

Full Length Research Paper

A research of occupational safety in forest products industry in Turkey

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Nowadays, occupational safety has become an important discipline for employees to work at healthier and safer places by providing safer working conditions at workplace. Therefore, occupational safety is important in terms of not only employees' safety but also being safely carried out the whole enterprise and the production. In the study, it was aimed to make analysis of worker's health and occupational safety of employees of forest industry enterprise operating in Duzce which is an important city regarding the forest products industry in Turkey. For this purpose, it was planned to apply the study in Duzce, in which every sub sector of forest products industry operate and a questionnaire, including employees of forest industry enterprise, was applied. In the study, the factors affecting worker's health of employees in forest industry enterprise and occupational safety and the situation of the enterprise in terms of the results were analyzed. As a result of the study, it was determined that 55.3% of employees did not receive occupational safety education and they are not pleased enough to the level of natural and artificial lightening. Furthermore, employees pointed out that back and belly ache, head and neck ache, foot and ankle ache and generally pain complains are their discomfort.

Key words: Occupational safety, forest industry, Duzce, Turkey.

INTRODUCTION

With the globalization and the removal of borders in trade, many business opportunities have come about in various areas; and with developing technology, the problems people face with have increased, as well. Among the most important ones of these increasing problems, occupational diseases and occupational accidents come first. In various job branches, a series of factors like the type of the job, its quality, its hardness and the working hour can cause injuries in musculoskeletal system and other different problems in human body.

Working has an important place in human life. Working life provides the individual not only with status in the society, but also with economical benefits. It is known that the factors that come out of the labor and the environment of the labor affects the workers' health or

causes occupational diseases and occupational accidents. The problems of occupational health and occupational diseases, which have reached considerable degrees today, can be prevented by taking precautions for the working environment and the work itself and with the applications for developing workers' personal health.

The results of the arrangements of working places that are made by not taking ergonomical arrangements into account will bring about an increase in the possibility of occupational accidents and occupational diseases. In that case, it is required that ergonomical arrangements to increase work safety be done. Occupational safety can be defined as all the methodized works done to examine and prevent the dangers, harms and functioning problems, which come out of working conditions in working place, for workers, machines and facility or production. Today, both for employers and employees, occupational safety have become a branch of science which lessens occupational accidents and occupational diseases by making working conditions healthy and safe in working

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places (Kurumer et. al., 2005).

The behaviour of working safety is something to do with human factor. Human factor implies the human and individual qualities that are effective on working behaviour so as to affect the environmental, organizational and health and security with the factors belonging to the job. Therefore, the efforts to develop health and security in working environment are directed to improve the attitudes of the workers and make them safe behaviors (Demirbilek and Cakir, 2008).

Providing working safety in working places is primarily a humanistic obligation, and more than that it is a legal duty. A physically and psychologically inconvenient working place, chemical factors, physical factors, biological factors, ergonomical factors, individual-based qualities generally cause occupational diseases and occupational accidents and psychological defections (Kacmaz, 1999; Ayhan, 2004).

The positions that the workers get while they are working are closely related to the workers' health and working efficiency. This situation is among the typical reasons of occupational accidents and occupational diseases (Oge, 2000).

The process, which started with the first laws to provide working health and safety, in time, has enabled a legislation of working health and safety to come to life which is wide-ranging, technical and changing and developing according to the needs of the day in many countries. Along with many national arrangements, international establishments also have done many arrangements about this subject. To take decisions and to develop suggestions about the subjects of working life in international level, in 1919, International Labour Organization (ILO) was founded. This foundation has accepted about 200 decisions of agreement and advice, and presented it to the use of member countries (Durdu, 2006).

The aims of the works of occupational health and safety generally can be counted as protecting the workers, providing production safety and working safety (Kilicogullari and Ozcan, 2007). The aims of the works of occupational safety are removing the dangers which may come about on the course of working, removing the conditions which may harm the workers in a working place and providing a safe working environment. The main aim of the works of working health and safety is preventing the workers from getting injured or dying (Gedik et. al., 2008).

Along with providing safe working environments, it's required that the insecurity in workers' behaviours be removed. For this, the workers should be given the instructions about working safety, and the working place should be provided with warnings, signs and signboards about occupational accidents and occupational health. Moreover, the factors which may reduce or harm the workers' sensomotorical activities should be removed and the ones who have chronic diseases shouldn't work at the places of dangers of accident.

MATERIALS AND METHODS

Materials

In this study, the analyses of workers' health and safety of the workers of forest industry enterprise being active in Duzce which is an important city regarding the forest products industry in Turkey. For that aim, it is planned that this study be executed in Duzce, where every sub-sector in the field of the forest products industry is active. In the study, the situations of the enterprises in terms of the factors that affect the health and working safety of the workers of forest industry enterprise and the result of these factors are analyzed.

According to the records of Duzce The Chamber of Commerce and Industry January - April, 2010, when the study was made, the number of recorded workers of forest industry is 3500 (Anonymous, 2010). In the scope of the study, while the number of the questionnaires to be answered is counted, by taking the number of the workers in the enterprises, 3500, into account, with the help of the following Formula, the calculation was made (Dorman et al., 1990).

$$n = \frac{Z^2 \cdot N \cdot P \cdot Q}{N \cdot D^2 + Z^2 \cdot P \cdot Q}$$

The minimum number of questionnaire to be done, whose sample dimension is calculated for 90% confidence level, 5% error margin, is found as 249,7. With the thought of rising the validity of these questionnaires, and possible faulty questionnaires among the questionnaires which will come back, that number was risen to 275 and the questionnaires were done. 11 of the questionnaires were kept out of assessment, and 264 questionnaires in total were taken to assessment.

Because more questionnaires were done than the number that was calculated by the help of the Formula which is used to calculate the sample dimension, the reached data number is accepted to be statistically enough.

Methods

The workers of the forest industry enterprises being active in Duzce are randomly picked. The study was, at first, planned according to face-to-face questionnaire method. In the process of preparing the questionnaire form being used, the studies included in literature which were done in this subject and alike were examined and a new questionnaire form appropriate for the aim of the study was prepared.

The questionnaire form was composed of 3 sections in which there were 17 questions and 53 variables in total. In the first part, some demographical qualities of the participants, in the second part, the analyses of the working place in terms of its present condition and working safety, in the third part, the ergonomical analyses of the working place and the unrests of the workers caused by the work were explored.

In the course of the analyses of the questionnaire, the variables in the acquired questionnaires were coded and a data base was formed at first. The variables in this data base were assessed by making use of SPSS (2003) package program. The relationships between the questions were put forward with the chi-square analyses.

It was assumed that the workers of forest industry enterprise of Duzce who participated in the questionnaire answered to the questions of the questionnaire totally by their own objective knowledge and experiences.

RESULTS

Analyses of validity and reliability

Analyses of validity analyses a measurement device whether it can really measure the qualities to be measured or not. In the study, factor analyses were used to determine the validity of structure. The validity of the data for the analyses of factor is found with Kaiser-Meyer-Olkin (KMO) coefficient. The value that is taken by Barlett sphericity test and its relevance examines whether the variables show correlation with each other or not. The fact that KMO is higher than 0.06 and Barlett test is relevant shows that the data is suitable for factor analyses (Sharma, 1996; Buyukozturk, 2002). When we look at the results, KMO is 0.882; Barlett test is 5474.422 and Sig. value is 0.000. These proportions show that the data group is suitable for factor analyses and they cause no problem in terms of validity.

In the study, at first, a reliability analyses was done to the data on the basis of inferential statistic. As the result of the reliability analyses of the measurement used in the study, the general reliability value of the data (Cronbach's Alpha coefficient) was appraised as 0.09. When this result was paid attention to, it is seen that the measurement is highly reliable. Because, the fact that Alpha is less than 0.40 shows that the measurement is not reliable, between 0.40 - 0.60 shows that it is lowly reliable, between 0.60-0.80 shows that it is reliable and between 0.80 - 1.0 shows that it is highly reliable (Ozdamar, 2002).

Demographical assessments

The examination results of the workers' some of the demographical qualities like sex, age, marital status and educational status are given in Table 1.

93.6% of the participant workers are male and 6.4% are female. When the age group is examined, it is stated that 18.6% of the workers are at 15 - 24; 50% are at 25 - 34; 22.3% are at 35 - 44 and 9.1% are at 45 - 55 year age range. When we look at the educational levels of the workers, it is seen that 1.9 % of them aren't literate, 27.3% of them graduated from primary school, 24.2% of them secondary school, 35.6% of them high school, 6.1% of them graduate school and 4.9% of them university (Table 1).

The occupational experiences of the workers were examined with the help of the time span in which they did the same job and they worked in the same place (Table 2).

When the Table 2 examined, it is seen that the proportion of 48.9% of the workers between 1 - 5 years, 22.3% of them 6 - 10 years, 14% of them 11 - 15 years and 14.8% of them 15 years and more did the same job. As the time of working in the working place, 75% of the workers between 1 - 5 years, 16.3% of them 6 - 10 years,

6.4% 11 - 15 years and 2.3% 15 years and more did work at the same working place.

The analyses of the enterprises in terms their present conditions and working safety

The dimensions of the enterprises where the participant workers work are given in Table 3. It was understood that 49.6% of the workers work at large-scale enterprises, 28.8% of them at small-scale ones, 20.8% at middle-scale ones and 0.8% of them work at micro-scale enterprises.

It was detected that 44.7% of the participants had working safety education, and 55.3% of them didn't have such an education. It was also understood that the workers had the educations of working safety at the rate of 42%, worker's health at 25.7%, emergency at 23.5% and first aid, civil defence and fire at 8.8%.

According to the participant workers, their enterprise is examined regularly by the official authorities in terms of working health and safety at the rate of 53.4%. However, it was detected that, according to the participant workers, no working safety determinations was done to prevent occupational accidents in their enterprises at the rate of 58.7%.

It was detected that, according to the participant workers, there are personal protective materials for working health and safety, and there are warning signs about working safety in their enterprises at the rate of 93.2%.

According to the participant workers, there is first aid team at the rate of 63.3% and there is a doctor for the working place at their enterprises at the rate of 65.5%. According to 51.9% of the workers, periodical health checks have been carried out in their enterprises since they started working and throughout their working life there. Also, according to the participant workers, the machines and other materials in their enterprises are being regularly checked over at the rate of 74.2%.

The workers' care about having breakfast regularly (3.61) is checked at a high rate, but the sufficiency of the tea breaks given during the work for having a rest (3.31) is checked at a low rate. According to the chi-square analyses done between the variable of the scale of the enterprise and the sufficiency of the tea-breaks given at the enterprise, a statistically relevant difference was detected ($p < 0.05$).

According to the workers, the sites where the labour is carried out are safe enough (3.37), but the convenience of the sites where production is carried out in terms of health (3.24) was checked at a low rate by the participants. According to the chi-square analyses done between the convenience of the sites where production is carried out in terms of safety and the variables of whether the workers had the education of working safety or not, a statistically relevant difference was detected ($p < 0.05$).

Table 1. Some of the demographical qualities of the workers.

| Worker properties | | Frequency | Percentage |
|--------------------|------------------|-----------|------------|
| Sex | Male | 247 | 93.6 |
| | Female | 17 | 6.4 |
| Age group | 15-24 | 49 | 18.6 |
| | 25-34 | 132 | 50.0 |
| | 35-44 | 59 | 22.3 |
| | 45-55 | 24 | 9.1 |
| Marital status | Married | 168 | 63.6 |
| | Single | 94 | 35.6 |
| | Other | 2 | 0.8 |
| Educational status | Illiterate | 5 | 1.9 |
| | Primary School | 72 | 27.3 |
| | Secondary School | 64 | 24.2 |
| | High School | 94 | 35.6 |
| | Graduate School | 16 | 6.1 |
| | University | 13 | 4.9 |

Table 2. The occupational experiences of the workers.

| Options | Time | Frequency | Percentage |
|--|-------------|-----------|------------|
| The time span of their doing the same job | 1-5 years | 129 | 48.9 |
| | 6-10 years | 59 | 22.3 |
| | 11-15 years | 37 | 14.0 |
| | 15 and over | 39 | 14.8 |
| The time span of their working in the same place | 1-5 years | 198 | 75.0 |
| | 6-10 years | 43 | 16.3 |
| | 11-15 years | 17 | 6.4 |
| | 15 and over | 6 | 2.3 |

Table 3. The scales of the enterprises the workers working at.

| Scale of an enterprise | Frequency | Percentage |
|--------------------------|-----------|------------|
| Micro-scale enterprises | 2 | 0.8 |
| Small-scale enterprises | 76 | 28.8 |
| Middle-scale enterprises | 55 | 20.8 |
| Large-scale enterprises | 131 | 49.6 |

According to the results of the chi-square analyses done between the convenience of the production sites in terms of health and the variables of the sexes of the participants and the scales of the enterprises, a statistically relevant relationship was detected ($p < 0.05$).

While the participants agreed with the sufficiency of the

laws for working health and safety (2.62) in our country at the lowest rate, they agreed with the sufficiency of the studies about working health and safety carried out by the state in Turkey (2.63) at a low rate. Also the participants believe that, the people in the administrative levels of their enterprises do not have enough knowledge about

Table 4. The ergonomical analyses of the working place.

| Judgments | Average | Standard deviations |
|-------------------------|---------|---------------------|
| Machine Noise | 3.57 | 1.19351 |
| Artificial Illumination | 3.35 | 1.03593 |
| Natural Illumination | 3.21 | 1.01126 |
| Temperature | 3.11 | 1.06552 |
| Air-conditioning | 3.05 | 1.07381 |
| Human Noise | 2.31 | 1.13243 |

working health and safety (3.09).

According to the chi-square analyses done between the scale of the enterprise and the sufficiency of the present legal legislation for occupational health and safety in Turkey, a statistical difference was detected ($p < 0.05$). According to the results of the statistical analyses between the sufficiency of the studies done for working health and safety in Turkey by the state and the variables of workers' education level and the scale of the enterprises, relevant differences were detected ($p < 0.05$). Between the statements of whether the workers had the education of working safety and the variables of the scales of the enterprises and the statement of whether the administrative had the enough information about occupational health and safety, there detected a relevant relationship ($p < 0.05$).

The ergonomical analyses of the working place

In the ergonomical analyses of the working place the level of illumination, ambient temperature, air-conditioning and noise factors were examined. The findings about the ergonomical analyses of the working place are shown in Table 4.

It was seen that the participants were most uncomfortable with machine noise in their enterprises. After machine noise, the workers stated that the level of the artificial illumination isn't enough for their work. The workers are less uncomfortable with the level of the natural illumination than the artificial one.

According to the workers, among the ergonomical factors which give the least trouble, there are human noise and air-conditioning.

Because of machine noise, which is shown as the most troublesome factor by the participants in the ergonomical analyses of the enterprise, it was detected that the workers mostly suffer from headache (2.91); along with this, irascibility (2.58) and decrease in the efficiency of work (2.51).

A statistically relevant difference was detected between the levels of illumination in the work place and the sexes of the participants ($p < 0.05$).

According to the chi-square analyses done between the sexes of the participants and the variables of the scales

of the enterprises and the levels of the natural illumination of the enterprises, a statistical difference was detected ($p < 0.05$).

The workers mostly complained of aching or itching eye (2.17) because of insufficient illumination. Also, according to the participants, insufficient artificial and natural illumination cause distraction (2.08) and reflections during the work (2.05).

A statistically relevant relationship was detected between the variable, used in the ergonomical analyses of the working place, of temperature and the variable of whether the workers had the education of working safety ($p < 0.05$).

Among the negative results that are brought about by the ambient temperature on the workers, the workers mostly complained about fatigue (2.35). The workers stated that, because of the temperature of the working place, there happens a descent in the working performance (2.26), low concentration (2.13) and slow reactions (2.12).

According to the chi-square analyses done between the variable of the air-conditioning of the working place and occupational experience, a statistically relevant difference was detected ($p < 0.05$).

The workers stated that, as a result of the insufficient air-conditioning at the working place, they mostly suffer from stress (2.51). They also stated that, they suffered from difficulty in breathing, coughing (2.38), headache-dizziness (2.33) and fatigue-slow reactions (2.26).

According to the chi-square analyses done between the human noise factor and the variables of the time span of working at the same place, a statistically relevant relationship was detected ($p < 0.05$).

The analyses of work-related discomforts

In the study, 10 different discomforts were detected in the analyses of the workers' work-related discomforts. The assessment results of the work-related discomforts according to their constancy in coming about are shown in Table 5.

The participants of the study mostly experiences back and waist pain. Back and waist pain are followed by headache and neck pain, foot and wrist pain. The

Table 5. The types of work-related discomforts.

| Discomforts | Average | Standard deviation |
|--------------------------|---------|--------------------|
| Back and waist ache | 2.84 | 1.28062 |
| Headache and neck ache | 2.81 | 1.18274 |
| Foot and wrist ache | 2.67 | 1.40432 |
| A general ache complaint | 2.54 | 1.42964 |
| Shoulder ache | 2.50 | 1.17644 |
| Eye Rubor | 2.28 | 1.27458 |
| Joint ache | 2.25 | 1.19727 |
| Watering of eyes | 2.18 | 1.17203 |
| Knee Ache | 2.16 | 1.20833 |
| Hip Ache | 2.00 | 1.22707 |

workers less suffer from hip pain. The workers also stated that they don't suffer much from knee pain and watering-eyes.

According to the chi-square analyses done between the complaints of back and waist pain and headache and neck pain, which are mostly suffered one by the workers, and the variables of the scales of the enterprises and the variable of whether they had the education of working safety, a statistically relevant difference was detected ($p < 0.05$).

According to the results of the chi-square analyses done between the discomfort of foot and wrist pain experienced by the workers and the variables of the sexes of the participants and their occupational experiences, a statistically relevant relationship was detected ($p < 0.05$).

According to the results of the chi-square analyses done between the fact that the workers have a general pain and the variables of the sex, the age of the participants and the time span of their working at the same place, a statistically relevant relationship was detected ($p < 0.05$).

According to the results of the chi-square analyses done between the variables of the sexes of the participants and the scale of the enterprise and the discomfort of shoulder pain, a statistically relevant difference was detected ($p < 0.05$).

As a result of the statistical analyses done between the variables of the time span of working at the same place and the scale of the enterprise and the discomfort of joint pain, a relevant relationship was detected, as well ($p < 0.05$).

According to the result of the chi-square analyses done between the discomfort of watering-eyes and the time span of working at the same place, a statistically relevant relationship was detected ($p < 0.05$).

A statistically relevant difference was detected between the discomfort of knee pain and the variables of the workers' educational level and their occupational experiences ($p < 0.05$).

According to the result of the chi-square analyses done

between the hip pain discomforts (the least felt one among the workers) and the variables of the sex of the participant and the time span of working at the same place, a statistically relevant relationship was detected ($p < 0.05$).

CONCLUSIONS, DISCUSSION AND SUGGESTIONS

At the end of the study it was detected that 55.3% of the participants did not have working safety education. In a study carried out by Yildirim et al. (2008) it was detected that the workers did not have education about working safety at the rate of 93%. According to Keles and Bicen (2008), the primary aim of the activities of working health and safety is to protect human health, which is above all, and increasing the efficiency of labour. The fact that the rate of occupational accidents in our country is much more than the rate of the developed countries is one of the most important evidences showing that workers don't have enough education about working safety before they get in to the working environment. The fact that the sector of forest productions industry is a busy sector makes it compulsory that working safety should be given more importance.

In a working environment, the need of illumination is related to some criteria like the qualities of the work, the normality of the eye functions of the workers, detecting the details because of the work's qualities. It should be known that, the highest level of illumination isn't the optimal approach. The basic illumination can be summarized as the one suitable for the purpose (Erkan, 2003). With the study which was carried out in the industry of forest productions being active in Duzce by Gedik and Batu (2005), it was understood that the enterprises benefit from the day light adequately (95.7%), and there is a homogenous illumination (72.9%) on their working sites. However, in this study, which was made on the same main mass 5 years after, it was seen that the workers were not contented enough with the levels of artificial and natural illuminations in their enterprise.

In the noise circumstances at such a rate to disturb the workers, such observations like human-fault related delays, too much lose of material, late reactions to certain warnings and slowness in realizing machine-related faults catch the attention (Erkan, 2003). It was found by Gedik and Batu (2005) that machine noise, which is the most troublesome factor for the participants, affects communication, safety and efficiency at the rate of 55.7%. In a study carried out by Gedik on the workers of the factories of furniture and tablet, it was seen that the machine noise disturbed the workers. With the study carried out by Barli (1988), it was detected that the workers were disturbed by the noise of machines and with the results of these studies, consistent results were found.

With the study of Gedik and Batu (2005), while it was detected that 60% of enterprises did not take precautions to lessen the noise, with the study carried out at the same site it was seen that 74.2% of the enterprises took precautions to lessen the noise.

In the study, while 93.2% of the participants check at a high rate that their enterprises have personal protective materials and signboards related to working health and security, according to Hendem (2007), it was stated that workers and employers don't have enough awareness and knowledge about the usage of personnel protective hardware in our country. Hendem (2007) puts forward that using personal protective hardware has an important place in preventing occupational accidents and occupational diseases.

In a study carried out by Durdu (2006), 48.4% of the participants believe that with the educations they get, occupational accidents and occupational diseases will be prevented. The participants stated that the present laws and the regulations made by the government for the working health and safety are inadequate in that study, as well.

In the study, according to the participants, it was detected that in 65.5% of the enterprises there are working place doctors, but in the study carried out by Seyhan (2009), it was detected that only in 17.2% of the enterprises there are working place doctors. In the study carried out by Durdu (2006), it was detected that only 48.4% of the participants see the working place's doctor in case of a health problem.

In the study, it was found that, while the common discomforts that the participants suffer from are back and waist pain, headache and neck pain, foot and wrist pain and general pain, in a study carried out by Gedik and Akyüz (2004), it was seen that foot pain was the most suffered one by 25.5%. Along with this, it was stated that a complaint of a general pain by 25.5% and back pain and wrist pain complaints by 11.8% were detected. According to Yildirim (1989), to protect body from various dangers whether while sitting or standing, one should sometimes sit and sometimes stand, rather than doing just one of them.

At the end of the study, it was found that the majority of the participants did not have educations about working

safety. Generally the upper administration should supply the workers with regular educations about working health and safety. Enterprises should be in dialogue with the related university faculties and departments for the mentioned subject and should help the university-industry cooperation develop.

Health and safety at work should not be considered just as general rules that include providing the workers life saver equipments or taking reformatory measures in the environment. It should also be supported by the management of business.

It is concluded that working areas are secure enough for the workers. However, it is stated that the workers have some troubles about the sanitation in the production departments of the business management. Administrators of the management are recommended to do workouts to prevent their workers from facing any negative situation that may affect their health.

The attendants conclude that administrators of the management do not have the required knowledge and experience for health and safety at work and they are recommended to provide a cooperative environment in which they can help their workers more.

The vehicles and machines should be carried out maintenance at certain intervals so as to decrease the machine noise which is the most complained issue in the business managements.

Ergonomics and work studies that are related to health and safety at work should be carried out and put into practice.

Work safety is prepared with law no 4857 which entered into force in 2003 in our country. The fifth part of this law is about the health and safety at work. It should not be forgotten that performing the required obligations and showing sensitivity about this issue by both the employers and employees would increase the success of health and safety at work.

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