Quantity used (in Kg/Litres) (whichever is relevant)	
		Yes	No		Weekly	Monthly

2.2 Quantity of each chemical stored on the premises: _____

2.3 Describe how are chemicals transported or transferred within the enterprise? -

How are chemicals used?

Name of chemical	How it is used	How often daily	Exposure level (if monitored)

--	--	--	--

(Use more space on another page if needed)

2.5 Control measures adopted at the enterprise (tick the relevant box)

Control method	Adopted		If Yes?		Remarks if necessary
	Yes	No	Adequate	Inadequate	
Substitution					
Isolation					
Natural Ventilation					
Forced Ventilation					
Local Exhaust Ventilation					
Other Engineering Controls					
Personal Protection					
Others					

2.7 How are workers exposed to chemical hazards? (Tick the relevant box)

Name of chemical/Ingredient	Approx. No. of workers exposed				

Do the workers frequently suffer from (Tick the relevant boxes)

- Headache
- Respiratory problems
- Solvent addiction
- Fevers
- Gastrointestinal problems
- Sickness related absence
- Other problems (describe)

3. Fire, Explosion, and Spillage hazards (Tick the relevant boxes)

3.1

Fire Hazard				Explosion Hazard				Spillage Hazard			
Low	Medium	High	None	Low	Medium	High	None	Low	Medium	High	None

3.2 Did a fire/explosion take place recently. Yes
 No

If yes, describe when, how and consequences

3.3 Other problems created by the enterprise

3.4 To the surrounding communities/localities (describe)

4. Control Measures/Facilities available at the enterprise
(Tick the relevant boxes)

Control method/facility	Adequate	Inadequate	None	Not needed
Air monitoring				
Biological monitoring/health surveillance				
Waste disposal				
First aid				
Emergency treatment of workers				
Transportation in case of emergency				
Fire fighting				

facilities				
Social security /compensation				
Warning signs				
Others				