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Research article

A CASE OF RISK ASSESSMENT BY USING FINE-KINNEY METHOD IN SUB-LEATHER PROCESSING

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Abstract

One of the most hazardous industries in the district of Bolu-Gerede of Turkey, leather-processing industry, takes an important place for the economy of the district and the country. The study was carried out in a medium-sized company operating in the leather processing sector in Bolu. Preventing the occurrence of industrial accidents and occupational diseases is one of the points to be emphasized in terms of companies and laborers in the industry. Occupational health and safety are concepts that increasingly become more important in today's societies. Awareness is raised and legal issues come to the fore regarding these concepts comprising a dimension of human health. Scientists are studying on occupational health and safety and looking for ways to prevent the accidents before they occur. In the study, Fine-Kinney risk analysis method has been applied in the sub-processes of a sample manufacturing company in the district; and the activities whose risk scores are very high after the study and high-risk activities have been handled in the first place; and it is observed that the risk-scores decreased after the regulatory and preventive practices. As for other activities, whose risk scores are lower, action plans were implemented. With this study, it is stated that the risk assessment is a proactive approach in occupational health and safety practices and the company's risk scores have been significantly reduced.

Keywords: Occupational health and safety; Fine-Kinney method; risk analysis; leather; tannery.

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1. Introduction

Chitin Leathercraft is the practice of making leather of animals like sheep, calf, pig and horse ready for industrial use by processing them with special methods. Turning the

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leather into a product by processing them with different methods for various purposes is also defined as the main field of activity of the leather processing industry [1].

It is predicted that the leathercraft in Gerede dates back 700 years with the participation of this region to Ottoman territories and it corresponds to the early 13th century, according to the communities living in this region. High altitude and cold & rainy weather in Gerede district, pose an advantage for the leathercraft and it has evolved into a long-standing industry. It is thought that leather production, which has been made for many years in this district, constitutes an inherited skill over inhabitants of this district. It is expected that the factories built in newly built Leather Organized Industrial Zone will leave the traditional production methods and adopt new production methods (Lean Manufacturing, 6 Sigma, etc.).

On the other hand, as a result of the inventions of 18th and 19th centuries and accordingly after the mass production movements of the workplaces, new and unsafe working conditions were created for the employees. Laws on laborers and occupational health have been passed in order to turn the inappropriate working conditions arising from employees or workplaces into appropriate conditions. Social security principles, which started to come forward in Europe in 18th century, became widespread in 19th century, various insurance institutions were established. Then, insurances of occupational accidents and occupational diseases were introduced. The increase in business accidents, its technological complexity, development and implementation of industrial and international standards, a continuous trend of transition from emergency liquidation to prevention and risk management, have been a prerequisite for the development of risk management information system in the industrial field [2].

As of the 1980s, numerous studies have been conducted in terms of hazards and risks which may be encountered by leather industry employees. Leather production includes many operations with different exposures, which can be harmful to the health of the workers, and particularly be carcinogenic [3,4]. Some of these studies were conducted on cancer risk among leather factory employees [5], occupational physical risks of leather staff [6]. The Fine-Kinney occupational risk assessment method is a widely applied method to control risks in its application areas [7,8].

In this study, a leather processing company operating in Gerede Leather Organized Industrial Zone was discussed and the risk assessment, being a preventive approach and required by law, was carried out. Fine Kinney risk assessment method was preferred because great numbers of chemicals were used in the industry. It is aimed to foresee the risks that the companies in leather industry may encounter on a sectoral basis (Leather industry), to ensure that pre-measures or measures are taken and to prevent occupational accidents before occurring, by a proactive approach in terms of occupational health and safety.

2. The Concept of Occupational Health and Safety in Turkey and in the World

According to International Labor Organization, an occupational accident is “an unexpected and unplanned occurrence”, which results in an injury or damage. Occupational Health and Safety (OHS) is a concept which becomes increasingly important. Today, OHS is a fact not only considering employee and employer individually but also having economic, social and international dimensions [9]. Occupational Health is the efforts aiming to ensure that the employee can work tranquilly in a working environment where the threats arising from the work environment or the materials or equipment used, are eliminated or minimized [10].

At its first session in 1950, the Joint ILO (International Labor Organization) / WHO (World Health Organization) Committee on Occupational Health defined the purpose of occupational health. Then the definition was revised in 1995 as follows: Occupational health should aim: the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention of health problems caused by working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and, to summarize: the adaptation of work to man and of each man to his/her job [11, 12].

According to the data of ILO, 270 million occupational accident occur annually in the World, over 313 million workers are involved in non-fatal occupational accidents (it means that everyday over 860.000 workers suffer occupational accident) and 160 million people contract work-related diseases annually [13].

Occupational safety is a scientific and systematic work done so that the employee can be protected from occupational accidents and diseases, benefit from fields such as engineering sciences, law, ergonomics, medical sciences, statistics, economy, mathematic, social politics, behavioral sciences to eliminate or minimize the occupational accidents and diseases in the work places [14].

Occupational Health and Safety is eliminating and minimizing occupational risks caused by working life such as occupational accidents and diseases laying employer, employee and state under legal, medical and technical obligations on the elimination or minimization of the dangers faced by employees against their lives and physical integrities in the working environment [15]. The function of Occupational Health and Safety Services is protecting the workers from the dangers. These can lead to injury, cancer and respiratory, musculoskeletal, fertility, neurologic or dermatologic and mental diseases along with hearing loss in the workplace [16]. According to the classification of Cascio, occupational accidents had two main reasons: (i) unsafe working behaviors, and (ii) unsafe working conditions. Cascio also divides unsafe work conditions into two parts as physical and environmental conditions. Physical conditions include broken equipment, insufficient equipment protector and lack of protective equipment. Noise, radiation, or dust and stress also create unsafe environmental conditions [17].

The first one of the most important steps regarding OHS taken in Turkey, is the Labor Law numbered 4857 and this law gave a different point of view to OHS and with this law it is aimed to bring our country in compliance with the norms of European Union. As a result of it a new concept of 'occupational safety specialist' was added to the literature of OHS. Finally, in order to meet the norms of the European Union, the Law of Occupational Health and Safety numbered 6.331, passed on June 20th, 2012 and published in gazette numbered 28.339, dated on June 30th, 2012 [18].

In Turkey, from 2013 when the OHS law came into force until the end of 2019, last seven years, according to the social security institution data the number of workplaces, the insured worker, the number of insured having work accident by incapacity days, the number of insured with occupational diseases, cases of fatal occupational injury in yea, is shown in Table 1. Looking at Table 1, it is observed that there is an increase of 17% in the number of workplaces, around 14% in the number of insured working. A decrease of about 16% in the number of insured who lost their lives as a result of work accidents and occupational diseases has seen that this ratio is higher when considered with the increase in the number of workplace and employee insured. There is an increase of 120% in the number of occupational accidents and 209% in the number of occupational diseases in the

years specified in Table 1. The reasons for this increase are that the occupational health and safety experts and also the workplace physicians, who are assigned to the companies, guide employers at the point of notifying all occupational accidents, big or small, and that the sanctions and notifications have been increased with the OHS law. Company executives have realized up to date by entering all occupational accidents into the system with the training, information, and guidance provided.

Table 1 Statistical distribution of occupational accidents occurred in Turkey between 2013-2019 [19]

Year	Workplace	Insured Worker	Number of insured having work accident by incapacity days	Number of insured having occupational disease	Cases of fatal occupational injury in year
2013	1.611.292	12.484.113	191.389	351	1.360
2014	1.679.990	13.240.122	221.366	494	1.626
2015	1.740.187	13.999.398	241.547	510	1.252
2016	1.749.240	13.415.843	286.068	597	1.405
2017	1.874.682	14.477.817	359.653	691	1.633
2018	1.879.771	14.229.170	430.985	1044	1.541
2019	1.891.512	14.314.313	422.463	1088	1.147

The number of workplaces and insured employee in leather industry are shown in Table 2. As it is seen from this table, the majority of the workplaces where leather-related products are small and medium sized enterprises. There are 65.257 registered employees in a total of 6.544 workplaces. Most of the workplaces are enterprises with less than 10 employees. The number of enterprises with more than 250 employees is only 7.

Table 2 The size of the workplaces in leather industry [19]

Activity Groups according to the classification	Number of workplaces				Total
	Number of insured workers in the workplace				
	1-9	10-49	50-250	250-1000+	
Manufacturing of leather-related products	5.222	1.121	194	7	6.544 workplaces

Number of deaths caused by occupational accidents and diseases in leather and all other industries of the year 2019 are shown in Table 3. 1.147 workers died from the occupational accidents in overall industries and majority of these workers were male. 1039 occupational accidents, 4 occupational disease and 2 fatal occupational accident occurred in the workplaces where leather-related products are manufactured.

Table 3 Number of deaths caused by occupational accidents and diseases [19]

Economic Activity Classification	Number of insured people died due occupational accident and diseases		
	Male	Female	Total
Manufacturing of leather-related products	1	1	2
Overall industries total	1126	21	1147

3. Risk Assessment Methods

In general; 'risk concept' can be defined as "combination of the possibility of occurrence of a specific hazardous incident and the damage, loss or injury caused by the results of this incident. Actually, it should be focused on the assessment and management of risk instead of defining the risk concept [20, 21].

The risks put the labor force, equipment, competitiveness and economy in jeopardy [22]. The risk is higher at small businesses. Additionally, their ability of risk inspection is lower. Small businesses may be more advantageous in terms of psychosocial risks [23, 24]. All potential work-related risks need to be identified and assessed in advance. In many countries, this process is laid down in OSH legislation [25].

The health and safety management system is not effective unless accompanied by a positive safety culture in the workplace. The International Labor Organization (ILO) noted that a key element for occupational safety and health management is promoting a culture of prevention within the enterprise. Introduction of a positive safety culture can therefore achieve further reductions in occupational injuries and diseases [26].

Risk analysis methods are divided into two groups; these are quantitative and qualitative methods. Quantitative risk analysis uses numerical methods when it calculates the risk. In qualitative risk analysis, numeric values are given to the values such as the probability of threat occurrence and the effect of the threat; and the risk value is found by processing these values with mathematical and logical methods [27]. The main risk analysis methods can be given as Primary Risk Analysis performed by using Checklist, Risk Assessment based on Decision Matrix Methodology (L-type and X-type Matrix), Hazard and Operability Analysis (HAZOP), Failure Mode and Effects Analysis (FMEA), Fault Tree Analysis-FTA, Cause-Effect Analysis and Fine-Kinney Method [28].

Fine-Kinney Method: With this method, the results of potential risks are ranked. In the event that the threat occurred, the size of the damage or loss to be occurred on human, workplace and environment are evaluated. It is widely used, and its usage is simple. This method makes it possible to use the workplace statistics. It is determined which precautions will be taken in the first place, according to the size of the risk value and it is prioritized according to the risk level [29]. What matters most is, that the values of probability, frequency and severity should be defined in a proper manner. Multiplying the values of probability, frequency and severity will give us the risk value ($\text{Risk} = \text{Probability} \times \text{Frequency} \times \text{Severity}$) [30]. In the formula, probability is the possibility of damage or accident occurring over time, frequency refers to the frequency of exposure to hazard. Severity represents the magnitude of the harm or damage to human, workplace and environment if the hazard occurs. When scoring the severity, one person's death is set as 40 points and more than one death is set as 100 points. The probability, frequency and severity values used in the Fine-Kinney method are shown in Table 4.

Table 4 Probability (P), Frequency (F) and Severity (S) values used in Fine-Kinney Method [31]

Probability Value	Probability of Damage	Frequency Value	Frequency of exposure to hazard over time	Severity Value	Estimated damage to human, and environment
10	Expected, certain	10	Almost continuous Several times an hour	100	More than one fatal accident Environmental disaster
6	High, pretty possible	6	Often Once or several times a day	40	Fatal accident Serious environmental hazard
3	Probable	3	Sometimes Once or several times a week	15	Permanent damage/Injury , Labor Loss
1	Possible but low	2	Not often Once or several times a month	7	Major damage / injury, external first aid
0,5	Unexpecte d but possible	1	Rare Several times a year	3	Minor damage / injury, Internal first aid
0,2	Unexpecte d	0,5	Very rare Once or less a year	1	Having a narrow escape No environmental loss

Making decisions according to the risk score and assessment of the consequences of the formula and selection the action to be done are shown in Table 5.

Table 5 Fine-Kinney method assessment of the consequence, decision and action table [29]

		Degree of the results	
Value	Explanation	Category	
1	Should be considered	Light-harmless or insignificant	
3	Important	Minor, low labor loss minor loss, first aid	
7	Serious	Major, significant harm, external treatment, work-day loss	
15	Very serious	Disability, loss of limb, environmental impact	
40	Very bad	Death, total disability, heavy environmental impact	
100	Disaster	More than one death, significant environment disaster	
Decision and Action according to the risk level			
Order	Risk Value	Decision	Action
1	R<20	Acceptable risk	Urgent measure may not be needed
2	20<R<70	Absolute risk	Must be included in action plan
3	70<R<200	Significant risk	Must be monitored carefully and eliminated by taking it into annual action plan.
4	200<R<400	High risk	Must be eliminated by taking it into short-term action plan.
5	R>400	Very high risk	Must take immediate action by breaking off.

4. Research Method and Results

In this study, cross-sectional research method has been used and the ground floor areas and processes of a leather-processing factory operating in the district of Bolu-Gerede, have been examined [32]. Before the study a risk analysis team has been established consisting of one chief supervisor, two Class-A occupational safety specialists, two Class-B occupational safety specialists, one occupational physician and employer's representative, employee's representative, department head and support members. Risk analysis methods have been examined with team members and for the risk analysis method to be applied in the workplace, Fine-Kinney method has been preferred. Information about Fine-Kinney risk analysis have been conveyed to the team members through training and afterwards field inspections have been done during the whole month and all necessary statistical data have been collected. Near-miss incidents and accident reports of the given business have been examined by team members in detail. Findings obtained, have been evaluated according to the Fine-Kinney risk analysis method and the risk analysis of the company has been generated. After the risk analysis was generated, it has been revised by taking proper steps and repeating the field observations.

5. Risk Assessment According to Fine-Kinney Method

Risk scores determined as a result of risk analysis and the risk scores revised after the measures taken against the sources of danger are shown in Table 6, 14 subjects with highest risk scores of the business, are listed. Inadequate personal protective equipment (PPE) to be used by employees against sources of danger, lack of labels for chemicals, lack of handrails on machines and faulty storage in coal storage areas are indicated as very high-risk activities. Specific risk definitions are made for each situation and proper steps are taken urgently for the priority ones.

Steps taken after risk analysis are shown in Table 6. The risk assessment identified the measures and the regulatory and preventive actions to be taken on the 14 subjects with the highest risk scores. New risk scores calculated after the steps taken are completed, are shown. For instance, personal protective equipment that are inadequate and were not used by employee have been delivered to the employee who must use them, against signature. Employees were informed about the personal protective equipment to be used and their use was controlled by the employer representative.

As a result of risk assessment performed by using Fine-Kinney method, risk score in 10 activities was found as 200 and above. It has been stated that inadequate personal protective equipment, lack of material safety data sheet of chemicals used in production and lack of handrails on machines are the activities with highest score (1200) (Table 6). As a result of the risk assessment, the work was immediately broken off in the areas with high risk scores, and after the risk score was decreased by implementing regulative and preventive activities, the production was restarted. For the unavoidable dangers detected in the workplace, appropriate personal protective equipment has been delivered to the employees as a debit. In consequence of this, risk score decreased to 20. For the chemicals that are in different packages for any reason; chemicals' own labels were put on the packages or containers where the chemicals are placed. Protective shields and handrails which are supposed to be on the machines have been reassembled to their places and the employees were informed through the trainings that they should never remove these preservatives. Risk score decreased to 60 in the relevant subject (Table 6). A problem has been detected in the coal storage activity which is one of the highest-risky matters. It was observed that the preserving and storage of the coals are faulty. In consequence of these faulty situations there is a risk of fire, fall and overturn and the company's managers were informed that they may cause injury and/or death. This situation was identified as "very risky" with 420 risk score (in Table 6), and the coals were stored in accordance with the standards by determining new storage areas for the coals to be used. The risk score decreased to 10.5 after corrective and preventive action.

It has been observed that heavy things are carried by the workers in the business and this was declared by the employees. It was detected that the workers carrying heavy things manually may contract musculoskeletal diseases. Current situation risk assessment team determined the probability value as 3, frequency value as 3 and severity of risk as 40 and risk score has been calculated as 360. This activity was reported as "high-risk" and it was recommended that it should be taken into the short-term action plan. Employees and employer/employer representative were informed that ancillary lifting equipment must be used to carry heavy loads. These appreciations were taken into consideration by employer representative and risk score was declined to 40.

Table 6 Risk assessment form current situation assessment

Risk Assessment Form Current Situation Assessment											
Probability (P), Frequency (F), Severity (S), Risk Score (RS)											
R<20 Acceptable risk, 20<R<70 Absolute risk, 70<R<200 Significant risk, 200<R<400 High- risk, R>400 very high risk											
Before Taking Measures							After Taking Measures				
Sources of Danger	Result	Current situation	P	F	S	RS	Measures Taken	P	F	S	RS
Chemicals	Occupational disease, cancer and/or death.	It has been stated that personal protective equipment used for current and potential risks in the workplace, are inadequate.	3	10	40	1200	For unavoidable risks detected in the workplace, appropriate personal protective equipment was delivered to employees as a debit and equipment were used by employees.	0,5	3	40	60
No labels of the chemicals	Occupational disease, cancer and/or death.	It has been seen that the chemicals used in the workplace are in different packages.	3	10	40	1200	For chemicals in different packages; chemicals' own labels were put on the packages or containers where the chemicals are placed.	0,5	3	40	60
No handrails in the machines	Injury, death	It has been seen that the handrails of the machines were demounted.	3	10	40	1200	Handrails which are supposed to be on the machines have been reassembled to their places and employees were informed that they should never remove those.	0,5	3	40	60
Fire, drop and topple	Injury and/or death.	It was observed that the storage of coals to be used in fueling boiler, are faulty.	10	6	7	420	Coals were stored in accordance with the standards by building new storage areas for the coals to be used.	0,5	3	7	10,5

Table 6 Risk assessment form current situation assessment (cont.)

Risk Assessment Form Current Situation Assessment											
Probability (P), Frequency (F), Severity (S), Risk Score (RS)											
R<20 Acceptable risk, 20<R<70 Absolute risk, 70<R<200 Significant risk, 200<R<400 High- risk, R>400 very high risk											
Before Taking Measures							After Taking Measures				
Sources of Danger	Result	Current situation	P	F	S	RS	Measures Taken	P	F	S	RS
Heavy, loads	Musculoskeletal diseases	It has been stated that heavy things are carried by workers	3	3	40	360	Employees and employer/employer representative were informed that ancillary lifting equipment must be used to carry heavy loads.	1	1	40	40
Working environment	Occupational disease, injury and/or death.	It was stated that necessary environment measurements (lightening, noise, dust, thermal comfort etc.) have not been carried out.	3	6	15	270	Necessary env. measurements were carried out by authorized company. Eliminating identified warnings and inadequacies identified in report, measurements were repeated.	0,5	3	15	22,5
Noise	Loss of hear, headache, lack of attention	After the environment measurement, places with high-decibel sound were detected.	3	6	15	270	In places where sound decibel is high, employees were given the earplugs and earmuffs with debit ticket.	1	2	15	30
Lack of technical training	Occupational disease, injury and/or death.	It was stated that the occup. training and cert. of competency of employees were insufficient.	3	6	15	270	Occupational trainings of the employees whose trainings were inadequate were completed and they became certificated employees.	0,5	2	15	15

Table 6 Risk assessment form current situation assessment (cont.)

Risk Assessment Form Current Situation Assessment											
Probability (P), Frequency (F), Severity (S), Risk Score (RS)											
R<20 Acceptable risk, 20<R<70 Absolute risk, 70<R<200 Significant risk, 200<R<400 High- risk, R>400 very high risk											
Before Taking Measures							After Taking Measures				
Sources of Danger	Result	Current situation	P	F	S	RS	Measures Taken	P	F	S	RS
Emergency exit	Injury and/or death.	It was observed that there were obstructive materials in the front and back parts of the doors.	6	1	40	240	These obstructive materials blocking the emergency exits were removed and they were inspected.	0,5	0,5	40	10
Emergency Health and safety signs	Injury and/or death.	It was seen that guide signs are inadequate and out of standards in emergency.	1	2	100	200	Emergency guide signs were placed on necessary areas in accordance with standards.	0,5	0,5	100	25
First aid staff	Injury and/or death.	It was observed that there are insufficient numbers of first aiders in workplace.	6	2	15	180	Employees identified as 'first-aider' were certificated and they received training from the occup. physician.	1	0,5	15	7,5
Health and safety signs	Injury and/or death.	It has been seen that health and safety signs are inadequate in the workplace.	3	3	15	135	Inadequate health and safety signs were placed.	0,5	2	15	15
Motor vehicles	Traffic accident; injury and/or death.	It was stated that the drivers of motor vehicles used inside the workplace have driving license, but some employees also use them without license.	3	3	15	135	The employees were informed that the employees should not drive the vehicles without license.	0,5	2	15	15

Table 6 Risk assessment form current situation assessment (cont.)

Risk Assessment Form Current Situation Assessment											
Probability (P), Frequency (F), Severity (S), Risk Score (RS)											
R<20 Acceptable risk, 20<R<70 Absolute risk, 70<R<200 Significant risk, 200<R<400 High- risk, R>400 very high risk											
Before Taking Measures							After Taking Measures				
Sources of Danger	Result	Current situation	P	F	S	RS	Measures Taken	P	F	S	RS
Long-term standing work	Occupational disease	A specific rest-break time has not been identified for workers standing for long periods.	3	3	15	135	Specific rest-break time has been identified for workers standing for long periods and these time periods have been implemented.	0,5	1	15	7,5

As a result of the risk assessment, the work was immediately broken off in the areas with high risk scores, and after the risk score was decreased by implementing regulative and preventive activities, the production was restarted. For the use of chemicals dangerous detected in the workplace, appropriate personal protective equipment has been delivered to the employees as a debit. In consequence of this, risk score decreased to 60. For the chemicals that are in different packages for any reason; chemicals' own labels were put on the packages or containers where the chemicals are placed. Protective shields and handrails which are supposed to be on the machines have been reassembled to their places and the employees were informed through the trainings that they should never remove these preservatives. Risk score decreased to 60 in the relevant subject (Table 6). A problem has been detected in the coal storage activity which is one of the highest-risky matters. It was observed that the preserving and storage of the coals are faulty. In consequence of these faulty situations there is a risk of fire, fall and overturn and the company's managers were informed that they may cause injury and/or death. This situation was identified as "very risky" with 420 risk score (in Table 6), and the coals were stored in accordance with the standards by determining new storage areas for the coals to be used. The risk score decreased to 10.5 after corrective and preventive action.

It has been observed that heavy things are carried by the workers in the business and this was declared by the employees. It was detected that the workers carrying heavy things manually may contract musculoskeletal diseases. Current situation risk assessment team determined the probability value as 3, frequency value as 3 and severity of risk as 40 and risk score has been calculated as 360. This activity was reported as "high-risk" and it was recommended that it should be taken into the short-term action plan. Employees and employer/employer representative were informed that ancillary lifting equipment must be used to carry heavy loads. These appreciations were taken into consideration by employer representative and risk score was declined to 40.

It was detected that the following are high-risk issues and the risk score were determined as 270 for these issues: The environment measurement has not been carried out, that the sound level was high, and the occupational training of the employees were insufficient. Business executives were informed that it should be taken into the short-term action plan. Necessary environment measurements have been carried out by authorized company. The warnings and inadequacies identified in the report were removed and the measurements were repeated. In the places where sound decibel is high, employees were given the earplugs and earmuffs with debit ticket. Occupational trainings of the employees whose trainings were inadequate were completed. Risk score of these activities have been decreased after the efforts made.

Emergency exits were specified as "source of danger" and were given 240 points as risk score. It was observed that there were obstructive materials in the front and back parts of the doors. This situation was specified as high-risky and the employer representative was warned about it and these obstructive materials blocking the emergency exits were removed and the employees were informed about the importance of this issue. At the end of the observations made after warning and informing, it was seen that the employees and managers abided by these. The fact that guide signs are inadequate and out of standards, was another high-risk factor. The risk score, which was determined as 200, decreased to 25 after the emergency guidance boards and signs became in accordance with standards.

In the risk analysis performed in the business, less risk scores have been determined in other activities. It has been reported to the company executives that high-risk issues should being monitored carefully and that these risks should be eliminated by taking them into annual action plan. The activities identified as 'absolute risk' were included in the action plan. It is stated that no immediate action is required for reasonable risks, but it is

essential to take measures. As a result, the issues with high and very high-risk scores were eliminated urgently and the safety of the workplace and employees was ensured considerably.

6. Conclusion and Recommendations

In the companies operating in the field of leather industry, there are significant hazards and the risks caused by these hazards. The possibility of occurrence of occupational accidents is high due to the machinery and the large number of chemicals, therefore it is quite important to carry out the risk analysis in the workplace.

In this study, using Fine-Kinney method, the risk analysis was carried out and the risk scores of the potential risks were identified. As a result of the risk analysis, the issues with high and very high-risk scores were evaluated urgently and the necessary regulative and preventive operations have been carried out. By this way, the risk scores have been lowered and the safety of the employees and the workplace is maintained. As it is seen in the case study, it is very important to carry out risk analysis and to take measures according to the results. For this reason, it was understood that it is very important to take measures for the high-risk scores identified by the risk analysis and that the action plan should be completed immediately and put into operation by breaking off if necessary.

By performing the risk analysis, a proactive approach to occupational health and safety practices has been exhibited, the occurrence of future occupational accidents is prevented and the damage to be given to workers, employers and the economy is avoided. It is utmost important to perform the risk analysis carefully throughout the country and in all sectors in terms of health and safety at work.

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