

THE EFFECT OF TRAINING ON WORK ACCIDENTS :

A STUDY DONE IN TWO THREAD MILLS

IN ISTANBUL .

by

Verda Ulueren

B.A., Ege University, 1980

Thesis Submitted in Partial Fulfillment of

the Requirements for the degree of

master Of Arts

in

Education

Bogazici University Library



39001100317125

14

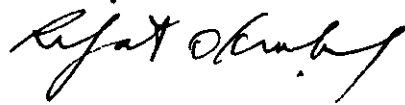
Boğaziçi Üniversitesi

1984

This thesis, submitted by Verde Ulueren to the Faculty of Education Department of Educational Sciences of Boğaziçi University in partial fulfillment of the requirements of the Degree of Master of Arts is approved.

Thesis Advisor

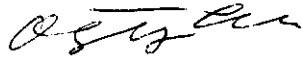
Dr. Rifat Okçabol



Committee Member


Prof. Dr. Turhan Oğuzkan

Committee Member


Prof. Dr. Oğuz Arı

Date of Approval

12.10.1984

ACKNOWLEDGEMENTS

I wish to express my gratitude to my advisor, Dr. Rifat Okçabol for his help, his great support and encouragement and his constructive criticism throughout this thesis. I want to convey my sincere thanks to Dr. Rifat Okçabol for his help.

I would like to express my thanks to my committee member Prof. Dr. Turhan Oğuzkan for his help and constructive criticism and for his all help in analysing the thesis.

I would also like to express my thanks to my committee member Prof. Dr. Oğuz Arı for his interest and his help.

I wish to express my gratitude to my friends Oya Afreşa for her great support and for her help.

Finally, I am grateful to all of the personnel of the personnel service of Altinyıldız and Zet-ip factories for their help. I would like to thank the training chief of Altinyıldız factory Turhan Akman, and director of Zet-ip factory Oben Gümüşel for their support and cooperation in this study.

THE EFFECT OF TRAINING ON WORK ACCIDENTS :

A STUDY DONE IN TWO THREAD MILLS IN ISTANBUL

The objective of this research is to determine general characteristics of the workers causing accidents. Besides these ; it has been aimed to answer the following questions :

Is there any relationship between the workers' sexes, ages, level of education, marital status, number of children, length of work and work accidents ?

Does working on the morning, afternoon or evening shifts have any effect on work accidents ?

Do certain machines seem to be a more frequent cause of accidents ?

For this research, factories carrying out training programs and factories not administering any training programs which resemble each other with respect to the number of workers, the type of work carried out, the machinery used, working hours, etc. were observed in Istanbul. One factory from each type was chosen non randomly, Altinyildiz as a factory having a training program and Zet-ip as having no training programs.

The accidents studied in this research occurred between January 1981 and December 1983 in both factories.

The accident record forms (appendix A) and personal files kept by the management of the factories were used as sources of data in this research. These data were transferred to a new form (appendix B) with the aim facilitating analysis.

The data collected on the last form were put into frequency tables in order to compare the general characteristics of the workers who had work accidents in Altinyildiz and Zet-ip factories. Chi-square

tests were applied to certain table to see whether the difference between the different categories were meaningful.

At the end of this analysis the following results were recorded.

With respect to the total numbers of male workers in each factories more accidents were reported in Zet-ip. Among the women those who were 25 years old or younger had more accidents than the older ones in two factories. Most of the workers who had accidents in both factories were elementary school graduates. Workers in Zet-ip had slightly higher levels of education than the workers of Altinyıldız.

The number of work accidents caused by married and unmarried women is roughly equal as percentages in both mills. Meanwhile, it has been found that married men have more accidents than unmarried men in both factories.

The highest rate of accidents in both factories is seen in the group which represents married workers having 3 or more children.

There is no important difference between the numbers of total male and female workers employed in the Zet-ip factory and no significant difference has been noted in the number of accidents taking place in this factory.

The percentage of accidents in both factories rates higher during the morning shift. While the accidents occurring during the afternoon shift take second place in both factories, the lowest percentage of accidents is found on the evening shifts. More accidents are reported during the first few hours of the work day for both factories.

The percentage of accidents caused by carelessness is higher than the percentage caused by lack of training in both factories. While the percentage of accidents caused by lack of training in the

Altinyıldız factory was found to be 40 percent, the same percentage is 42 percent in the Zet-ip factory.

When the situation is analysed, accident occurrence due to lack of training is most prominent amongst workers working on the combing machines. The figures are 56 percent for the Altinyıldız factory, 67 percent for the Zet-ip factory. The Chi-square test was used to see if there was any significant difference between workers who had undergone training and those who had not, with respect to the causes of accidents. No statistically significant results were obtained.

It should be born in mind that this study has a number of limitations. The main limitation is the practical difficulties in establishing identical control and experimental groups. It is possible that training produces the best effects when combined with other accident reducing measures such as; better selection of workers ; satisfactory level of pay; order and discipline during work and other such precautions.

It believed that because there are no studies carried out on this subject in the textile sector in Turkey and because the interest in this subject has increased over the past few years, this research will be of some significance. This study might be considered as a pilot study which attempted to study the effect of training programs on work accidents.

İŞ KAZALARINDA EĞİTİMİN ETKİSİ İLE İLGİLİ
İSTANBULDAKİ İKİ İPLİK FABRİKASINDA YAPILAN
ÇALIŞMA

Bu tezin amacı, eğitimden geçen ve eğitimden geçmeyen işçilerden kaza yapanların genel karakterlerini belirlemektir. Bunun yanında aşağıdaki soruların cevaplarının bulunması da amaçlanmıştır.

İşçilerin cinsiyetleri, yaşları, öğrenim düzeyleri, medeni durumları, sahip oldukları çocuk sayısı, çalışma süresi ile iş kazaları arasında ilişki var mıdır ?

Sabah, öğle ve akşam vardiyasında çalışmanın iş kazaları üzerine herhangi bir etkisi var mıdır ?

Belli makineler iş kazalarına daha fazlamı neden oluyor ?

Bu araştırma için, İstanbulda, işçi sayısı, makina sayısı, çalışma saatleri, iş türü bakımından benzer olan eğitim çalışması yapan ve yapmayan fabrikalar seçilmek istendi. Bu tür bir çalışmaya kolay izin alınamaması nedeniyle ancak iki fabrika seçilebilmiştir. Seçilen fabrikalardan Altınyıldız fabrikasında eğitim çalışması yapılmakta, Zet-ip fabrikasında ise yapılmamaktadır.

İki fabrikada da incelenen dönem olarak Ocak 1981 ile Aralık 1983 arasındaki dönem alınmıştır.

Kaza kayıt dosyalarından ve işçi sicil dosyalarından alınan bilgiler, değerlendirmeyi kolaylaştırmak için ek B de sunulan yeni bir form'a aktarılmıştır. Bu yeni formda toplanan bilgiler, iki fabrikada kaza yapan işçilerin genel özelliklerini karşılaştırabilmek için dağılım tabloları haline getirilmiştir. Gerekli tablolara chi-square testi uygulanmıştır. Araştırma sonunda aşağıda özet olarak verilen sonuçlar bulunmuştur.

Zet-ip fabrikasındaki işçilerin öğrenim düzeyleri Altınyıldız fabrikasındaki işçilere göre daha yüksektir. İki fabrikada da çalışanların büyük oranı ilkokul mezunudur.

Her iki fabrikada da bekâr kadın işçilerle evli kadın işçilerin kaza sayıları oransal olarak hemen hemen eşittir. Evli erkeklerin ise bekâr erkeklere göre daha çok kaza yaptığı görülmektedir.

İki fabrikada da kaza sayısı en çok üç ve daha çok çocuklu işçilerdedir.

İki fabrikada da sabah vardiyasında kaza oranı en fazladır. Öğle vardiyasındaki kaza sayıları ikinci sırayı alırken, en düşük kaza yüzdesi akşam vardiyasında bulunmuştur.

İki fabrikada da dikkatsizlik nedeniyle olan kazaların yüzdesi eğitimle ilgili kaza yüzdelerinden daha yüksektir. Altınyıldız fabrikasında, eğitim eksikliği ile olan kazaların yüzdesi 40 iken , Zet-ip fabrikasında bu oran yüzde 42 dir.

Tarak makinasında çalışan işçilerin kaza sayıları diğer makinalara göre daha yüksek bulunmuştur.

Görüldüğü gibi kaza yapanların genel özellikleri tekstil sektörü dışındaki araştırma bulgularıyla paralellik göstermektedir.

Eğitimden geçmiş işçilerle, eğitimden geçmemiş olan işçiler arasında iş kazaları açısından fark olup olmadığı chi-square testi ile denendiğinde istatistiksel olarak anlamlı farklılıklar bulunamamıştır.

Bu araştırma belli sınırlar içinde yapılmıştır. En önemli sınırlama kontrol ve araştırma gruplarının pratikte kurulması zorluğundan olmuştur. Ayrıca bu araştırma sırasında belirli konuların dikkate alınmaması eğitimin esas etkisini ortaya koymayı zorlaştırmıştır. Örneğin araştırma sırasında iş kazalarını azaltıcı etkisi olan işçilerin daha iyi seçilmesi, ücretin tatminkâr olması, dinlenme saatleri , takım çalışması, çalışma boyunca disiplin sağlanması, çalışanların motive edilmesi ve benzeri konular dikkate alınmadığından eğitimin iş kazalarını azaltmada etkisinin varlığını ve etki derecesini göstermek mümkün olamamıştır.

Konuya duyulan ilginin son senelerde artması ve tekstil sektöründe bu konu ile ilgili yapılmış arařtırmaların olmaması nedeniyle bu arařtırmanın önem taşıyacağı sanılmaktadır. Bu çalışma eğitimin iş kazaları üzerine etkisini incelemeye çalışan bir ön çalışma olarak kabul edilmelidir.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
ABSTRACT	iv
ÖZET	vii
LIST OF TABLES	xi
CHAPTERS	
I- INTRODUCTION	1
A- The Significance of Work Accidents	2
B- The Reasons for Work Accidents	5
1- Technical Reasons	5
2- Personal Reasons	8
a- Increasing Knowledge	12
b- Increasing Ability	14
C- The Objective of This Research	14
D- The Significance of This Research	15
II- RESEARCH METHOD	17
A- Population and the Sample	17
B- Data Collection	19
C- Analysis of the Data	20
III- FINDINGS	21
A- Demographic Characteristics	21
B- Time of Occurrence of the Accidents	26
C- The Reasons for the Occurrence of the Accidents.	30
D- Other Characteristics	34
E- Losses due to Accidents	37
IV- CONCLUSIONS and RECOMMENDATIONS.	38
A- Results and Suggestions	42
REFERENCES	46
APPENDIX A- Accident Record Form	48
APPENDIX B- Form for Data Analysing	49

LIST OF TABLES

	Page
TABLE 1- Deaths and Permanent Disabilities in the years 1976 - 1980	3
TABLE 2- Work Days Lost Due to Strikes and Accidents . .	4
TABLE 3- Work Accidents in the Textile Sector	5
TABLE 4- The number of accidents in both factories . . .	22
TABLE 5- The distribution of workers by sex and age in 1983	23
TABLE 6- The distribution of workers by their levels of education	24
TABLE 7- The marital status of the workers	25
TABLE 8- The number of children of workers who cause accidents	26
TABLE 9- Work accidents with respect to periods of work .	28
TABLE 10- The distribution of accidents by shifts	29
TABLE 11- The distribution of accidents by work hours . .	30
TABLE 12- Accidents due to lack of training and caution .	31
TABLE 13- The distribution of work accidents with respect to their causes of origin	32
TABLE 14- Accidents by type of machines	33
TABLE 15- The marital status of the workers and hours of accidents	34
TABLE 16- Accidents according to age group and shifts . .	35
TABLE 17- The relationship between duration and types of accidents	36
TABLE 18- Work days lost due to accidents	37

I. INTRODUCTION

In Turkey, a country which rates among the highest on the list of world countries with respect to work accidents, the number of casualties deaths and work day losses is extremely high. The fact that work accidents reach such numbers as revealed in the following parts, has attracted the rescarchers attention.

Besides the suffering caused by these accidents, arrestations or delays in production during the rectification of the faulty or affected machinery, the time spent by other workers decreases the quality and quantity of production. Loss of time in replacement of workers who are badly injured, hospital expenses and reparations paid have increased interest in this subject over the years.

As defined by law, work accidents are ;

Events that cause the worker physical or psychological damage during working hours when the injured worker is within working place boundaries, because of the job given to the worker by the employer while being sent to carry out a job given by the employer, during the time reserved for the braest feeding of babies of mothers or during transportation to or from the place of work in a vehicle given by the employer for use by workers.

(506 sayılı iş kanunu)

It is possible to prevent or decrease the number of work accidents, as defined above, by taking some precautions.

It has been seen by the successof developed countries, particularly in recents years, if the necessary care is taken, it is possible to decrease the occurrence of work accidents considerably.

The objective of this research is to reveal in detail the general characteristics of workers having work accidents and to emphasise precautions which may decrease the number of accidents. It will also attempt to specify the significance of the age of workers, their levels of education, their marital status, their working hours, and the machine types that they work with on work accidents.

A- The significance of Work Accidents

Today, there about 50 million work accidents occurring each year in the industrial sector around the world. This means that about 160.000 industrial workers have accidents each day. The importance of such accidents in our country will be understood better when one considers that Turkey is placed fourth on the list of world countries with respect to the number of work accidents (Üzdamar, 1978.)

Developed countries have shown considerable progress in decreasing the number of work accidents. For example, between 1942 and 1970 in the United States, although employment increased twice and production capacity increased seven times, the number of deaths dropped from 18.000 to 14.000 per annum, the rate of work accidents in the U.S.S.R. between 1966 and 1976 dropped by twice its former amount (M.P.M.,1982.) Despite all these attempts and actual successes in reducing the number of work accidents, the rate in developed countries is still high. For example, in the United States there are 15 deaths per day on the average and 18 - 20 work accidents take place each minute.

In Federal Germany, this frequency is approximately 13 accidents per minute and deaths per day (Aral, 1978.)

If coal mining is taken as an example, the repetition frequency of total accidents in Turkey is 9 times higher than the ones in the United States, 10 times higher than the ones in Great Britain, and 14 times higher than the amount of total accidents in Yugoslavia (Güven, 1978.)

The order of reasons which cause large numbers of work accidents vary from one country to another (Toktaş, 1979.) For example, while casualties caused by getting caught between or under something, by falling down stairs from a height and accidents due to dropping some object, take the first three ratings respectively in Japon.

Accidents due to the use of machinery and equipment is rated highest in Turkey and casualties caused by falling from a height or down stairs and by using manual equipment comes second and third respectively.

The number of deaths and permanent disabilities accuring as a consequence of work accidents in Turkey are quite high. The number of deaths and permanent disabilities between the years 1976 and 1980 are shown below in Table : 1

TABLE 1- DEATHS and PERMANENT DISABILITIES IN THE YEARS 1976 - 1980*

<u>Years</u>	<u>Permanent Disabilities</u>	<u>Deaths</u>
1976	3.187	1.113
1977	3.454	1.309
1978	3.075	1.178
1979	2.905	1.448
1980	2.577	1.320
<u>Total</u>	<u>15.198</u>	<u>6.368</u>

* M.P.M., 1982

Table 2 shows the distribution of loss of work days due to strikes and work accidents in our country, between the years 1975 and 1979. It can be seen that the number of days lost due to work accidents is higher than the number of days lost due to strikes with the exception of the result of 1977.

TABLE 2- WORK DAYS LOST DUE TO STRIKES AND ACCIDENTS^x

Years	Work days lost due to work accidents	Work days lost due to strikes
1975	5.098.048	1.102.682
1976	2.787.219	1.768.201
1977	3.204.068	5.778.205
1978	3.091.218	1.598.905
1979	2.687.155	2.215.347
Total	16.868.308	12.465.340

^xM.P.M., 1982

When the distribution of deaths and permanent disabilities caused by work accidents according to various activity groups in the year 1979 is analysed, it is seen that the rate is highest among the construction work groups with 27.140 accident (M.P.M., 1982.)

Construction work group is followed by the metal goods production industry with 23.217 work accidents and the textile industry with 19.202 work accidents. Table 3 shows the distribution of work accidents, permanent disabilities, deaths and number of worker in the textile sector, between the years 1975 - 1979.

TABLE 3- WORK ACCIDENTS IN THE TEXTILE SECTOR^x

Years	Work Accidents	Permanent Work Accidents	Deaths	Number of Workers
1975	11.577	191	12	141.753
1976	16.630	365	12	165.426
1977	16.487	387	2	160.763
1978	17.762	308	3	160.491
1979	19.202	190	21	165.781

^xM.P.M., 1982

B- The reasons For Work Accidents

Work accidents can be categorised into two main groups ; those which arise because of technical reasons and those which arise because of personal reasons.

1- Technical Reasons

Accidents arising due to technical reasons are caused by the incompatibility of the factory building, the planning of the row material and equipment, the positioning of machinery, protective equipment for the workers and machinery, lightning, heating, humidity

air conditioning, noise and other technical conditions (I.L.O.,1965.)

With respect to the work accidents that may arise due to technical reasons, there are articles covering legal precautions in various Turkish laws.

Besides the laws concerning health and employment of workers, there are a number of regulations which have been put into effect by the Ministry of labor (Turhan - Kocaoğlu, 1984.)

These regulations cover the following areas in detail.

Health conditions and security precautions that should be maintained in the working place; health conditions and security precautions that should be found in the dormitories for workers; precautions that should be taken in case of illnesses arising due to equipment and machinery and raw material in use ; medical precautions which should be taken in case of work accidents; security precautions and necessary equipment that should be maintained in order to prevent work accidents in working areas; and personal security equipment.

Also, conditions which affect work accidents directly and indirectly such as lighting, air conditioning, heat, humidity, dust, noise and others have been classified in different regulations according to the type of activity and its branches. For example in the textile sector lighting should be 200 lux where the combing machines are situated, 280 lux is necessary where the wick machines , 400 lux where the ring machines and 500 lux where the weaving machines are situated (Kurt, 1978.)

With respect to noise, the noise level must not exceed 80 d.b. within working area boundaries where dangerous and heavy work is carried on.

The body of current law especially article number 73 of labor law, openly states that the employer must comply with all the conditions

required to maintain the security and health of workers. Workers have to conform to rules stated by employers.

The Ministry of Labor are sent inspectors from to check working conditions and to see whether the requirements stated by various laws and regulations are fulfilled.

These job security inspectors inform the employer about their wish to inspect work conditions. Inspection is performed under the supervision of a guide provided by the employer and the direction of the work flow is taken into consideration in the inspection process. After the inspection, a report about the work conditions and warnings is sent to the employer and the next inspection date is given by the inspector. Checks are made to see whether warnings have been heeded seriously and security measures taken.

However, the number of job security inspectors in Turkey is so few. The number of job inspectors in 1976 was 166. The number of work places for which they were responsible was 642672 and the number of workers employed by these work places was 1.823.380. In other words, for every inspector there remained 3.871 work places and 10.983 workers to inspect (Dinç, 1978.)

In short there is a current body of law which states the necessary steps to prevent work accidents technically, but the control mechanisms are insufficient. Under these conditions it is not difficult to explain the accidents that arise due to technical reasons. This can be seen better by reviewing some of the research taken out in this area. For example, in the research entitled "Relation between the frequency of accidents and the size of work plant" (Toktaş, 1979.) and "The distribution of work accidents according to the number of insured workers in the plant at the time" (Gürtan - Kılıç, 1978.) It was observed that work accidents occur more frequently in small work plants, and the reason stated for this is related to the lack of adherence

to technical requirements in these plants. In another research carried out in a construction machinery production plant, it was discovered that working conditions did not conform to the requirements stated by regulations (Döşemeci, 1978.) As a result of the above study it was found that of all those employed 32 percent are affected moderately, 18 percent seriously, and 50 percent more seriously are affected by the sound of engines; 42 percent moderately, 35 percent seriously, 12 percent more seriously those affected by heat in the work environment; 3 percent moderately, 35 percent seriously and 11 percent more seriously by the brightness of the lighting; 5 percent moderately, 4 percent seriously and 78 percent more seriously by the work accidents happened around.

Of all industrial accidents today, there is agreement that 20 percent of them arise from the incompatibility between technical conditions and jobs performed and that the remaining 80 percent is caused by personal factors (Çelikel, 1978.)

2- Personal Reasons

It is possible to group accidents arising from personal factors into two categories. The first reason lies in the workers' social and psychological conditions and the effects these conditions have on job performance, the second reason is the workers' insufficient knowledge of the job they are performing.

Among the workers' personal conditions that constitute the first reason, there are numerous factors arising from their private lives and psychological backgrounds that may have a role in causing accidents. For example; the sex, age, marital status, level of education, means of transportation to or from work, duration of work, human relations in the work environment, personal life, nutrition of the worker

and psychological conditions such as sleeplessness on the day of the occurrence of the accidents, illness of children or restlessness at home, or arguments with his/her fellow workers etc. may cause difficulties in directing attention to work and in concentration on their jobs. This and many other similar factors may affect the workers and their probability of occurrence of work accidents.

Research that has been carried out, has shown that seemingly unimportant factors can have deep effects on work accidents.

In research done by the Izmir Metaş Metallurgy factory on the effects of psychological factors on work accidents, it was found that there is a negative relationship between the workers ages and work accidents; that as physical ability of the workers decreases, the number of work accidents increases; and that workers that can not discharge their aggression are more likely to have accidents (Çelikol, 1978.) It has also been observed that the workers' attitudes towards the past, future, their age, personal ability and authority are variables that are closely related to work accidents.

The following results were found in research carried out to specify the effects of the means of transportation to and from the place of work (Akbulut - Koray, 1978.)

Among male workers between the ages 20 and 29, those who were unmarried rated higher in feeling fatigue upon starting work and in causing accident. Other than these, young workers who had been doing physical work for less than 5 years were those who felt the most fatigue. Another characteristic has to do with the period of time between getting up in the morning and leaving the house. The highest percentage of fatigue was seen among the workers who remained only about half an hour in their homes in the mornings, and going to work without having breakfast.

On the other hand those workers who lived in rented houses and found the distance between their homes and work placed too long, and spent about two hours on transportation were among the highest percentages who felt fatigue upon starting work. Again , those who spend 5 to 6 hours between coming home and going to bed, in other words, those who sleep late felt more fatigue by comparison and form the largest accident-causing group.

Statistics revealed by the Institute of Social Security in 1977 show that the workers who have high numbers of accidents are those who have low wages and heavy responsibilities of supporting their families (Kurt, 1978.)

In other research, it was found that the majority of accidents took place during the first four hours of the work day (Gürtan-Kılıç, 1978.) This has been interpreted by the researcher in such a way that the private lives of the workers affect them so much that they still remain under its influence during these early hours of work period.

All these studies show that how work conditions personal life style and events in daily life are important for people and how these influence work and occurrences of work accidents.

The lack of knowledge of workers about their jobs, another reason for accidents arising from personal factors, also plays an important role in causing work accidents. Job inexperience insufficient knowledge of the machinery used and tasks performed and not knowing which activities are hazardous and what dangers they could lead to facilitate the probable occurrence of these types of accidents.

The training programs which may be applied at work have the objective of preventing the type of accidents that arise due to the lack of knowledge of workers about the machines they work with.

There are no sanctionary regulations related to the administration of training programs. Despite this fact, firms are profiting from training programs and the number of new firms implementing these kinds of programs is increasing every day.

Work analyses plays an important role in the preparation of such training programs in firms. The following questions and related factors are taken into consideration when carrying out work analyses (Salvendy - Seymour, 1973 - Walter,1979.)

1- What is the activity of the factory, what is produced ?

2- How suitable is the internal and external construction of the building for the activity of the plant ?

3- What are the lighting, air conditioning, humidity, heat, dust, noise and other conditions like ?

4- Which types of machinery have been selected for productive purposes ?

a- What are the detailed structures of the machinery ?

b- Which parts of the machinery are dangerous ?

c- What protective equipment can be used for the workers and the machinery, what are their advantages ?

d- Which machines require higher physical, as opposed to mental ability and which require higher mental as opposed to physical ability ?

5- What is the number of workers working on the machines ?

6- Which worker works directly and which worker works indirectly with the machines ?

7- How long are the daily and weekly work hours ?

8- If the working conditions are suitable to have more than one shift how many shifts are necessary ?

9- How long do the lunch and rest periods last ?

Work analyses that are made by taking the above criteria into consideration enable extensive data to be collected on these subjects, this data helps develop suitable training programs. Individuals who are responsible for training, prepare training programs compatible with the working conditions through the use of the information derived from the data.

Training programs have two main objectives; to increase the knowledge and the ability of the workers (Salvendy - Seymour, 1973, I.L.O.,1965.)

a- Increasing Knowledge

The knowledge of workers about the job and machine used can be increased in three stages. The first stage comprises of attempts to help workers acquire knowledge about the plant. To do this, work places in the plant are described to the workers. Within this description, information is given on how to reach the factory, the means of transportation, the situation of the canteen and the cafeteria, lunch and rest hours, where security equipment such as fire extinguishers, are kept, how these are used, emergency exits and so on.

Details such as working principles, the kind of behavior expected from the workers, the regulations to which workers must conform, the wage system and how and when wages are paid are explained.

This information given about the firm and work plants is an important factor in aiding the workers to adapt themselves to their work and in relieving them from various doubts about the firm and the job therefore it constitutes an important stage in adjusting workers psychologically to their new job.

The second stage is oriented towards increasing the workers' job experience. Extensive information is given about the machines that the worker works or is going to work with. Films and slides are used to inform the worker about the machines, their parts and the names, the functions of every part, the dangerous sections of the machines, the function and importance of precautionary security equipment, the ideal working speed of the machines, the ideal working positions, hazardous moves and the probable dangers relating to the carelessness of the workers. Demonstrations on the machinery are advantageous. Following this, workers are given practical trials with the machines. Their errors are pointed out and the correct method is demonstrated during this practice. When it is believed that the workers are ready they are allowed to begin to work on their newly acquired or different job.

This stage is the most effective stage in reducing the rate of work accidents by training because the greatest danger concerning accidents comes from unfamiliarity with the machinery used. Insufficient knowledge on the part of workers about the machines that they work with, unawareness of the dangerous parts of these machines, lack of knowledge or erroneous behavior and the extent of the danger connected to such errors, dangers which arise from increasing the working speed of machines or from not using security equipment, raise the likelihood of accidents occurring.

The third stage is oriented towards providing workers with information on how to maintain the quality of production. After specifications have been made on how to direct the performance of workers through work analysis, so that the quality standard is sustained, necessary training programs are carried out.

b- Increasing Ability

These are training studies carried out in order to develop the ability and working methods of the workers. During these programs, newly employed workers are shown how they should perform and information which is developed through practical work is given. Method is demonstrated and necessary measures are taken to correct the errors of the workers who have already been employed for some time and continue making the same mistakes. It is quite difficult for workers to overcome former habits in most cases. During implementation of the programs designed to increase the workers ability, workers are shown any novelties which come with fast developing technology too.

c- The Objective of This Research

The interest of the researcher was aroused by the fact that work accidents have reached a significant level in the world and particularly in Turkey. This situation has caused more emphasis to be laid on precautions taken to reduce the number of accidents and increased needs to identify how effective these precautions have been.

As it was explained in the previous section, there are various reasons for work accidents. Since studying each sector individually, considering all the reasons involved in work accident, takes a great deal of time and resources, this research deals only with accidents in the textile sector in Istanbul.

The objective of this research is to study the effects of training programs on workers administered by firms and to clarify the general characteristics of workers who have accidents. Besides these, it has been aimed to try to find answers to the following questions:

Is there any relationship between the workers, sexes, ages and work accidents ?

Is there any relationship between the level of education of workers and work accidents ?

Does the marital status of the worker have any influence on work accidents ?

Is there any relationship between the number of children that the workers have and work accidents ?

Does the period of time between the day of the admission of workers up to the date of the accident relate to the accidents ?

Does working on morning, afternoon or night shifts have any effect on work accidents ?

Are there any peak hours that accidents occur most frequently?

Do certain machines seem to be the more frequent cause of accidents ?

D- The Significance of This Research

Numerous sources on technical causes, which are responsible for work accidents were found while surveying different literature. Many sources and related research were found on the description of technical accidents and sanctionary regulations and laws concerning precautions to prevent work accidents. Besides this there has also been a number of sources and research about the relationship between work accidents and personal living conditions, private lives, and psychological moods of workers which all are considered to be the source of accidents happening as a result of personal reasons.

However the lack of knowledge of workers about their jobs, which constitutes the second reason for personal accidents, and the

solution of this problem through application of training programs has not been emphasised enough, and has not been studied. For this reason, it has not been possible to find studies carried out on the subject. In the literature there are only some articles which suggest the importance of this subject.

The importance of the law and the necessity of administering training programs has come into light only in the past few years. The precautions taken to prevent or reduce the number of work accidents in the previous years has been considered inadequate, there is common agreement today that these types of precautions are not enough and that workers should also be educated in the nature of their work and so more managers should start new training programs and their numbers increase daily.

It is believed that because there are no studies carried out on this subject in the textile sector and because the interest on this subject has increased over the past few years, this research which is oriented towards specifying the relationship between training programs and work accidents, will make some contribution to the area. And its importance lies in being the first study carried out in the textile sector in this context.

Since the factories chosen for this research were selected nonrandomly, it is far from representing the active textile sector in Istanbul.

Although the findings of this research can not be statistically generalized to the textile sector in Istanbul and around the country, hopefully it may help clarify the concept and aid studies that will be carried out in the coming months and years.

II- RESEARCH METHOD

The main objective of this research is to clarify the relationship between training programs applied on the job and work accidents, and to identify some characteristics of workers who had accidents. The secondary aim was to try to find answers to various questions stated earlier.

A- Population and the Sample

To study the above mentioned the relationship between training programs and the characteristics of the workers, factories, within the city boundaries of Istanbul, one with a training program and another one without a training program but which resemble each other with respect to the number of workers, the work carried out, the machinery used, working hours, etc. were considered for this study.

Through contacting the major textile factories in Istanbul all those with training programs and those without any program were specified first. Then permission was requested for the application of this study by explaining the objectives and subject of the research to the managers of the factories. However, only the authorities of Altinyıldız Textile factory in Yeni Bosna, where the researcher had previously studied and applied a training program, gave the permission requested. Of those factories which had no training program four gave permission. Since all of these four factories were thread mills, the thread department of the Altinyıldız factory was taken into consideration. Considering the machine types and numbers, the number of workers employed, the work done, the working hours and the number of working shifts in the Altinyıldız factory, the Sefaköy Zet-ip

factory was also selected from the last four factories for this study due to the similarities between the latter and the thread department of the former.

In this research, the accidents caused only by personal reasons and the workers having these accidents during January 1981 and December 1983 in both factories were studied. Since the workers who worked in transportation, workshop, machine care, and cleaning in the Altinyıldız factory thread department had received no training, those employees who worked in the above mentioned jobs were omitted from the studies of both factories. The reason for leaving the periods before 1981 out was that Zet-İp had just changed hands and the new authorities were unable to find files recording work accidents before 1981. Since Zet-İp has started new training programs recently the period after 1983 was also left out.

During the period studied, the two factories are similar in terms of production, number of workers, types of machines, working hours and number of work shifts. The main difference between these factories is that one applies training programs and the other does not.

The training programs administered in the Altinyıldız factory consist of practical applications of the information given to the workers about the machinery they will be using; making them aware of the dangerous parts; specifying the importance of precautionary security equipment to be used with the machines; showing them the correct working positions and demonstrating the dangerous results of erroneous behaviours. After having been trained, every worker is given a trial period, under responsible supervision, on the training machines which are identical to the machines that will be used during actual works. If the workers are unsuccessful, they are dismissed before being formally employed.

B- Data Collection

Factories are compelled legally to keep records of work accidents. Consequently, every firm has developed a form for filing accidents. While these forms vary among firms it is possible to find similar data included on all of them. On these forms data such as the name and date of birth of the workers having the accidents, his/her marital status, the date of accidents, how the accidents occurred and whether the accident was caused by technical or personal reasons, can be found. In addition to these accident files, both factories have personal files for each worker. These files include some of the above mentioned information and others such as the number of children and educational level of workers.

Accident record forms and personal files were used as sources of data in this research. Data on the types of accidents were not taken from these sources directly. Accidents were classified into two different types by the researcher for practical reasons. The distinctions between accident types are those that happened because of lack of attention and those that are related to lack of training. As the training programs are related to work done using machinery, it was taken for granted that all accidents related to machines were also related to the lack of training. The remaining group was classified under the category where accidents are believed to be the result of lack of attention.

The data found on accident forms and personal files on workers having accident because of personal reasons were transferred to a new form (Appendix B) with the aim of facilitating analysis. The data about the accidents which were the result of technical reasons are left out in this study.

In this last form, the conditions under which the workers were working at the exact time of the occurrence of the accident, are considered. For example the data about a worker, who is married today and has children, but was unmarried at the time of the accident, was recorded as unmarried as this constituted his conditions when the accident took place.

In the case when more than one accident took place, data was recorded for the time of a randomly selected accident.

C- Analysis of the Data

The data collected on the new form were put into the contingency tables in order to compare the general characteristics of the workers who had accidents while being employed at Altinyildiz and Zet-ip factories.

These contingency tables were analysed according to the number of frequencies, and percentages found in different categories. In addition to these descriptive analysis, the Chi-square test is used to see whether there is any relationship between workers' background with training or without training for the job and selected characteristics of the workers.

III- FINDING

In this chapter the findings of the study are reported under certain headings such as demographic characteristics, time of occurrence of the accidents, reasons for the occurrence of the accidents, other characteristic and losses due to accidents.

A- Demographic Characteristics

The total number of workers and work accidents in both of the factories is given in Table 4. In Altinyıldız factory which applies training programs, the total number of employed workers has risen each year. While this total was 582 in 1981 it rose to 601 in 1982 and to 667 in 1983. In Zet-ip factory where there are no such training programs, the number of employed workers was 400 in 1981, 390 in 1982 and this decrease in numbers continues down to 375 in 1983. When changes in the number of employed men and women were studied over the years, it was found that 77 percent of the employed workers in Altinyıldız factory in 1981 were women and 23 percent were men. The percentage of female workers rose to 81 percent in 1982 and stayed same in 1983, while the percentage of men has dropped to 19 percent. Meanwhile in Zet-ip factory there was no significant change in the percentage of female and male workers for the years between 1981 and 1983.

The number of accidents had by female and male workers in Altinyıldız is proportional to their total workers. The number of accidents of the male workers in Zet-ip is more than the number of accidents of the male workers in Altinyıldız factory.

Another aspect which deserves attention is that, while in the Altinyıldız factory only 2 workers had more than one accident in three years, 8 workers had more than one accident during the same period in the Zet-ip factory.

While the number of female workers having accidents in the Altinyıldız factory in 1981 was 10, this rose to 18 in 1982 and 21 in 1983. The number of male workers having accidents on the other hand dropped from 8 in 1981 to 3 in 1982 and to 2 in 1983. No significant fall or rise was noted in the Zet-İp factory these years.

TABLE 4 - THE NUMBER OF ACCIDENTS IN BOTH FACTORIES

Years	Sex	ALTINYILDIZ				ZET-İP			
		Number of workers		Number of workers		Number of workers		Number of workers	
		Total	%	Having Accidents	%	Total	%	Having Accidents	%
1981	Female	447	77	10	56	229	57	5	38
	Male	135	23	8	44	171	43	8	62
	Total	582	100	18	100	400	100	13	100
1982	Female	487	81	18	86	226	58	10	56
	Male	114	19	3	14	164	42	8	44
	Total	601	100	21	100	390	100	18	100
1983	Female	539	81	21	91	223	59	4	29
	Male	128	19	2	9	152	41	10	71
	Total	667	100	23	100	375	100	14	100
Average of 3 years	Female	491	80	16,3	79	226	58	6	40
	Male	126	20	4,3	21	162	42	9	60
	Total	617	100	20,6	100	388	100	15	100

Here it was attempted to find the association between the workers who had undergone training or who had not undergone any training and the age groups of the workers. The history of accidents of the workers in 1983 according to age groups and factors was tabulated in Table 5. All of the 23 accidents taking place in the 16-20 age group and 13 of the 14 accidents taking place in 21-25 age group were caused by women.

Among the workers who are 16 years old or older, the number of accidents of male workers is higher than the female workers' accidents when their total numbers are taken into consideration.

In Zet-İp the number of male workers' accidents is higher than the female workers' accident proportionally in all age groups. In Zet-İp male workers had more accidents at all age groups while females had less accidents at the age of 31 or higher age groups.

TABLE 5- THE DISTRIBUTION OF WORKERS BY SEX AND AGE IN 1983

Age Group	Workers	ALTINYILDIZ			ZET-İP		
		Female	Male	Total	Female	Male	Total
16-20	Total	175	9	184	52	23	75
	Having accidents	23	0	23	7	6	13
21-25	Total	147	13	160	42	30	72
	Having accidents	13	1	14	3	4	7
26-30	Total	102	44	146	60	15	75
	Having accidents	6	6	12	6	2	8
31-35	Total	80	40	120	35	37	72
	Having accidents	4	4	8	1	4	5
36- +	Total	35	22	57	34	47	8
	Having accidents	3	2	5	2	10	12
TOTAL	Total	539	128	667	223	152	375
	Having accidents	49	13	62	19	26	45

The distribution of workers who had accidents according to their education levels is given in Table 6. The education level of total number of workers in the Zet-ip factory is higher than the total number of workers in the Altinyıldız factory. It was observed that the majority of all employed workers in both factories were elementary school graduates and most of the workers who had accidents in both factories were elementary school graduates.

TABLE 6- THE DISTRIBUTION OF WORKERS BY THEIR LEVELS OF EDUCATION

Levels of education	Workers	ALTINYILDIZ			ZET-IP		
		Female	Male	Total	Female	Male	Total
Literate	Total	15	7	22	0	0	0
	Having accidents	4	1	5	0	0	0
Elementary	Total	519	110	629	211	133	344
	Having accidents	43	11	54	16	24	40
High School	Total	5	11	16	12	19	31
	Having accidents	2	1	3	3	2	5

The distribution of marital status of employed workers in both factories is given in Table 7. According to this, the number of work accidents caused by married and unmarried women is roughly equal to the percentages. Meanwhile, it has been found that married men have more accidents than unmarried men.

In the Zet-ip factory, the number of work accidents caused by married or unmarried women workers remain roughly the same, again percentage wise. The number of accidents caused by married men in this factory, is again higher as compared to the number of accidents caused by unmarried male workers.

TABLE 7- THE MARITAL STATUS OF THE WORKERS

Marital Status	Workers	ALTINYILDIZ			ZET-İP		
		Female	Male	Total	Female	Male	Total
Unmarried	Total	319	34	353	116	46	162
	Having accidents	29	1	30	10	6	16
Married	Total	220	94	314	107	106	213
	Having accidents	20	12	32	9	20	29
Total	Total	539	128	667	223	152	375
	Having accidents	49	13	62	19	26	45

The number of children of the married workers who had accidents in this factories is shown in Table 8. If analysed closely, the table displays a minimum amount of accidents for married workers who have no children, in both factories. The larger number of accidents belong to married workers with 1 or 2 children. However, the highest rate of accidents in both factories was seen not in these groups but in the group which represents married workers with 3 or more children.

TABLE 8- THE NUMBER OF CHILDREN OF WORKERS WHO CAUSE ACCIDENTS

Number of children	Altinyıldız Workers		Zet-ıp Workers	
	Total	Having accidents	Total	Having accidents
0	21	1	27	6
1	98	10	71	7
2	161	11	93	11
3 +	34	10	22	5
Total	314	32	213	29

The Chi-square test was used to see if there was any significant difference between the workers of two factories who had undergone training and those who had not with respect to. Some demographic characteristics such as age, level of education, marital status and number of children. No statistically significant difference was found.

B- Time of Occurrence of the Accidents

The time that has passed since the starting date of employment and the data of the occurrence of the accidents is analysed in Table 9. It is seen that according to figures in 1983 in the Altinyıldız factory, among workers who have been employed for 6 months or less, 105 (93 percent) are women and 8 (7 percent) are men ; among workers who have been employed for 6 months to 1 year, 179 (92 percent) are women and 16 (8 percent) are men.

This considerable difference in numbers between male and female workers has also been seen in the number of accidents as well. Among workers who have been employed for 1 year or less all of the 19 accidents were caused by women.

Again in the year 1983, among workers who were employed for periods between 1 and 3 years, 128 (77 percent) were women and 39 (23 percent) were men. Among workers who had been employed for 3 to 5 years 68 (60 percent) were women, and 45 (40 percent) were men. Among those employed for longer than 5 years 59 (75 percent) were women and 20 (25 percent) were men. The majority of accidents occurring in these periods belong to women and it is proportional to their totals.

There is no important difference between the total numbers of male and female workers employed in the Zet-ip factory and no significant difference has been noted in the number of accidents taking place in this factory according to the length of the duration before an accident occurred

Whereas the majority of workers in the Altinyıldız factory fall into the less than 1 year employment range, workers who have been employed for longer than one year constitute the majority in the Zet-ip factory.

When both factories are taken into consideration with respect to the percentage of accidents taking place, it was noted that the percentages within all the working periods are considerably close to one another. Nevertheless, while the percentage of accidents which took place among the workers who had been employed for over 5 years is 8 percent in the Altinyıldız factory, this percentage is 27 percent in the Zet-ip factory.

TABLE 9- WORK ACCIDENTS WITH RESPECT TO PERIODS OF WORK

Periods of work (X)	Workers	ALTINYILDIZ			ZET-İP		
		Female	Male	Total	Female	Male	Total
6 months>X	Total	105	8	113	17	4	21
	Having accidents	7	0	7	3	0	3
1 year>X) 6 mths.	Total	179	16	195	45	34	79
	Having accidents	12	0	12	3	7	10
3 years>X) 1 yr.	Total	128	39	167	67	43	110
	Having accidents	15	5	20	4	3	7
5 years>X) 3 yrs.	Total	68	45	113	59	49	108
	Having accidents	11	7	18	6	7	13
X) 5 years	Total	59	20	79	35	22	57
	Having accidents	4	1	5	3	9	12
Total	Total	539	128	667	223	152	375
	Having accidents	49	13	62	19	26	45

Table 10 shows the distribution of number of accidents according to the time of the work period (there are three working periods the morning, afternoon and evening shifts.)

The objective here is to see if there is any relation between the frequency of accidents taking place and the shift during which it occurs.

The percentage of accidents in both factories rates higher during the morning shifts. While the accidents occurring during afternoon shifts take second place in both factories. The lowest percentage of accident occurrence is found on evening shifts.

Considering that the number of workers working per shift remain constant these findings are of interest.

TABLE 10- THE DISTRIBUTION OF ACCIDENTS BY SHIFTS

Shifts	ALTINYILDIZ				ZET-IP			
	Female	Male	Total	%	Female	Male	Total	%
Morning	21	9	30	48	8	14	22	49
Afternoon	15	3	18	29	8	7	15	33
Evening	13	1	14	23	3	5	8	18
Total	49	13	62	100	19	26	45	100

The distribution of accidents according to working hours is shown in Table 11. Looking at the frequencies, the highest percentage of accidents belongs to the Altinyildiz factory during the first two hours and it is 37 percent of the total accidents. The highest percentage of accidents in the Zet-ip factory is seen in the third and fourth hours of work and is 38 percent. While the highest accident percentage among the women workers in the Altinyildiz factory is seen in the first four hours evenly distributed between the first two and the next two hours. The highest percentage of accidents occurring again among women is seen in the third and fourth hours in Zet-ip. Generally speaking the number of accidents is lower in the second half of the work period

TABLE 11- THE DISTRIBUTION OF ACCIDENTS BY WORK HOURS

Work hours	ALTINYILDIZ				ZET-IP			
	Female	Male	Total	%	Female	Male	Total	%
1st - 2nd	18	5	23	37	3	7	10	22
3rd - 4th	18	4	22	35	8	9	17	38
5th - 6th	7	3	10	16	4	5	9	20
7th - 8th	6	1	7	11	4	5	9	20
Total	49	13	62	100	19	26	45	100

The χ^2 test was used to see if there was a significant difference between workers who had undergone training and those who had not with respect to the period of time between beginning of the employment in given factory and the data of occurrence of the accident the shift and work hours. No statistically significant results were found.

C- The Reasons for the Occurrence of the Accidents

Work accidents are divided into two groups such that one group consist of accidents taking place due to carelessness and second group those occurring because of lack of training and the distribution is given in Table 12. According to this the percentage of accidents caused by carelessness is higher than the percentage caused by lack of training in both factories. While the percentage of accidents caused by lack of training in the Altinyıldız factory was found to be 40 percent, the same percentage rose 42 percent in the Zet-ip factory.

TABLE 12- ACCIDENTS DUE TO LACK OF TRAINING AND CAUTION

Type of accidents	ALTINYILDIZ				ZET-İP			
	Female	Male	Total	%	Female	Male	Total	%
Accidents related to training	20	5	25	40	7	12	19	42
Accidents related to carelessness	29	8	37	60	12	14	26	58
Total	49	13	62	100	19	26	45	100

Accidents analysed according to training and carelessness classified in to 6 groups with respect to their cause of origin are stated below and its distribution is given in Table 13.

- 1- Machines : Accidents caused by machines arise out of the relationship between workers and the machinery used. Accidents caused by machinery are likely to increase due to lack of knowledge of workers about the machines.
- 2- Cuts : These are accidents which happen when parts of the workers' bodies are cut by knife, sharp devices being used.
- 3- Drops : While working, dropping equipment or something upon parts of the body causing injuries.
- 4- Falls : These accidents are caused by workers falling from a certain height or falling down for other reasons.
- 5- Sudden movements : The workers are liable to sprain parts of their body through sudden or wrong body movements.
- 6- Bumps : These types of accidents are caused by bumping against hard objects.

Most of the accidents taking place in both factories in terms of their cause of origin arise from the relationship between

the worker and his machine. The percentage of these accidents which occur due to machinery in the Altinyıldız Factory is 40 percent and this percentage is 42 percent in the Zet-ip factory. The percentage of accidents occurring due to cuts 27 percent in the Altinyıldız factory and 18 percent in the Zet-ip factory.

TABLE 13- THE DISTRIBUTION OF WORK ACCIDENTS WITH RESPECT TO THEIR CAUSES OF ORIGIN

Causes	ALTINYILDIZ				ZET-IP			
	Female	Male	Total	%	Female	Male	Total	%
Machines	20	5	25	40	7	12	19	42
Cuts	14	3	17	27	3	5	8	18
Drops	3	1	4	6	5	3	8	18
Falls	3	0	3	5	2	1	3	7
Sudden movements	5	2	7	11	1	1	2	4
Bumps	4	2	6	10	1	4	5	11
Total	49	13	62	100	19	26	45	100

The distribution of workers having accidents according to the type of machinery used is given in Table 14. Among those who have accidents in both factories, the number of workers working at the ring machines are 21 and 15 respectively. In the other words 34 percent of the accidents are related to the workers who are working at the ring machines in Altinyıldız. The corresponding percentage is also 34 in Zet-ip. The second highest rate of workers having accidents in the Altinyıldız factory belong to the workers employed

at the top machines. They committed had 19 accidents which is about 31 percent of the total accidents in Altinyıldız. Second place in the percentage list of work accidents in the Zet-ip factory is given to forkers at combing and wick machines, the number of these is 9 which is 20 percent of total. The number of work accidents is highest in both factories among workers at the ring machines.

Nevertheless when the situation is analysed with respect to accidents arising while working at machines due to lack of training, it is found that the highest percentage of accidents is seen among workers working with combing machines. The figures are 56 percent for the Altinyıldız factory and 67 percent for Zet-ip factory.

TABLE 14- ACCIDENT BY TYPE OF MACHINES

Types of Machine	ALTINYILDIZ				ZET-IP			
	Total Workers	Acci- dents	Accidents due to		Total Workers	Acci- dents	Accidents due to	
			Lack of Training	Care- less- ness			Lack of Training	Care- less- ness.
Combing	88	9 100 %	5 56 %	4 44 %	63	9 100 %	6 67 %	3 33 %
Wick	120	5 100 %	2 48 %	3 60 %	81	9 100 %	5 56 %	4 44 %
Ring	172	21 100 %	5 24 %	16 76 %	102	15 100 %	5 33 %	10 67 %
Bobin	132	8 100 %	4 50 %	4 50 %	82	7 100 %	2 29 %	5 71 %
Tops	155	19 100 %	9 47 %	10 53 %	47	5 100 %	1 20 %	4 80 %
Total	667	62 100 %	25 40 %	37 60 %	375	45 100 %	19 42 %	26 58 %

The X^2 test was used to see if there was any significant difference between workers who had undergone training and those who had not, with respect to the causes of accidents. No statistically significant results were obtained.

D- Other Characteristics

When the relationship between the workers' marital status and the hours of work accidents is studied (Table 15), it is seen that while the total number of accidents occurring during the first hours of work is highest, there is a conspicuous drop in the number of accidents during later hours in the Altinyıldız factory. On the other hand, the highest number of accidents in the Zet-ip is seen in the third and fourth hours. The number of accidents during the other hours are relatively close to one another in value. When the situation is looked into, with respect to the marital status of the workers, it was observed that the accidents caused by unmarried workers were highest in the first and second and fifth and sixth hours of work as opposed to married workers. It was also noted that the number of accidents caused by married workers were higher during the remaining hours. In the Zet-ip factory, results showed that on the whole married workers have more accidents than unmarried workers.

TABLE 15- THE MARITAL STATUS OF THE WORKERS AND HOURS OF ACCIDENTS

Hours	ALTINYILDIZ			ZET-İP		
	Unmarried	Married	Total	Unmarried	Married	Total
1st - 2nd	13	10	23	3	7	10
3rd - 4th	10	12	22	5	12	17
5th - 6th	6	4	10	4	5	9
7th - 8th	1	6	7	4	5	9

Upon the analysis of the relationship between the work shifts and age groups (Table 16) the number of accidents are higher on the morning shifts for all age groups in both factories. However the number of accidents is highest in the afternoon shift among the 16 - 20 year group at the Zet-ip factory. It is interesting to note that out of 23 accidents 10 occurred during the morning shift in the Altinyıldız factory within the 16 - 20 year group, and out of 8 accidents 5 occurred the morning shift within the 31 - 35 age group. In Zet-ip factory, 7 out of 8 accidents in the 26 - 30 year group, 6 out of 12 accidents in the 36 and over age group took place during the morning shift.

TABLE 16- ACCIDENTS ACCORDING TO AGE GROUP AND SHIFTS

Age Group	ALTINYILDIZ				ZET?IP			
	Morning shift	Afternoon shift	Evening shift	Total	Morning shift	Afternoon shift	Evening shift	Total
16 - 20	10	6	7	23	4	7	2	13
21 - 25	6	6	2	14	3	3	1	7
26 - 30	7	3	2	12	7	0	1	8
31 - 35	5	2	1	8	2	2	1	5
36 - +	2	1	2	5	6	3	3	12
Total	30	18	14	62	22	15	8	45

The distribution of the accidents, the types of accidents and the length of duration at work, is shown in Table 17. In the Altinyıldız factory there was no accident reported due to lack of training occurring in a duration of longer than 5 years whereas in the Zet-ip factory accidents occurring due to the lack of training in the same period of

time was reported as 6 and accidents arising from the lack of caution or carelessness were reported as also 6 .

While the number of accidents related to the lack of training within a duration time of 6 months or less was 5 in the Altinyildiz factory but the number of accidents taking place because of the same reason and in the same period of time was zero in the Zet-ip factory.

Number of accidents due to the two types of causes distributed almost evenly for the different length of duration time as stated in Table 17.

TABLE 17- THE RELATIONSHIP BETWEEN DURATION AND TYPES OF ACCIDENTS

Duration at work (X)	ALTINYILDIZ			ZET-IP		
	Accidents due to Lack of Training	Careless-ness	Total	Accidents due to Lack of Training	Careless-ness	Total
6 months>X	5 71 %	2 29 %	7 100 %	0 0 %	3 100 %	3 100 %
1 yr>X>6 mths.	4 33 %	8 67 %	12 100 %	4 40 %	6 60 %	10 100 %
3 yrs>X>1 yr.	9 45 %	11 55 %	20 100 %	3 43 %	4 57 %	7 100 %
5 yrs>X>3 yrs.	7 39 %	11 61 %	18 100 %	6 46 %	7 54 %	13 100 %
X>5 yrs.	0 0 %	5 100 %	5 100 %	6 50 %	6 50 %	12 100 %
TOTAL	25	37	62	19	26	45

In the section pertaining to other characteristics, information related to workers causing accidents in both factories were compared diagonally.

The Chi-square test was used to see if any difference existed between the workers who had undergone training and those who had not with respect to marital status and the hours of accidents, their ages and shifts, and length of work duration and the types of accidents taking place. No statistically significant results were obtained with respect to the relationship between age shifts and length of work duration type of accidents taking place. Only among the workers of Altinyıldız factory there was relationship between the hours of accidents and marital status of the workers at a 0.10 significant level.

E- Losses due to Accidents

The periods of discontinuation of work because of absences resulting from accidents show approximately equal rates of change in both factories (Table 18.) The most frequent period of discontinuation of work was at the most a few days in both factories. It was about 45 percent of the total work days which were lost because of accidents. About 70 percent of the total loss of work days, lasted between a day and seven days.

TABLE 18- WORK DAYS LOST DUE TO ACCIDENTS

Lost work days (X)	ALTINYILDIZ				TNE-İP			
	Female	Male	Total	%	Female	Male	Total	%
4 days X	20	8	28	45	6	14	20	44
7 days X > 4 days	13	1	14	23	7	5	12	27
10 days X > 7 days	8	4	12	19	4	3	7	16
1 month X > 10 days	8	0	8	13	2	4	6	13
Total	49	13	62	100	19	26	45	100

IV- CONCLUSIONS and RECOMMENDATIONS

If the relationship between the age and sex of the workers in terms of the number of work accidents is studied, it is interesting to see that in the Altinyıldız factory almost all of the accidents taking place among the 16 -25 age group were caused by women. Again in the same factory, as the age increased the total number of women workers decreased and the number of work accidents also decreased in proportion. Another fact of interest is that the majority of the workers employed in this factory in the 16 - 30 age group is constituted of female workers. This conspicuous difference between the numbers of male and female workers disappears among the workers who are 31 years old or older. In the Zet-ıp factory, on the other hand, these aspects noted to exist in the Altinyıldız factory are not seen at all.

It is believed that the reason for this situation rests in the fact that the Altinyıldız factory has preferred to increase their employment of young female workers over the last few years. One underlying reason for the preference of employing young women at the Altinyıldız factory is the lower wage rate paid to this work group. Another reason is that this factory includes all its new workers in the training program without the exception of workers having been employed previously elsewhere therefore, it is logical for them to prefer inexperienced workers.

The Zet-ıp factory, on the other hand, seems to prefer to employ more qualified workers and are able to keep their employees for a longer period of time. As a consequence, workers employed in this factory are more qualified and better educated. Probably because of the abovementioned reasons there are more young female workers in Altinyıldız. The difference between the numbers of female

and male workers in Zet-ip are not as high as in Altinyıldız.

When the level of education of the workers is looked at, it is interesting to point out that there weren't any workers reported in the first group who do not have any diploma but know how to read and write in the Zet-ip factory. It is presumed that this situation is the result of employing more qualified workers mostly in the Zet-ip factory in comparison to the Altinyıldız.

Upon the analysis of the distribution of work accidents according to work shifts, it was found that in both factories the highest frequency of accidents, with about the same percentages, are seen in the morning shifts for both male and female workers. The number of accidents are seen to decline considerably during the afternoon shift and have reached a minimum level during the evening shift. Also, it was found that 72 percent of the accidents in the Altinyıldız factory took place in the first four hours and this percentage was 60 for the Zet-ip factory for the same period. Similar results were found in studies previously conducted concerning the time of accidents and it was assumed that the underlying cause had to do with the effect of the private lives of the workers before the occurrence of accidents. For example, some simple reasons such as the worker having drinking, or gambling habits, going to bed late at night and so being unable to get proper rest before resuming work the following morning, by neglecting breakfast, coming to work during the rush hour and so on, may increase the probability of the workers having accidents. An other likely reason is the difficulty in being able to concentrate quickly on the work in the morning which increases the chance of occurrence of accidents.

These factors which influence those working during the morning shift will not have the same effect on those who work during afternoon

or evening shifts. For example workers who begin work at 15.00 in the afternoon may have the necessary rest and sleep after getting to bed late at night, therefore there would be less of a problem of fatigue. Similarly, factors such as neglecting breakfast or getting caught in the rush hour will not be of significance for those who begin work during the afternoon and evening shifts.

In the section related to the reasons for the occurrence of work accidents, the accidents described as having been caused by lack of training, refer to those accidents to do with machinery. As can be seen in Table 12, a difference of only 2 percent between the two factories has been found with respect to this type of accident. This difference between the factory administering the training program and the factory which is not, is much less than it was expected. This result shows that various factors may influence the occurrence of work accidents to a considerable extent. For example, among many others, one factor is that some machines are more dangerous than others. This subject can be better understood upon analysing the figures given in Table 14. It is seen from Table 14 that the number of workers working with ring machines is higher than the workers working with another machine in both factories. The number of accidents are also higher among workers working on ring machines in both factories. However the machine which seems to be the cause of the highest number of accidents related to lack of training is the combing machines in both factories. This is interesting because the number of workers in both factories working on combing machines is about the lowest but despite this fact, most accidents occur on these machines which may show that they are considerably dangerous, more so than other machines. This in turn shows that the positive effects of training may be lessened by the danger posed by the type of machines used, con-

sequently no matter how much training is carried out, the probability of having accidents by the workers working on these machines may remain high.

When the ages and periods of work were studied it was seen that naturally the number of accidents increase in proportion to the total number of workers employed. Here a different situation is observed ; that the number of accidents is related to the types of machines used.

Another factor which reduces the effect of training programs may be the lack of caution or carelessness on the part of the worker

A trained and experienced worker who has increased knowledge on the machine which he uses may eliminate the effect of his training by momentary carelessness. In some cases this condition also holds true for the accidents resulting in cuts, drops, falls, sudden movements, bumps etc., which are collected under the lack of caution group category. The percentage for accidents collected under this group (related to improper care while working) are high in both factories. They account 60 percent in Altinyaldiz and 58 percent in Zet-ip (see Table 14.) This situation also shows the importance of the effect carelessness has on the occurrence of work accidents.

In Table 16 an analysis was carried out to see if any relationship between the workers' ages and work shifts existed. In both factories and for all age groups accidents are most frequent during the morning shift. Therefore, it may be interpreted that this frequency of accidents during morning hours is caused not by age but by the effect of the private lives of the workers on their performance.

Looking at Table 17, it is interesting to point out that when the relationship between periods of work and types of accidents

is studied, the situation in the Altinyıldız factory shows that in a period of 6 months or less, 5 out of 7 accidents are related to lack of training. Meanwhile, although no training is carried out in the Zet-ip factory, accidents due to lack of training are not come across at all in this duration of employment.

One reason for this may be that the Altinyıldız factory preferred to employ inexperienced workers in the last few years. Another reason could be that the workers who have been used to working in their own manner in another plant where they were employed previously find it difficult to adopt to the new and specific rules of the training program applied in Altinyıldız. This situation may make it more difficult for the worker to work during the starting phase. Workers who are used to working without rules will need time to adapt and this extra amount of time may cause problems to arise. For example, for a worker who had handled a machine manually before, it would have been difficult to use the correct equipment and methods for the new job in the new place.

A- Results and Suggestions

In this research, it was found that the lack of training and carelessness and the use of dangerous machines constituted the main cause of work accidents in these two textile mills. As can be observed in Table 12 accidents related to carelessness rate as high as 60 percent in the Altinyıldız factory and 58 percent in the Zet-ip factory. Those accidents which are related to the lack of training or to the use of machines may also arise out of momentary lack of caution. Extensive information about the machines used and on the

importance of the subject is given to the workers during training programs.

However lack of caution can eradicate all the effects of training. Methods of prevention designed in order to limit such accidents will be touched upon below. These methods of prevention will be effective also for accidents arising from cuts, drops, falls, sudden movements, bumps, etc.

The main cause of carelessness is fatigue. For this reason the importance of the fact that workers must begin work after having enough rest should be emphasised. Apart from this, it may be helpful to provide tea-breaks of 10-15 minutes duration, perhaps with music during morning and afternoon hours. These may enable the workers to relax and gather their concentration. Another main point would be to establish order and discipline in order to eliminate the underlying causes of accidents. For example, incorrect placement of equipment of machinery and disorderly arrangement of materials may increase the likelihood of accidents happening. Behavior such as unnecessary haste, running, uncontrolled movements, making jokes with fellow workers may increase the risk of having accidents.

In order to decrease the danger of the use of machinery, necessary technical precautions must be taken. Here, responsibility rests on the workers and on the employers both. The employer should provide all the essential parts of the machinery that may prevent accidents, and the workers should always use these accident preventing parts.

In this research the main objective has been to specify certain characteristics of the workers who have accidents in two selected textile mills. As was previously stated, records kept in the factories have constituted the main sources of information for this procedure. It is possible that part of the information may have been

lost or not recorded at all, for example the emotional state of the worker upon the occurrence of an accident and the conditions under which the worker was working at the time of an accident are important points which have to be taken in to consideration. There is nothing to guarantee that the information obtained on certain characteristics of the subjects is totally reliable since there is a certain subjectivity in factory records of accidents, and in evaluation of the type of accidents by the researcher.

In research that will be carried out in the future, it would be helpful to have direct contact with the workers who cause accidents and to find out their state of mind at the time of the occurrence of the accidents. It would be a more realistic approach to evaluate information gathered from two sources directly, from workers and employers. More reliable data from these two sources may enable a researcher to make more realistic evaluation. If the sample represented the population (textile sector in Istanbul) better generalization would have been possible. Here the findings could not be generalized to the textile sector in Istanbul, because of the inadequate selection of the sample due to uncontrolled restrictions raised by the nature of this study and by the nature of employers in textile sector.

A total of two factories one as an experimental and other one as control group were used in this research. This study which comprises of an experimental and control group, may be misleading in terms of the real effect of training programs on work accidents, because many other uncontrolled factors belonging to a factory or to the workers may affect results. A study using two or more control groups would be able to control more variables and may identify the

influence of training on work accidents much better.

Workers employed in the textile sector have generally lower levels or few years of education and less work experience. Since there is a high demand for man-power in this sector, workers who accept low pay are preferred. They are found among unqualified and less educated people.

It is particularly difficult to ensure that these kinds of workers work in accordance with the rules specified by training programs.

The reasons for the difference between the Altinyıldız factory and the Zet-ip factory in terms of the number of accidents and types of accidents were as significant as expected. The reason may be that Altinyıldız employs more unqualified workers. Choosing more qualified workers with preferably higher levels of education may play an important role in decreasing the frequency of accidents in the textile sector.

It should be born in mind that this study has a number of limitations. The main limitation is the practical difficulties in establishing identical control and experimental groups. Since a number of intervening variables might have excited influence on the final result. There is a need to be cautious in coming to a conclusion about the negliable effect of training on reducing work accidents. This result may be due to the colouring of fine results by several intervening factors present in the control and experimental groups. It is possible that training produces best effect when combined with other accident reducing measures, such as better selection of workers, satisfactory level of pay, technical precautions spacing of rest periods, motivating the worker, team sprit, order and discipline during work.

REFERENCES

- AKBULUT, T., and KORAY, S., " Hızlı kentleşmenin getirdiği trafik sorununun işçi sağlığı üzerinde etkisi hakkında bir araştırma ", 1. Ulusal İşçi Sağlığı Kongresi, İstanbul : İstanbul Tabip Odası Yayınları, 1978, p. 703 - 709.
- ARAL, F., " İş Kazaları ve İş Güvenliği ", 1. Ulusal İşçi Sağlığı Kongresi, İstanbul : İstanbul Tabip Odası Yayınları, 1978, p. 92-96.
- ÇELİKOL, A., " İş Kazalarının Ruhsal Etmenleri ", 1. Ulusal İşçi Sağlığı Kongresi, İstanbul : İstanbul Tabip Odası Yayınları, 1978, p. 400 - 407.
- DÖŞEMECİ, M., " Bir İnşaat Makinaları Yapım Yeri İncelemesi ", 1. Ulusal İşçi Sağlığı Kongresi, İstanbul : İstanbul Tabip Odası Yayınları, 1978, p. 530 - 535.
- DİNÇ, H., " İş Kazaları ve İş Güvenliği ", 1. Ulusal İşçi Sağlığı Kongresi, İstanbul : İstanbul Tabip Odası Yayınları, 1978, p. 72-78.
- GÜRTAN, K., and KILIÇ, T., Türkiyede Faal Sendikal Hayata Geçisten Sonraki İş Kazaları, İstanbul : İstanbul Üniversitesi Yayınları, 1978.
- GÜVEN, R., " Açılış Konuşmaları ", 1. Ulusal İşçi Sağlığı Kongresi, İstanbul : İstanbul Tabip Odası Yayınları, 1978, p. 40 - 43.
- I. L. O., " Effect given to the Conclusions of the Previous Sessions ", International Labour Organization, Genova: 1965, p. 15 - 35.
- İŞ KANUNU, Sayı : 506, Madde : 11 / a.
- KURT, S., " İş Kazaları ve İş Güvenliği " 1. Ulusal İşçi Sağlığı Kongresi, İstanbul : İstanbul Tabip Odası Yayınları 1978, p. 80 - 82, 413 - 421.

- M.P.M., İş Kazalarının Önleme Semineri, Ankara : Milli Prodüktivite Merkezi Yayınları, No: 261, 1982, p. 86 - 87.
- ÖZDAMAR, S., " Türkiye'de İş Kazaları Yoğunluk ve Nitelik Bakımından İş Kollarına Göre Dağılımı ", İşçi Sağlığı ve İş Güvenliği Semineri Notları, Bursa : Sümerbank Tekstil Eğitim ve Araştırma Merkezi Yayınları, 1978, p. 2 - 10.
- SALVENDY , G., and SEYMOUR,W.D., " Method of Job Analysis," Prediction and Development of Industrial Work Performance, New York : A Wiley - Interscience Publication, 1973, p. 39 - 80.
- TOKTAŞ, U. F., " Kaza Sebeplerine göre İş Kazalarının Dağılımı ", T.C. Çalışma Bakanlığı Çalışma Dergisi, Ankara : Yorgancıoğlu Matbaası, 1979, p, 150 - 155.
- TURHAN , G., and KOCAOĞLU,E., İşçi Sağlığı ve İş Güvenliği Mevzuatı , Ankara : Türk-İş Yayınları, 1984.
- WALTER, R., " Occupational Safety and Health Workers ", Occupational Outlook Handbook, New York : 1979, p. 202 - 215.

APPENDIX A
ACCIDENT RECORD FORM

İşyerinin Ünvanı : _____

Adresi : _____

VIZİTE KAĞIDI

(Sigortalıya Ait)

/ / 197

Sigortalı : Tedavinin yapılabilmesi için sicil kartını göstermek zorundasın.

SİGORTALININ	1) Sicil No. :			
	2) Adı ve Soyadı :			
	3) Doğum Tarihi :			
	4) İşe giriş tarihi :			
	5) Viziteye çıkmak için işyerinden ayrıldığı tarih ve saat :			
6) Geçindirmekle yükümlü olduğu kimsesi bulunup bulunmadığı (A)				
İŞ KAZASI HALİNDE	7) Olay tarihindeki işçi sayısı			
	8) Sigortalının yaptığı iş ve bu işin mahiyeti :			
	9) İş kazasının oluş şekli, vuku bulunduğu yer, tarih ve saat :			
	10) Olay günündeki işbaşı saati :			
	11) Tanıkların Ad ve Soyadları :			
Sigortalının prim ödeme halinin sona erip ermediği, ermişse tarihi :				
13)	Prim ödeme gün sayısı	Hakettiği ücretler	Prim veya ikramiye gibi ek ödemeler	İşyerince veya mahkemelerce ödenmesine karar verilen ücret prim ve ikramiyeler
Aylar	(C)	(D)	(B)	(P)
Ocak				
Şubat				
Mart				
Nisan				
Mayıs				
Haziran				
Temmuz				
Ağustos				
Eylül				
Ekim				
Kasım				
Aralık				

APPENDIX B

FORM for DATA ANALYZING.

Code No.		01	02	03	
Sex	Female				
	Male				
Marital statuses	Unmarried				→
	Married				
Number of children	0				→
	1				
	2				
	3 and over				→
Level of education	Literate				
	Elementary				
	High school				→
Ages of workers	16 - 20				
	21 - 25				
	26 - 30				
	31 - 35				
	36 - 40				
	41 - 4				→
Working periods	6 months>X				→
	1 year>X 6 months				
	3 years>X 1 year				
	5 years>X 3 years				
	X 5 years				→
Shifts	Morning				
	Afternoon				
	Evening				→

		Code No.	01	02	03	
The times of occurrence of the accidents	1st hour					
	IIInd hour					
	IIIrd hour					
	IVrth hour					
	Vth hour					
	VITH hour					
	VIIth hour					
	VIIIth hour					
Causes	Machines					
	Cuts					
	Drops					
	Falls					
	Sudden movements					
	Bumps					
Types of machine	Comb					
	Wick					
	Ring					
	Bobin					
	Tops					
Lost work days (X)	4 days X 1 day					
	7 days X 4 days					
	10 days X 7 days					
	13 days X 10 days					
	15 days X 13 days					
	2 months X 15 days					

Code No.		01	02	03	
Years	1981				
	1982				
	1983				
Number of accidents of each worker	1				
	1 or more				
Type of accident	Accidents related to training				
	Accidents related to carelessness				
Number of technical accident of each worker	0				
	1				
	2				
	3 or more				