CHAPTER - IV

DISCUSSION

Every nations development depends upon Industralization, Agriculture and other economic activities. Economic development of nation is one important factor who totally depends upon Industralization. Industralization and Agricultural activities fulfill the basic needs of human beings. Although industralization is essential for economic development, but during its process it causes deterioration of environment, various types of occupational hazards and occupational diseases. These occupational hazards affects the health of worker doing that profession. Sometimes even death is also the ill-effects of occupational hazards. Hence now-a-days, the attention of developing countries have been focussed towards the protection of environmental pollution and making the workplaces safer for work. Various labour laws have been made regarding the industrial safety, health status of workers and also for improving the quality of product, efficiency of workers.

The textile industry perticularly powerloom sector is one among others in which workers doing their job in adverse working conditions. The work environment and working conditions mainly affects the health of workers.

Mostly the workers working in powerloom sector are of age ranges from 17 to 55 years, mean age of workers is 35.7 years, height of workers ranges from 148 cms to 178 cms

with mean height 159.3 cms and weight ranges from 36 kgs to 70 kgs with mean weight 48.75 kgs.

The physical fitness score of worker indicates very poor performance due to unavailability of healthy conditions. The Grip strength of workers varied between 22 kgs to 44 kgs for right hand, whereas for the left hand Grip strength ranges from 19 kgs to 48 kgs. The Grip strength values of workers shows poor performance as compared to the control values.

For industrial operations, measurement of pulse rate will be the most direct simple method available for evaluating stress of job on body of workers Narayane (1986). The pulse rate and blood pressure values mainly affected due to work intensity. The cardiovascular responses mainly affected due to prolonged exposure of noise, heat stress, high concentration of dust, intensity of work as well as duration of work. These cardiovascular responses well correlates with the age of workers and exposure of work. There is increase in heart rate, blood pressure values of powerloom workers during work as well as after shifts.

As it is expected the pulse rate responses of individual workers in a group varied. A number of workers fail to attempt a steady state and their recovery time was longer indicating less physical fitness. The postural strain

is another important factor of physical strain on powerloom workers leading to low back pain and pains in joints [Plate No.II(D)].

Body temperature of workers also goes on increasing during work as well as after shift, It has been observed that body temperature of workers increases due to intensity of work as well as surrounding heat stress. There is significant increase in body temperature of workers during work as well as after shift.

The work loads in powerloom operations are comparatively high. A significant observation for the physiological responses like heart rate, blood pressure (diastolic and systolic) and body temperature of workers found to increase due to intensity of work during operations as well as after shift.

A study of lung function shows that, there is significant decrease in Peak expiratory flow rate, Tidal volume, Inspiratory reserve volume, Expiratory reserve volume, Vital capacities, Forced vital capacities, Forced reserve capacitives, Total lung volumes, Forced vital capacities and Forced expiratory volume in one second values of lung during work and after shift. The FEV_1 values of workers indicates acute ventilatory impairments, 42% workers shows definite acute ventilatory impairments and 35% workers

were found to have slight to moderate ventilatory impairments.

Respiratory illness and other indeterminate type of respiratory illness related to occupational environment among textile workers in India has been reported by Damodaran (1962), Vishwanathan (1964), Raghvan et al. (1963), Siddhu (1966); Thiruvengadam et al. (1970), Schilling (1981), Mathur (1988), Sawant and Muthane (1988), Parikh (1990) and Chattopadhayay et al. (1993).

Two major types of respiratory illness were observed among subjects studied. The first group shows that typical similarities with classical byssinosis as described by Schilling (1981), while other group showed complex symptoms associated with cough, monday fever, chest tightness and wheezing. These symptoms were found to show relationship with particular working day or after weekly off. The indcidence of respiratory illness shows relationship with duration of exposure to cotton dust, the severity of illness were found to be increased with age.

Decrease in Peak expiratory flow rate values, Tidal volume, Inspiratory reserve volume, Expiratory reserve volume, Vital capacity, Forced respiratory capacity, Total lung capacity, Forced vital capacity and FEV_1 values occurs due to chest tightness during work as well as after shift.

This significant decreament in lung function mainly occurs due to cotton dust.

The physiological responses of workers changes due to different occupational stresses like noise, heat, light, humidity and concentration dust in weaving sheds. The questionnaire study reveals the occupational stresses among powerloom workers, in which most of workers complains about low back pain, chest tightness, headache, problems in hearing. It has been concluded that, these complains are due to mainly intensity of workload as well as due to environmental factors.

Powerlooms generates characteristic noise due to shuttle propulsion and arresting mechanisms like swell spring that results in production of high noise. In weaving sheds powerloom workers as well as jobber and reelers are also exposed to dangerously high level of noise. The threshold limit value is 85 dB for textile mills, but noise level in weaving sheds exceeds this limit.

The noise level in large weaving sheds ranges from 102 dB to 106 dB. The noise level in textile mills about 100 dB can cause permanent hearing loss (Agarwal 1987). The high level of noise was fond near powerloom (107 dB) near worker (104 dB), middle of shed (106.5 dB), at the entry of shed (102 dB) and at end of shed (104 dB). It has been concluded

that the high level of noise in powerloom workers may cause detrimental effects on ears. The noise level in the office near weaving sheds ranges about 93 dB and at nearest house was about 77.25 decibels. The high level of noise in office also affects other persons doing other jobs regarding the weaving process.

Thermal stress is another important environmental stress factor which affects the health status of workers. It has been observed that the environmental conditions in weaving sheds are 'too warm'. A significant record of temperature in weaving shed was 34.5°C. Sen et al. (1964) observed that, the physiological responses of workers in cotton textiles operations mostly affected due to work intensity as well as thermal stress.

As expected; the cardiovasculer responses i.e. pulse rate and systolic blood pressure as well as diastolic blood pressure was found to be a significantly higher in powerloom workers, which is due to high level of heat stress and high level of noise. The body temperature also goes an increasing with duration of work and after shifts.

The relative humidity level inside the weaving sheds was purposely maintained by sprinkling the water for easy weaving process otherwise the warp threads from weaving shuttle cut down again and again. It has been observed that;

humidity level in weaving sheds ranges form 68% to 94% and is mainly due to inadequate ventilation. The higher relative humidity and increased thermal stress in powerloom sheds mainly affects the powerloom workers so if ventilation is increased, then humidity and heat stress may decreased and helps in increasing the efficiency and productivity of work.

In weaving sheds cotton dust produced during weaving process; that dust freely fly in air and gives rise to various degree of respiratory stresses among workers. Several investigators investigated these respiratory stresses among the workers in cotton spinning mills. Berry et al. (1973); Gupta et al. (1986); Parikh et al. (1990); Sawant and Kore (1994). Occurance of Byssinosis among powerloom workers were investigated by Thiruvengadam and Kamat et al. (1970). It has been concluded that, the occurance of Byssinosis and other respiratory symptoms mostly found in respiratory tract are due to inhalation of cotton dust. Roach and Schilling (1960) studied a clinical and environmental study of Byssinosis in the Lancashire cotton industry and investigated that prevalence of byssinosis correlated most highly with protein in medium sized dust particles ie. approximately 7 μ to 2 mm.

In present investigation it has been significantly observed that, there is high concentration of dust in

powerloom sheds which ranges from 129.5 $\mu g/m^3$ to 144.9 $\mu g/m^3$. Such concentration of cotton dust might be the possible cause chest tightness, cough etc and decreases PEFR values, tidal volumes, IRV values, ERV values, TLC values, vital capacity, FVC values and more significantly FEV_1 values. The significant decrease in PEFR value mostly observed on first working day after weekly off; than any working days. This significant decrease well correlates with the age groups as well as exposure period.

Observation of chest X-ray P.A. of workers exposed to cotton dust, shows fibrosis of lower lobes of lungs.

Light is an important environmental factor, about 80% impressions carried through gate way of vision. During weaving process, appropriate intensity of light is essential. It has been observed that due to inadequate illumination there was poor co-ordination of eyes and hands with brain and most of workers complaints about visual strain.

Section 17 of factories act suggest that minimum intensity of illumination for workplace should range from 1000 to 2000 lux. It has been observed that, intensity of light in weaving sheds was very poor, due to production of dust and inadequate ventilation. The illumination levels at different places in weaving shed ranges from 40 to 290 lux

i.e. near powerloom (290 lux), at enterance of shed (280 lux), and near reeling machine (40-42 lux). Such illumination level mainly affects the working capacity of workers leading to visual fatique.

In industrial situations, the workers are exposed to various physical and social conditions which have been found to affect their health and efficiency. Investigators in the field of ergonomics and occupatimal health have centered their attention in studying the effect of different individual factors as well as the effects of different combination of factors such as work environment, level of physical and mental fitness, age, sex, training, nutrition, work load, nature of manufacturing processes etc. It is well established from a number of experimental studies (Brouha, 1960) that, when work is performed the displacement of physiological and psychological functions from resting level to a higher working level requires an additional energy expenditure. The job of weaver is absolutely routine. The subjects of present study are found to be engaged in this type of jobs for 10 to 12 hours a day and for 35 years; and they are acclimatized to specific working conditions. Because of poor level of education, backward socio-economic conditions the powerloom workers accept the available working condition as alotted to them. They have no choice but they have to be remained contented with what they have.

Dangerous levels of cotton dust, noise are encountered in powerloom sheds. The respiratory impairments, high levels of blood pressures and several non auditory effects such as interference with communication, disturbance, stress, annoyance etc. are found to affect the performance. Recognizing the adverse effects of occupational hazards due to workplace environmental factors, international labour organization has adopted the conventions concerning the protection of industrial workers against occupational hazards in the working environment. Unfortunately the powerloom sector is unorganised and running without research. The working conditions and work environment is extremely adverse and it is difficult to maintain approximate level of health status.

In the factories act 1948, there are provisions for providing the personal protective equipment to the workers who are exposed to unsafe and unhealthy environment. These provisions of law relating to the use of personal protective equipment are made with a view to protect the industrial worker against possible hazards. It is also the intention of law that these personal protective equipments shall be of such type and made of such material that it withstand to such specific hazards for which it is actually being used and to make the industry safe for those who are

engaged in it and also to ensure that the industry does not adversly affect the society.

The personal protective equipments are the second line of defense to protect powerloom workers. Defensive removal of dust by means of suction system for a group of looms must be practised. Travelling dust cleaners should be used. Airborne dust control by exhaust ventilation and good housekeeping in powerloom sheds can control the high concentration of dust, thus preventing some specific and nonspecific respiratory disturbances due to dust exposure. Another hazardous factor of powerloom sector is noise which can be controlled by modifying source of noise, blocking or reducing it along the path from the source of isolating it from the receiver by means of hearing protective equipment.

Provision of satisfactory working conditions enables the workers to work satisfactorily, accurately, safely and with minimum fatigue. Adequate lighting is another important factor which influences health status of worker and productivity. Ideal level of illumination for factories appear to be in range of 1000-2000 lux. The inadequate lighting in powerloom sheds may be another important factor causing defects in visual fatigue. Therefore. in the area of weaving and cloth inspection area satisfactory level of lighting should be maintained to avoid visual strain.

The physiological responses of the powerloom workers while working with protective equipments such as face mask and earmuffs have indicated their beneficial effects and they feel comfortable during working, thus minimizing stress due to dust and noise.

In the powerloom sheds warm and humid environment is maintained because such condition is desirable for process. But such environment when combined with the climatic heat load and heavy work load found to make environmental conditions severaly adverse. The intensity of such conditions become deteriorating during summer season. The work in such condition creats strain and fatigue among workers consequently affecting their health, efficiency and production. Provision of cool water and providing appropriate rest allowance may put the workers in comfortable conditon. The workers on their own choice are found to take unscheduled rest which may be the one of the factor that helps them to recover from the strained state, and it is also difficult to measure the work load in terms of actual production of the cloth because length of the cloth produced is associated with number of other factors such as size of the bobbin and shuttle, quality of raw material and machine troubles etc.

While concluding the present thesis on the

physiological evaluation of jobs and occupational stresses in powerloom workers, it should be mentioned that; practically all the objectives with which the present investigation was taken up, have been fulfilled. Thus the present treaties describes the physiological evaluation of jobs and occupational stresses in powerloom workers, where prevalence of respiratory impairment and ill effects of noise are possible.

The present investigation opens several avenues for further research on the occupational stresses in powerloom industry. Some ideas for such future work as listed below in brief.

1. The present work has been carried out only in some selected powerloom sheds. A detailed study of environmental scenario of the powerloom industry with a view of the various occupational hazards will give a better picture regarding the health status and occupational hazards in powerloom industry.
2. In the present investigation only pulse rate and blood pressure have been taken as physiological parameters. A better understanding of evaluation of job severity in powerloom industry can be obtained by studying some more physiological parameters such as measurement of energy expenditure or finding out energy cost of each operation.

3. The incidence of byssinosis in textile industry has been recognized for more than century. Until recent years no studies have been made on the environment producing the respiratory impairment of byssinosis in powerloom industry. It has been assumed that the finest particles of cotton dust settled in the lung are responsible for respiratory impairment or byssinosis in textile mills. This also seems to be true for the powerloom workers. Though there is sufficient evidence of the respiratory stress; the detailed study of dust levels and size range of dust particles and the relationship between the dust exposure and respiratory stress and the non-specific dust disease is essential.
4. In the present investigation it was observed that workers are exposed to high level of noise. It will be interesting to perform the pure tone audiometry of the powerloom workers.
5. In the present study it has also been observed that, use of protective equipments keep the workers comfortable during work. It will be interesting to study the performance efficiency of weavers by studying the behavioural measurements in powerloom workers by wearing protective equipments.
6. Recent trend in the study of occupational physiology concerns with investigation of combined effects of

environmental factors. Researchers mostly deal with the exposure of a worker to a complex unfavourable environment. The combined effect of these factors is determined by their interaction. Unfortunately, most of the researchers have not studied the physiological mechanism in the combination of factors like temperature, humidity, noise, vibration etc. Only the final effect on this or that system or on the individual as whole is studied. Therefore it will be interesting to study epidemiology of the long term effects of combined effects of cotton dust, noise, heat, humidity and vibration.

The improvement of hygienic norms on dust, noise, vibration and heat as the most wide spread stressful factors of occupational environment is necessary for the maintenance on the health status of workers and for creation of the environment for productive and qualitative labour.

The share of the powerloom sector in the national annual cloth output is more than 72%. It is the largest employment generator sector with more than 80 lakhs persons directly employed. Its export performance is spectacular and it is a special class of rural entrepreneurs which mainly comes from SC, ST, NT and OBC. It is important to note that it is the only sector of textile industry, which is running

without research or innovation of any kind. This sector can play a role in the economy of our country. The powerloom committee [1964] has stated that, "The powerloom is much more than an instrument of production. It is symbol of vast country wide process of economic transition and techno-social change. Behind it lie deep economic urges of millions of people to break through the barrier of poverty, to improve ever so little, their level of life line and to uplift themselves to a slightly higher social level". It seems that, a sweating toiling human mass, menaced by a grim strugle for existence, is in search of an anchor which would help them in escaping the drift of hunger and distress. Thousands of workers have abandoned their ancestral homes and have migrated to Ichalkaranji to fulfill the clothing requirement of the nation at the cost of their health and lives. Hence it is necessary to take genuine measures for their health protection and this will be only possible, if one undertakes the extensive research in this important sector of the textile industry.