EXAMINING THE APPROACHES OF OHS PROFESSIONALS TO THE REASONS FOR FALLS FROM HEIGHT

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ABSTRACT

EXAMINING THE APPROACHES OF OHS PROFESSIONALS TO THE REASONS FOR FALLS FROM HEIGHT

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Except motor vehicles accidents, the death rate on occupational accidents which occur falling from high places or into depths, is higher than any other accidents. According to the importance of the topic, in the study, examining the approaches of OHS professionals to the reasons and effects of occupational accidents which occur as falling from heights is aimed. For this, 100 accident inspection reports from Labor Inspection Board were surveyed.

Accident reasons were derived from those inspection reports. The reasons were evaluated by 125 occupational health and safety professionals according to their importance. The participants of the evaluation were OHS experts and OHS inspectors at State Agencies, academicians in the field of OHS and occupational safety experts from private sector.

Then, the evaluation results were analyzed through a statistic program to see if they had any significant difference according to the experiences of participants and where the participants work.

Through analysis; it is observed if the participants have different points of view to the accident reasons. As a result, preventing and decreasing actions about the determined priorities were offered.

Keywords: Working at Heights, Falls From a Height, Accident Reasons, Evaluation of Reasons, Construction Sector, Occupational Accident

ÖZ

İSG PROFESYONELLERİNİN YÜKSEKTEN DÜŞME KAZALARINA YAKLAŞIMLARININ İNCELENMESİ

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Motorlu taşıt kazaları hariç, yüksek bir yerden veya derin bir yere düşme şeklinde gerçekleşen iş kazalarında ölüm oranı diğer kazalardan daha yüksektir. Konunun önemine istinaden, bu çalışmada İSG uzmanlarının yükseklikten düşme şeklinde gerçekleşen iş kazalarının sebeplerine ve etkilerine yaklaşımlarının incelenmesi amaçlanmaktadır.

Bu amaçla, İş Teftiş Kurulundan elde edilen 100 kaza inceleme raporu incelenmiştir.

Kaza sebepleri bu raporlardan çıkarılmıştır. Çıkarılan bu sebepler 125 iş sağlığı ve güvenliği profesyoneli tarafından önemlerine göre değerlendirilmiştir. Değerlendirme yapan katılımcılar kamuda görevli İSG uzmanları ve iş müfettişleri, İSG alanında çalışmakta olan akademisyenler ve özel sektörde çalışmakta olan iş güvenliği uzmanlarından oluşmaktadır.

Daha sonra değerlendirme sonuçları katılımcıların tecrübeleri ve çalıştıkları yerlere göre anlamlı bir fark gösterip göstermediğini görmek açısından bir istatistik paket programı ile incelenmiştir.

Analiz vasıtasıyla, kaza sebepleri ile ilgili olarak katılımcıların farklı bakış açılarına sahip olup olmadıkları gözlemlenmiştir. Sonuç olarak, belirlenen önceliklere göre önleyici ve azaltıcı tedbirler önerilmiştir.

Anahtar Kelimeler: Yüksekte Çalışma, Yüksekten Düşme, Kaza Sebepleri, Sebeplerin Değerlendirilmesi, İnşaat Sektörü, İş Kazası

To my father, my mother, my sisters and my son who are my blessings

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I would like to say I am so lucky that I literally surrounded by good people. They are my family, my colleagues, my teachers, my friends; they are everywhere I go and don't even notice that they do more than ordinary things. They don't expect someone to thank, but they deserve to know I couldn't do this without them and I feel happy to be with them.

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I would also like to thank to my son, Tuna. One day late at night he tried to retype some commas to dots on the computer. I know he would always let me study if he wasn't someone who easily gets bored to play alone. Joking aside, with his joy, he gave me the power I needed.

To my father Kâmil AKARSU, my mother Sevim AKARSU, my sisters Rânâ Meriç and Sadberg, I would like to say I know I'm very lucky to have them. Maybe I can't show how grateful I am, but I am.

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LIST OF ABBREVIATIONS

AEF	Accident Evaluation Form
AET	Accident Evaluation Table
ARIS	Accident Reasons' Importance Scale
HSE	Health and Safety Executive (England)
İBYS	Occupational Health and Safety Information Management System
ILO	International Labour Organization
OHS	Occupational Health and Safety
PCA	Principal Component Analysis
PPE	Personal Protective Equipment
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

According to the International Labour Office (ILO) numbers, every year about 2.3 million people in the world die of occupational accidents and diseases (ILO, 2015). It means about 6.300 people die because of occupational accidents and diseases every single day.

Those numbers can only be compared with the bloodiest wars of the human history. In the First World War, about 9 million soldiers died in 4 years (İpek, 2015). This situation shows that it should be noticed that humanity is in a serious struggle against occupational accidents and diseases.

In this study, the reasons for 100 accidents, which happen falling from heights were examined. Most of those accidents occurred in construction, which is a big and fast growing industrial sector. According to the International Labour Organization (ILO), at least 60,000 fatal accidents occur each year on construction sites around the world. That means one in six of all fatal work-related accidents (ILO, 2009).

Accident risk with serious injury in construction sector is nearly three times higher than other occupations (Sohail, 1997). Therefore, the construction has the reputation of being a dangerous or highly hazardous sector because of the high incidence of accident and fatality numbers around the world (Smallwood, Haupt, & Shakantu, 2008).

Falls are the second leading cause of all accidental deaths worldwide (WHO, 2018) and the leading reason for fatal construction accidents (ILO, 2003). It should be noted that; beside all accidents cause direct costs like loss of lives, health and skilled employees; compensation costs and interruption or quitting of production, there are also indirect costs. An occupational accident damages the reputation of a company irrevocably and has legal and financial consequences (Leigh & Robbins, 2004).

1.1. The Current Occupational Health and Safety (OHS) Situation by Numbers

In Turkey, the situation is not different from the rest of the world. According to the average numbers of last ten years, construction sector has the highest rate of fatal accidents with almost 20 % of whole accidents with fatalities (see Table 1.1.). More than half of this rate happens as falling from height or into the depth. Table 1.1 shows the annual proportions of occupational accidents in the form of falls from height according to official data of the Occupational Health and Safety Data Management System (İBYS, 2019). As it is seen from the tables, accidents that occur in the form of falling from height affect the accident rates quite negatively and it is continuing rising.

It need to be considered that preventative safety culture is beneficial for employees, employers and governments alike (ILO, 2005). Occupational and industrial accidents are all caused by preventable factors that could be eliminated by implementing already known and available measures and methods (ILO, 2016).

In Turkey, the population is much higher than most of European countries. The average age is 32 (TUİK, 2019). According to Turkish Statistical Institute (TUİK)'s last general census in 2000, labor force is 28.544.359 and employed labor force is 25.997.141 people (TUİK, 2019).

To get the picture in sight, here is the current situation about OHS in Turkey with numbers (İBYS, 2019);

The numbers of OHS Professionals:

Occupational safety experts	72,589
Occupational physician	29,729
OHS Trainers	1,747

The numbers of OHS Establishments:

Public Health and Safety Unit	2,444
Educational Institution	77
Laboratory	125

More detailed numbers about OHS in Turkey are presented in Table 1.1 and Table 1.2 about the OHS numbers in Turkey.

Table 1.1. *Accident Related Numbers in Turkey (İBYS, 2019)*

	Falls from height	Total accidents	Ratio of falls from height to total accidents (%)	Death as a result of falls from height	Total fatality	Ratio of death as a result of falls from height to total fatality (%)
2009	8,364	64,316	13.00	218	1,171	18.62
2010	8,992	62,903	14.30	278	1,444	19.25
2011	9,871	69,227	14.26	265	1,700	15.59
2012	18,903	74,871	25.25	210	1,032	20.35
2013	28,479	191,389	14.88	250	1,301	19.22
2014	32,509	221,366	14.69	236	1,580	14.94
2015	36,340	191,389	18.99	244	1,310	18.63
2016	41,418	221,366	18.71	256	1,428	17.93
2017	50,323	191,389	26.29	269	1,597	16.84
2018	46,616	221,366	21.06	207	1,128	18.35

Table 1.2. *OHS Related Numbers in Turkey (İBYS, 2019)*

Paper Type	Total Paper till Today	Numbers of Papers for only 2018	Number of OHS Professionals	Number of Active OHS Professionals	Number of Active OHS Professionals/Total OHS Professionals	Number of Needed OHS Professionals	Time Use Capacities of Active OHS Professionals	Real Need
Occupational Physician	41,247	3,648	29,646	12,529	42.30 %	9,815	49.30	19,909
OHS experts Type A	18,953	334	12,217	6,550	53.60 %	8,282	60.60	13,667
OHS experts Type B	20,596	3,807	16,841	11,294	67.10 %	7,338	68.30	10,744
OHS experts Type C	83,381	4,327	42,112	9,432	22.40 %	6,322	50.50	12,519
Trainers of Occupational Physician and OHS Experts	4,655	223	1,731	-	-	-	-	-
Other Health Personnel	17,389	3,640	17,389	4,334	24.90 %	2,195	46.60	4,711
Trainers of Other Health Personnel	16	1	16	-	-	-	-	-

1.2. Definitions

In order to better understand the current situation mentioned in this chapter, it is necessary to have a good understanding of the concepts. It should not be forgotten that words could have many meanings; when a concept especially from a non-technical origin is investigated, it can be seen that it carries many different meanings than a person thinks he/she already knows. This is the case when it comes to OHS. Decisions that can radically affect people's lives are based on what meanings are derived from each word of those definitions. In this section, how some concepts related to this study and also to OHS, which is a multidisciplinary field, are defined is given.

1.2.1. Hazard and Risk

Hazard and risk are two similar concepts which can easily be confused. Occupational Health and Safety Law defines “hazard” as “Potential which is in the workplace or can come from outside, to cause harm or damage to the employee or workplace.” (Law no.6331, 2012). In addition, “risk” is defined as “Possibility of loss, injury or other harmful consequences from the hazard.” (Law no.6331, 2012)

Health and Safety Executive (HSE) defines hazard as “the potential to cause harm, including ill health and injury; damage to property, plant, products or the environment, production losses or increased liabilities” and moreover says “The level of risk is determined from a combination of the likelihood of a specific undesirable event occurring and the severity of the consequences” (HSE, 2004).

A germ may be hazardous but, in order for a germ to pose a risk for us, we must get in contact it. Otherwise, a germ that will never come into contact does not pose a risk. Therefore; if there is a chance that the hazard will happen, then it can be called a risk.

In Figure 1.1, there is a bad example of working at height from a garbage truck in Turkey.

Figure 1.1. A Work on a Garbage Truck in Turkey

1.2.2. Occupational Health and Safety

A generally accepted definition of occupational health and safety (OHS) is "the science of anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment" (Alli, 2008). As it concerns everyone from all over the world, working in different places and doing different works, it has a wide and inclusive scope of various disciplines.

1.2.3. Occupational Accident

HSE defines accident very shortly as an event that results in injury or ill health (HSE, 2004). Another internationally accepted definition for occupational accident is "an unexpected and unplanned occurrence, including acts of violence, arising out of or in connection with work which results in one or more workers incurring a personal injury, disease or death." as occupational injury (ILO, 2002).

In Turkey, there is a much more detailed definition for occupational accident in the Social Security Law no.5510 as "an event which occurs while the insured employee at work; due to work being carried out by the employer; if the insured is working

independently on his / her behalf and account, due to his / her own work; the insured working under an employer, as being sent as attendant to another place outside the workplace without doing the actual work; according to the labor legislation at the times the nursing insured women to allocate milk to her child and during insured employees going and coming back to the place of work with a vehicle supplied by the employer, and makes damage to the insured employee immediately or later, physically or mentally" (Law No. 5510, 2006).

In Occupational Health and Safety Law, a more comprehensive definition of an occupational accident is defined as an event that occurs in the workplace or due to the execution of the work, causing death or rendering body integrity mentally or physically disabled (Law no.6331, 2012).

It is worth mentioning that according to ILO, if death occurs as a result of an occupational injury in one year from the day of the accident, the death is accepted as a fatal occupational accident (ILO, 2002). According to Turkish regulations, if the case is an occupational accident, there is no such time limit to exclude the case from being an occupational accident.

1.2.4. Risk Assessment

Risk assessment is a process intended to estimate the risk to a given target organism, system or (sub)population, including the identification of attendant uncertainties, following exposure to a particular agent, taking into account the inherent characteristics of the agent of concern as well as the characteristics of the specific target system (WHO, 2004).

A risk assessment can be summarized in 5 steps as presented in Figure 1.2.

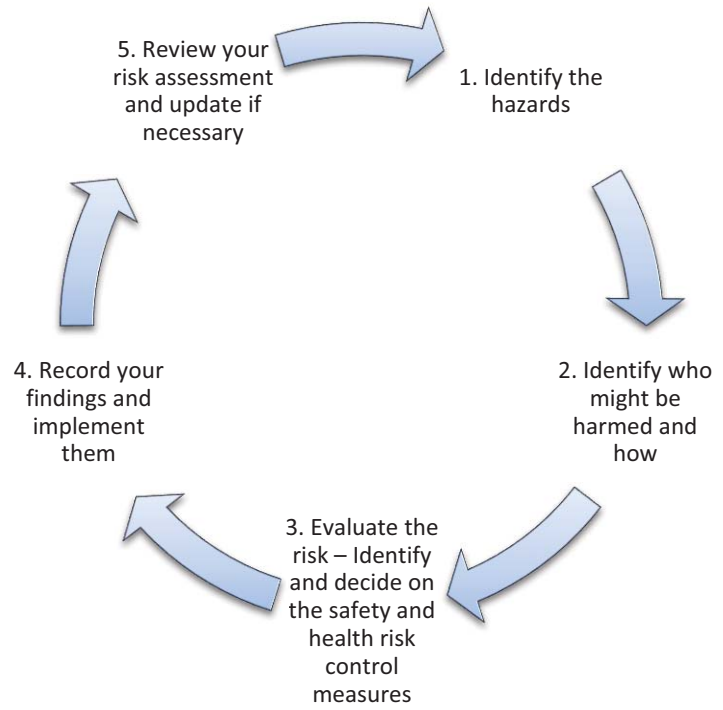

Figure 1.2. Risk Assessment Loop *(HSE, 2019)*

In Turkey, Occupational Health and Safety Law says a risk assessment is "determining the hazards that exist or may come from out of the workplace, the factors that lead to risks and the risks arising from these hazards, analyzing and grading them and determining the control measures". According to the same law, it is among the general obligations of the employer to carry out risk assessments in the workplace (Law no.6331, 2012).

By assessing risk in work environments, it is possible to forecast the size, severity, probability and even time of risks that may occur. Therefore, risk assessment is considered vital. To do a risk assessment, as much data as possible needed to be collected and examined. In addition, a strong accident reporting system needs to be in place.

Although the most comprehensive accident data in Turkey can be obtained from the Social Security Institution's statistical annuals, those data only cover the insured employees in regulations (Law No. 5510, 2006).

1.2.5. Working at Height

One of the most developed countries in terms of OHS and the land of skyscrapers, Singapore's Workplace Safety and Health Act defines "work at height" as "(a) in or on an elevated workplace from which a person could fall; (b) in the vicinity of an opening through which a person could fall; (c) in the vicinity of an edge over which a person could fall; (d) on a surface through which a person could fall; or (e) in any other place (whether above or below ground) from which a person could fall, from one level to another and it is reasonably likely that the person or any other person would be injured due to the distance of the fall;" (MOM, 2013).

Figure 1.1. Panorama of Skyscrapers in Singapore by Deniz Akarsu (2017)

With the same logic according to the British regulations, "work at height" means "(a) work in any place, including a place at or below ground level; (b) obtaining access to or egress from such place while at work, except by a staircase in a permanent workplace, where, if measures required by these Regulations were not taken, a person could fall a distance liable to cause personal injury" (2005).

Although working at height expressions may vary from country to country; most developed countries accept falls from one level to another as falls from a height.

According to Turkish regulations also, in all areas where there is a difference in level and the possibility of injury as a result of falling; it is considered working at height (2013).

Working at height can be carried out in a wide variety of indoor and outdoor work places. In this study; 100 work accidents were examined which were occurred during the work at height in different work places and sectors like; constructions, power lines (see Figure 1.4.), mines, garbage collection trucks (see Figure 1.1.), transportation vehicles, workshops, garden walls, and water canals.

Figure 1.2. Power Lines in Ankara Region by Deniz Akarsu (2019)

1.3. The Aim of the Study

To be specific,

While this research, instead of examining the occupational accidents as a whole, a more specific item was discussed. In Turkey, occupational accidents which occur as falling from a height is one of the most common forms of accidents resulting in fatalities. Due to the importance of the subject, the topic “occupational accidents” was narrowed as “occupational accidents which occur as falling from a height” for this study.

To be reliable,

While studying about occupational accidents, in order to provide realistic results; the most important part is the source of the study needs to be based on experienced, real

cases. Labor inspection reports, expert reports of OHS professionals and court orders which also depend on the first two reports are the most reliable and acceptable sources of those studies. Concerning this, the accident reasons were derived from inspection reports.

To sustain participation to the study from different groups,

During the evaluation of the accident reasons depending on that reliable source, the aim of the study is to investigate if there is any difference in the perspectives of focus groups where 125 professionals gathered from.

The distinguish factors were the experience of the participants and where the participants work. According to where these 125 participants work, three groups which consist of 46 officers at state agencies, 30 academicians at universities and 44 experts at private sector were reached. According to 125 participants' OHS experiences, three groups which consist of 40 participants with 1-6 years' experience, 55 participants' with 7-10 years' experience, and 30 participants with more than 10 years' experience were reached.

To learn the approaches,

Although there is no dependable academic study to prove that the causes of accidents are exaggerated, underestimated or ignored by subjective and variable perspectives; it cannot be denied that such case law is frequently mentioned in the field of OHS.

If there is a lens in the nature of human beings that distances, zooms in or blurs the truth; the production of suitable glasses will be provided only with the proof of this inclination through this study and similar academic studies in other branches in the future. That is why it is searched if there is any difference between the groups' approaches to the accident reasons.

To make contribution to prevent work accidents,

As a result of the study, interpreting whether the evaluations of the participants were significantly different or the same; it is intended to understand the reason of them. This will help defining the true intervention priority of factors causing accidents to prevent them to happen.

CHAPTER 2

METHOD

In this study, first, official correspondence and interviews have been made in order to attain the documents. After the essential permissions, three months archive study began. The rough data of the study was obtained as a result of that archive study carried out at Turkish Employment Agency General Directorate, the Branch Office of the Inspection Unit.

The data attained from the Inspection Unit was tabulated. At the same time a pool of OHS professionals was gathered. It was asked to 125 OHS professionals to contribute voluntarily the study via Informed Consent Form (see Appendix A) and the preparations of analyzing the data were concluded.

To evaluate the accident reasons, Accident Evaluation Form (AEF) was derived from the inspectors' reports (see Appendix B). After all participating OHS professionals fulfilled the AEF; the results were analyzed by means of a statistical package program.

The activities performed in the study were represented gradually in a chronology in Table 2.1.

Table 2.1. *Thesis Process Chronology*

Thesis Process Chronology
Defining the Thesis Title
Official Correspondence and Interviews
Archive Study
Tabulation of Rough Data Informed Consent Form Accident Evaluation Form (AEF)
Gathering a Participant Pool
OHS Experts and inspectors from the State Agencies Academicians Safety Experts
Fulfilling the AEF
Face to face
Statistical Analyze (SPSS)
Writing up the Thesis

2.1. Participants

In this study, a pool of 125 participants was composed to examine the importance of the 24 causes of accidents identified as the result of the archive study at the Inspection Unit of Turkish Employment Agency. Participants consisted of OHS professionals working in the state agencies, private sector, and academicians studying in the field of OHS.

46 OHS professionals from state agencies, 44 OHS professionals from private sector and 35 academicians studying in the field of OHS scored the causes of the accidents by means of the AEF (see Figure 2.1.).

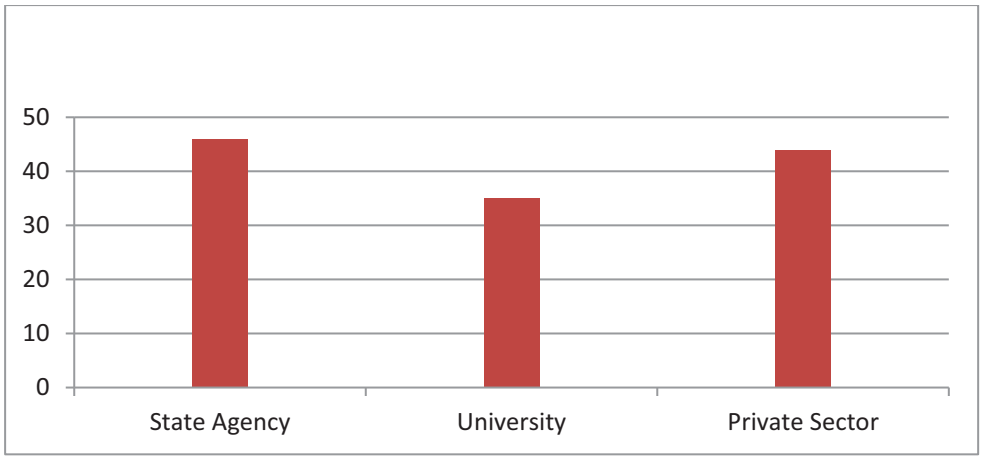

Figure 2.1. Distribution of Where Participants Work

As working at height is closely related to the construction sector and most of the accidents occurred in construction area, all academics participating in the assessment were chosen from the ones who have been studying about construction. By the way, the participant OHS professionals working in the state agencies and private sectors were all engineers who mostly were civil engineers.

125 participants also were categorized according to their OHS experiences to see if the experience changes their approach to the accident reasons. 40 participants with 1-6 years' experience, 55 participants' with 7-10 years' experience, and 30 participants with more than 10 years' experience were scored the causes of the accidents by means of the AEF (see Figure 2.3).

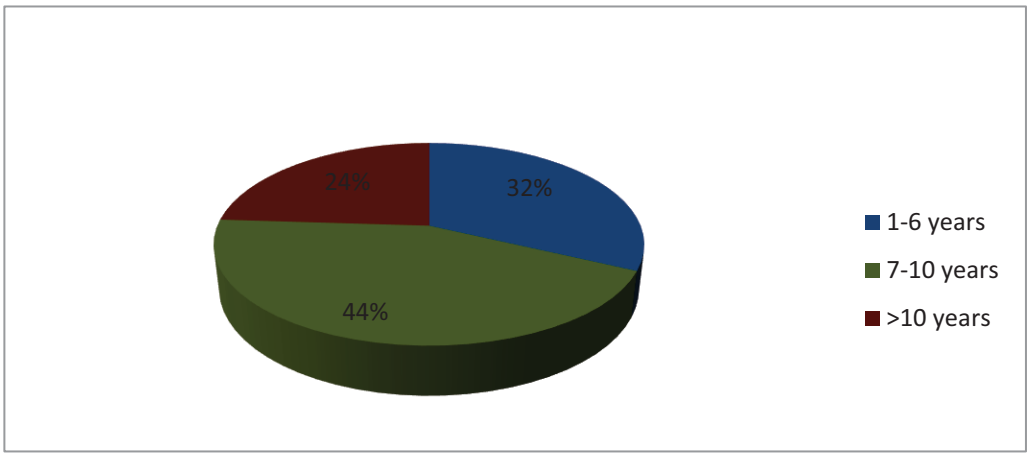

Figure 2.2. Experience Distribution of Participants

As local participants fulfilled the AEF face to face, upstate and abroad participants got the forms via electronic environment.

2.2. Instruments

2.2.1. Procurement of Accident Data

The accident data compiled as a result of a three-month archive study run at Turkish Employment Agency General Directorate, the Branch Office of the Inspection Unit (see Figure 2.4).. In the procurement phase of accident reports, 1600 reports in approximately 450 folders at Inspection Unit Archive in Sıhhiye and 400 reports in 130 folders in Inspection Unit Archive in Ostim were examined. As a result of this examination, 100 accident reports of accidents which happened falling from a height were reached and accident stories were taken as copies (see Appendix E: Accident Stories).

Figure 2.3. Procurement of Accident Data from Sıhhiye Office of Inspection Unit by Deniz Akarsu

In this study, the reasons for the accidents that occurred in the form of falling from heights were expressed in 24 items:

R1. Failure to provide all kinds of machines, tools, equipment, materials and working methods in accordance with the work and legislation

R2. Failure to periodically control of the used machinery, vehicles, equipment, materials and working methods

R3. (Access Roads, Vehicles and Platforms and Passages between Floors, etc.) Failure to eliminate falling risk in passings

R4. Failure to ensure that working at height is carried out by using appropriate collective protection equipment

R5. Failure to provide personal protective equipment to employees

R6. Failure to properly use personal protective equipment by employees

R7. Negligence or error of third person or institutions other than casualty or employer (subcontractor)

R8. Failure to provide working at height training for employees

R9. Failure to provide vocational training to employees

R10. Inadequate OHS training for employees

R11. Lack of essential health report of employees

R12. Management uncoordination in studies

R13. Failure to conduct the study under the supervision and control of a competent person

R14. Failure to assign appropriate work meeting the qualifications of the employee or assignment work that does not meet the qualification of the employee

R15. Failure to clearly instruct employees by determining proper working method

R16. Failure to provide a safe working environment by performing checks and audits in the workplace

R17. Failure to Provide Risk Assessment and Emergency Action Plan

R18. Not preparing and using OHS caution and warning signs in the workplace

R19. Incautiousness of employees

R20. Employee’s disregard of the work or carelessness

R21. Doing some work outside of the task or authority of the employee

R22. Employee’s acting against the instructions

R23. Employee's inexperience, ignorance or lack of knowledge and ability

R24. Improper use of personal protective equipment by employee

2.2.2. Categorization and Frequencies of Accident Reasons

As categorizing the frequencies of each accident reason, how many times one reason was occurred in 100 accidents gave the frequencies.

Also, discussing with the senior expert from the Directorate General of Occupational Health and Safety, Mustafa TÜLÜ; the senior expert from the Centre for Labor and Social Security Training and Research, Metin Cudi YARDIMCI and my supervisor Prof. Dr. Türker ÖZKAN, those accident reasons were categorized with their frequencies from high to low under three groups; environmental, organizational and personal reasons (see Table 2.2., Table 2.3. and Table 2.4.)

Table 2.2. *Environmental Reasons and Their Frequencies in 100 Accidents*

f	ENVIRONMENTAL
44	R4. Failure to ensure that working at height is carried out by using appropriate collective protection equipment
42	R1. Failure to provide all kinds of machines, tools, equipment, materials and working methods in accordance with the work and legislation
39	R6. Failure to properly use personal protective equipment by employees
38	R3. (Access Roads, Vehicles and Platforms and Passages between Floors, etc.) Failure to eliminate falling risk in passings
15	R2. Failure to periodically control of the used machinery, vehicles, equipment, materials and working methods
15	R5. Failure to provide personal protective equipment to employees
6	R7. Negligence or error of third person or institutions other than casualty or employer (subcontractor)

Table 2.3. *Organizational Reasons and Their Frequencies in 100 Accidents*

f	ORGANIZATIONAL
72	R16. Failure to provide a safe working environment by performing checks and audits in the workplace
55	R10. Inadequate OHS training for employees
49	R11. Lack of essential health report of employees
41	R13. Failure to conduct the study under the supervision and control of a competent person
35	R15. Failure to clearly instruct employees by determining proper working method
18	R9. Failure to provide vocational training to employees
10	R14. Failure to assign appropriate work meeting the qualifications of the employee or assignment work that does not meet the qualification of the employee
10	R17. Failure to provide risk assessment and emergency action plan
10	R18. Not preparing and using OHS caution and warning signs in the workplace
8	R12. Management uncoordination in studies
6	R8. Failure to provide working at height training for employees

Table 2.4. *Personal Accident Reasons of The Sufferers Who Had the Accident and Their Frequencies in 100 Accidents*

f	PERSONAL
61	R20. Employee’s disregard of the work or carelessness
57	R19. Incautiousness of Employees
19	R24. Improper use of personal protective equipment by employee
17	R22. Employee’s acting against the instructions
10	R21. Doing some work outside of the task or authority of the employee
7	R23. Employee's inexperience, ignorance or lack of knowledge and ability

2.2.3. Accident Evaluation Form (AEF)

24 accident reasons identified as causing 100 accidents, constituted 24 items of AEF. After reviewing by the senior expert from the Directorate General of Occupational Health and Safety, Mustafa TÜLÜ; the senior expert from the Centre for Labor and Social Security Training and Research, Metin Cudi YARDIMCI and the academician from the Department of Psychology and the Deputy Secretary General at ODTÜ, Prof. Dr. Türker ÖZKAN; AEF was found proper for determining the importance of the causes by scoring between 1 and 10.

During the survey of the factors causing the accidents; a total of 24 reasons were determined from inspectors' subjective statements which have very close or the same meanings at the reports.

2.2.4. Accident Reasons' Importance Scale (ARIS)

ARIS with 24 items were defined accident reasons in the inspectors' reports. Participants were asked to score those accident reasons according to their importance on a 1-10 scale (1=the least important accident reason, 10=the most important accident reason).

As the result of the factor analysis, items of ARIS were loaded on three factors named: organizational (managerial), personal and environmental. The Cronbach's Alpha score of 11 items of organizational or managerial reasons and 6 items of personal reasons are both 0.91. The Cronbach's Alpha score of 4 items of environmental reasons is 0.84.

2.3. Procedure

First, the ethical approval from Middle East Technical University Ethical Committee was obtained. Then, the participants were informed about the study in progress by means of the Volunteer Participation Form (see Appendix B). The participants were requested to fill out the form. While 67 participants who were local were able to fill in the form face-to-face, other 58 upstate or abroad participants filled in the form electronically via internet. 125 participants in total scored 24 accident reasons face to face or electronically.

2.3.1. Item Pool Development

The Assessment of the Accident Evaluation Table (AET) was prepared by examining the presence of these 24 causes for each accident. As the accident reasons, "the experience of the participants" and "where the participants work" were the columns; 100 accidents formed the lines of the table (see Appendix C).

2.3.2. Main Study

The Assessment of AET was run with a statistical analysis program. It was observed whether the score given to the reasons for the accidents made a significant difference according to the experience of the OHS participant or where they work. In this program, descriptive analyses, correlation analyses, analysis of variance (ANOVA) tests and factor analysis were run.

CHAPTER 3

RESULTS

3.1. Descriptive Analyses

In the study, the scores of 125 participants' on the causes of accidents were analyzed in terms of their experience on OHS and where they work. Their descriptive data was given in Table 3.1.

Table 3.1. *Descriptive Data of Participants*

Experience	Number	Ratio (%)
1-6 years	40	32
7-10 years	55	44
>10 years	30	24
Total	125	100
Where participant work	*N*	%
State Agency	46	36.8
University	35	28
Private Sector	44	35.2
Total	125	100

The mean values were the average values that the participants gave to an accident reason. As the participants evaluated the accident reasons from 1 to 10, the mean values were also in this range.

For a set of numbers from a to b (assuming a<b), the formula of calculation of mean values (M) is;

$$M = \frac{\sum_{a}^{b} \mathrm{x}}{\mathrm{b} - a}$$

The standard deviation is the square root of the average of the differences between each number in a group of numbers and average of that group of numbers (Özmen et al., 2018).

In a group, there are N numbers and xi_{avr} (mean value of i data set) is the average of value of that group. Then the formula of SD is (Shafer & Zhang, 2012) ;

$$SD = \sqrt{\frac{\sum_{i=1}^{N}(xi - xi\text{avr})^2}{N}}$$

Standard deviation measures the variability of a random variable. It gives how "spread out" the data set is (Shafer & Zhang, 2012). SD reveals if the numbers of a group are close to the mean value or not (Özmen et al., 2018). It also shows the variations in the group. If the SD is high, it means the values are spread over widely. If all data entries are the same, then SD will be equal to zero (Shafer & Zhang, 2012).

If a Standard Deviation value is large; it means the test has a distinctive feature, the group is heterogeneous, the difference between the values is high and predictive success is low. If a Standard Deviation is small, the test has a low discrimination, the group is homogeneous and the difference between the values is low (Al-Saleh & Yousif, 2009). So, the precision of the obtained mean value can be determined by the standard deviation of the sampled mean.

3.1.1. Descriptive Analyze Table Based on Experiences of Participants

40 participants with 1-6 years' experience, 55 participants with 7-10 years' experience and 30 participants with more than 10 years' experience on OHS scored the AEF. M and SD values basing on experiences of participants were given in Table 3.2..

Table 3.2. *Descriptive Analyze Table Based on Experiences of Participants*

	F	1-6 years' experience		7-10 years' experience		>10 years' experience	
		M	*SD*	*M*	*SD*	*M*	*SD*
R1	0.671	8.85	1.44	9.18	1.07	9.00	1.79
R2	0.090	8.58	1.71	8.51	1.57	8.40	1.94
R3	1.217	8.49	1.79	9.00	1.55	8.97	1.68
R4	2.433	8.68	1.72	9.33	1.00	8.83	1.93
R5	2.409	8.43	1.58	7.85	1.97	8.69	1.69
R6	1.507	8.85	1.56	8.44	1.92	9.07	1.36
R7	0.452	6.41	2.20	5.94	2.39	5.93	3.20
R8	1.058	8.38	1.90	8.31	1.84	8.90	1.68
R9	2.678	8.64	1.40	7.87	1.90	8.55	1.86
R10	1.881	7.93	1.61	7.96	1.86	8.69	1.97
R11	4.532	8.18[a]	2.01	7.05[ab]	2.48	8.41[ac]	2.18
R12	4.455	7.78[a]	1.59	7.43[ab]	1.70	8.59[ac]	1.80
R13	0.435	8.20	1.87	8.09	1.73	8.48	1.98
R14	1.098	8.25	1.89	7.69	1.71	8.17	2.48
R15	3.654	8.20[a]	1.65	7.69[ab]	2.00	8.80[ac]	1.69
R16	1.353	8.93	1.27	8.45	1.62	8.83	1.44
R17	3.446	7.75[a]	2.10	7.22[ab]	2.11	8.52[ac]	1.70
R18	1.976	7.33	2.14	6.60	2.35	7.45	1.84
R19	2.360	8.45	1.80	8.20	2.26	7.31	2.67
R20	2.495	8.58	1.85	8.40	2.02	7.48	2.61
R21	5.289	8.63[ab]	1.53	7.89[a]	2.02	7.00[ac]	2.65
R22	0.267	8.23	2.09	7.91	1.88	8.03	2.41
R23	0.529	8.08	1.86	7.76	2.18	7.55	2.43
R24	0.906	8.38	1.85	7.91	2.01	8.41	2.11

It is observed that the groups' evaluations went parallel in general. R7 had the lowest score from all groups.

3.1.2. Descriptive Analyze Table Based on Where the Participant Works

46 participants from state agencies, 35 participants from Universities and 44 participants from private sector scored the AEF. M and SD values basing on where participants work were given in the following titles.

Table 3.3. *Descriptive Analyze Table Based on Where the Participants Work*

	F	State Agency		University		Private Sector	
		M	*SD*	*M*	*SD*	*M*	*SD*
R1	0.424	9.16	1.38	9.06	1.30	8.89	1.47
R2	0.005	8.52	1.76	8.49	1.70	8.50	1.66
R3	0.365	8.98	1.56	8.66	1.68	8.81	1.78
R4	0.307	9.07	1.60	8.83	1.36	9.07	1.58
R5	2.117	7.89	2.17	8.14	1.61	8.66	1.48
R6	3.466	8.20^{ab}	2.19	8.94^{a}	1.19	9.07^{ac}	1.34
R7	0.467	5.91	2.37	5.94	2.62	6.39	2.65
R8	1.370	8.11	2.11	8.63	1.59	8.71	1.66
R9	1.497	7.91	1.84	8.51	1.69	8.46	1.74
R10	0.103	8.02	1.82	8.17	1.76	8.18	1.91
R11	1.305	7.29	2.49	7.94	2.29	8.02	2.17
R12	1.423	7.48	1.80	8.11	1.53	7.91	1.81
R13	0.153	8.16	1.80	8.14	1.72	8.34	1.98
R14	0.230	7.83	2.04	8.09	1.62	8.07	2.19
R15	1.766	7.72	2.16	8.43	1.48	8.30	1.76
R16	0.219	8.59	1.61	8.80	1.23	8.73	1.53
R17	0.940	7.38	2.41	8.00	1.66	7.77	1.99
R18	2.266	6.51	2.30	7.14	2.20	7.48	2.01
R19	2.056	7.64	2.41	7.97	2.35	8.59	1.94
R20	1.488	7.93	2.32	8.09	2.23	8.68	1.86
R21	1.355	7.69	2.13	7.69	2.37	8.34	1.87
R22	3.791	7.58^{ab}	2.03	7.80^{a}	2.21	8.71^{ac}	1.86
R23	1.987	7.38	2.23	7.80	2.18	8.27	1.95
R24	2.882	7.64	2.23	8.66	1.68	8.34	1.85

It is observed that the groups' evaluations went parallel in general. R7 and R18 had the lowest two scores in all groups.

3.2. Correlation

Correlation analysis is used to see the strength of relevance between variables. The higher the correlation value, the stronger the relevance of the variables (Karadimitriou,

2019). The relationship can be negative or positive and the strength of relativeness are defined according to those ranges.

In the study in progress, values between 0.50 to 1.00 were assumed strong, values between 0.30 to 0.49 as moderate and values higher than 0.30 as weak (Pereira, 2013). Correlation values between variables were given in the Table 3.4. To optimize the table, the variables from 3 to 26 were called R1 to R24. What they stand for was listed under 2.2.1. Procurement of Accident Data.

Where the Participants work (1 = State Agency, 2 = University and 3 = Private Sector) was positively correlated with R5 ($r = .181$, $p < .05$), R6 ($r = .218$, $p < .05$), R18 ($r = .188$, $p < .05$), R19 ($r = .180$, $p < .05$), R22 ($r = .231$, $p < .01$) and R23 ($r = .178$, $p < .05$).

Experience (1 = 1-6 years, 2 = 7-10 years and 3 = more than 10 years) was only negatively correlated with R21 ($r = -.248$, $p < .01$).

R1 (Failure to provide all kinds of machines, tools, equipment, materials and working methods in accordance with the work and legislation) was positively correlated with R2 ($r = .708$, $p < .01$), R3 ($r = .590$, $p < .01$), R4 ($r = .595$, $p < .01$), R5 ($r = .374$, $p < .01$), R6 ($r = .384$, $p < .01$), R8 ($r = .482$, $p < .01$), R9 ($r = .231$, $p < .05$), R10 ($r = .292$, $p < .01$), R11 ($r = .217$, $p < .05$), R12 ($r = .202$, $p < .05$), R13 ($r = .305$, $p < .01$), R14 ($r = .292$, $p < .01$), R15 ($r = .241$, $p < .01$), R16 ($r = .353$, $p < .01$), R17 ($r = .350$, $p < .01$), R18 ($r = .241$, $p < .01$) and R21 ($r = .192$, $p < .05$).

R2 (Failure to periodically control of the used machinery, vehicles, equipment, materials and working methods) was positively correlated with R1 ($r = .708$, $p < .01$), R3 ($r = .639$, $p < .01$), R4 ($r = .504$, $p < .01$), R5 ($r = .442$, $p < .01$), R6 ($r = .496$, $p < .01$), R7 ($r = .245$, $p < .01$), R8 ($r = .396$, $p < .01$), R9 ($r = .284$, $p < .01$), R10 ($r = .337$, $p < .01$), R11 ($r = .244$, $p < .01$), R12 ($r = .315$, $p < .01$), R13 ($r = .372$, $p < .01$), R14 ($r = .310$, $p < .01$), R15 ($r = .257$, $p < .01$), R16 ($r = .441$, $p < .01$), R17 ($r = .402$, $p < .01$), R18 (2 $r = .371$, $p < .01$), R21 ($r = .226$, $p < .05$), R22 ($r = .288$, $p < .01$), R23 ($r = .240$, $p < .01$) and R 24 ($r = .274$, $p < .01$).

R3 [(Access Roads, Vehicles and Platforms and Passages between Floors, etc.) Failure to eliminate falling risk in passings] was positively correlated with R1 ($r = .590$, $p < .01$), R2 ($r = .639$, $p < .01$), R4 ($r = .665$, $p < .01$), R5 ($r = .340$, $p < .01$), R6 ($r = .417$, $p < .01$), R8 ($r = .348$, $p < .01$), R9 ($r = .216$, $p < .05$), R10 ($r = .307$, $p < .01$), R12 ($r = .358$, $p < .01$), R13 ($r = .396$, $p < .01$), R14 ($r = .222$, $p < .05$), R15 ($r = .304$, $p < .01$), R16 ($r = .460$, $p < .01$), R17 ($r = .402$, $p < .01$), R18 ($r = .331$, $p < .01$), R20 ($r = .178$, $p < .05$), R22 ($r = .254$, $p < .01$), R23 ($r = .286$, $p < .05$) and R24 ($r = .292$, $p < .01$).

R4 (Failure to ensure that working at height is carried out by using appropriate collective protection equipment) was positively correlated with R1 ($r = .595$, $p < .01$), R2($r = .504$, $p < .01$), R3 ($r = .665$, $p < .01$), R5 ($r = .246$, $p < .01$), R6 ($r = .309$, $p < .01$), R8 ($r = .448$, $p < .01$), R9 ($r = .264$, $p < .01$), R10 ($r = .288$, $p < .01$), R12 ($r = .391$, $p < .01$), R13 ($r = .386$, $p < .01$), R14 ($r = .257$, $p < .01$), R15 ($r = .318$, $p < .01$), R16 ($r = .429$, $p < .01$), R17 ($r = .388$, $p < .01$) and R18 ($r = .241$, $p < .01$).

R5 (Failure to provide personal protective equipment to employees) was positively correlated with Where the Participants work ($r = .181$, $p < .05$), R1 ($r = .374$, $p < .01$), R2 ($r = .442$, $p < .01$), R3 ($r = .340$, $p < .01$), R4 ($r = .246$, $p < .01$), R6 ($r = .776$, $p < .01$), R7 ($r = .345$, $p < .01$), R8 ($r = .510$, $p < .01$), R9 ($r = .439$, $p < .01$), R10 ($r = .342$, $p < .01$), R11 ($r = .439$, $p < .01$), R12 ($r = .312$, $p < .01$), R13 ($r = .427$, $p < .01$), R14 ($r = .287$, $p < .01$), R15 ($r = .474$, $p < .01$), R16 ($r = .312$, $p < .01$), R17 ($r = .387$, $p < .01$), R18 ($r = .437$, $p < .01$), R21 ($r = .274$, $p < .01$), R22 ($r = .236$, $p < .01$) and R24 ($r = .525$, $p < .01$).

R6 (Failure to properly use personal protective equipment by employees) was positively correlated with Where the Participants work ($r = .218$, $p < .05$), R1 ($r = .384$, $p < .01$), R2 ($r = .496$, $p < .01$), R3 ($r = .417$, $p < .01$), R4 ($r = .309$, $p < .01$), R5 ($r = .776$, $p < .01$), R7 ($r = .281$, $p < .01$), R8 ($r = .493$, $p < .01$), R9 ($r = .458$, $p < .01$), R10 ($r = .377$, $p < .01$), R11 ($r = .311$, $p < .01$), R12 ($r = .338$, $p < .01$), R13 ($r = .512$, $p < .01$), R14 ($r = .346$, $p < .01$), R15 ($r = .484$, $p < .01$), R16 ($r = .391$, $p < .01$), R17 ($r = .375$, $p < .01$), R18 ($r = .432$, $p < .01$), R19 ($r = .217$, $p < .05$), R20 ($r = .201$, $p <$

.05) R21 ($r = .282$, $p < .01$) R22 ($r = .311$, $p < .01$) R23 ($r = .340$, $p < .01$) and R24 ($r = .613$, $p < .01$).

R7 [Negligence or error of third person or institutions other than casualty or employer (subcontractor)] was positively correlated with R2 ($r = .245$, $p < .01$), R5 ($r = .345$, $p < .01$), R6 ($r = .281$, $p < .01$), R8 ($r = .281$, $p < .01$), R9 ($r = .344$, $p < .01$), R10 ($r = .272$, $p < .01$), R11 ($r = .467$, $p < .01$), R12 ($r = .385$, $p < .01$), R13 ($r = .291$, $p < .01$), R14 ($r = .485$, $p < .01$), R15 ($r = .325$, $p < .01$), R17 ($r = .255$, $p < .01$), R18 ($r = .260$, $p < .01$), R19 ($r = .212$, $p < .05$), R20 ($r = .272$, $p < .01$) R21 ($r = .401$, $p < .01$) R22 ($r = .385$, $p < .01$) R23 ($r = .394$, $p < .01$) and R24 ($r = .242$, $p < .01$).

R8 (Failure to provide working at height training for employees) was positively correlated with R1 ($r = .482$, $p < .01$), R2 ($r = .396$, $p < .01$), R3 ($r = .348$, $p < .01$), R4 ($r = .448$, $p < .01$), R5 ($r = .510$, $p < .01$), R6 ($r = .493$, $p < .01$), R7 ($r = .281$, $p < .01$), R9 ($r = .636$, $p < .01$), R10 ($r = .650$, $p < .01$), R11 ($r = .571$, $p < .01$), R12 ($r = .393$, $p < .01$), R13 ($r = .483$, $p < .01$), R14 ($r = .308$, $p < .01$), R15 ($r = .540$, $p < .01$), R16 ($r = .407$, $p < .01$), R17 ($r = .625$, $p < .01$), R18 ($r = .582$, $p < .01$), R21 ($r = .247$, $p < .01$), R22 ($r = .270$, $p < .01$), R23 ($r = .177$, $p < .05$) and R24 ($r = .316$, $p < .01$).

R9 (Failure to provide vocational training to employees) was positively correlated with R1 ($r = .231$, $p < .05$), R2 ($r = .284$, $p < .01$), R3 ($r = .216$, $p < .05$), R4 ($r = .264$, $p < .01$), R5 ($r = .439$, $p < .01$), R6 ($r = .458$, $p < .01$), R7 ($r = .344$, $p < .01$), R8 ($r = .636$, $p < .01$), R10 ($r = .654$, $p < .01$), R11 ($r = .522$, $p < .01$), R12 ($r = .420$, $p < .01$), R13 ($r = .501$, $p < .01$), R14 ($r = .402$, $p < .01$), R15 ($r = .577$, $p < .01$), R16 ($r = .291$, $p < .01$), R17 ($r = .414$, $p < .01$), R18 ($r = .479$, $p < .01$), R20 ($r = .183$, $p < .05$), R21 ($r = .304$, $p < .01$), R22 ($r = .252$, $p < .01$), R23 ($r = .290$, $p < .01$) and R24 ($r = .425$, $p < .01$).

R10 (Inadequate OHS training for employees) was positively correlated with R1 ($r = .292$, $p < .01$), R2 ($r = .337$, $p < .01$), R3 ($r = .307$, $p < .01$), R4 ($r = .288$, $p < .01$), R5 ($r = .342$, $p < .01$), R6 ($r = .377$, $p < .01$), R7 ($r = .272$, $p < .01$), R8 ($r = .650$, $p < .01$), R9 ($r = .654$, $p < .01$), R11 ($r = .525$, $p < .01$), R12 ($r = .482$, $p < .01$), R13 ($r = .505$, $p < .01$), R14 ($r = .279$, $p < .01$), R15 ($r = .460$, $p < .01$), R16 ($r = .421$, $p < .01$), R17

($r = .531$, $p < .01$), R18 ($r = .512$, $p < .01$), R21 ($r = .215$, $p < .05$), R22 ($r = .297$, $p < .01$), R23 ($r = .280$, $p < .01$) and R24 ($r = .255$, $p < .01$).

R11 (Lack of essential health report of employees) was positively correlated with R1 ($r = .217$, $p < .05$), R2 ($r = .244$, $p < .01$), R5 ($r = .439$, $p < .01$), R6 ($r = .311$, $p < .01$), R7 ($r = .467$, $p < .01$), R8 ($r = .571$, $p < .01$), R9 ($r = .522$, $p < .01$), R10 ($r = .525$, $p < .01$), R12 ($r = .421$, $p < .01$), R13 ($r = .376$, $p < .01$), R14 ($r = .309$, $p < .01$), R15 ($r = .465$, $p < .01$), R16 ($r = .348$, $p < .01$), R17 ($r = .565$, $p < .01$), R18 ($r = .503$, $p < .01$), R21 ($r = .259$, $p < .01$), R22 ($r = .220$, $p < .05$), R23 ($r = .186$, $p < .05$) and R24 ($r = .311$, $p < .01$).

R12 (Management uncoordination in studies) was positively correlated with R1 ($r = .202$, $p < .05$), R2 ($r = .315$, $p < .01$), R3 ($r = .358$, $p < .01$), R4 ($r = .391$, $p < .01$), R5 ($r = .312$, $p < .01$), R6 ($r = .338$, $p < .01$), R7 ($r = .385$, $p < .01$), R8 ($r = .393$, $p < .01$), R9 ($r = .420$, $p < .01$), R10 ($r = .482$, $p < .01$), R11 ($r = .421$, $p < .01$), R13 ($r = .637$, $p < .01$), R14 ($r = .348$, $p < .01$), R15 ($r = .603$, $p < .01$), R16 ($r = .484$, $p < .01$), R17 ($r = .413$, $p < .01$), R18 ($r = .443$, $p < .01$), R22 ($r = .258$, $p < .01$), R23 ($r = .356$, $p < .01$) and R24 ($r = .261$, $p < .01$).

R13 (Failure to conduct the study under the supervision and control of a competent person) was positively correlated with R1 ($r = .305$, $p < .01$), R2 ($r = .372$, $p < .01$), R3 ($r = .396$, $p < .01$), R4 ($r = .386$, $p < .01$), R5 ($r = .427$, $p < .01$), R6 ($r = .512$, $p < .01$), R7 ($r = .291$, $p < .01$), R8 ($r = .483$, $p < .01$), R9 ($r = .501$, $p < .01$), R10 ($r = .505$, $p < .01$), R11 ($r = .376$, $p < .01$), R12 ($r = .637$, $p < .01$), R14 ($r = .409$, $p < .01$), R15 ($r = .593$, $p < .01$), R16 ($r = .604$, $p < .01$), R17 ($r = .418$, $p < .01$), R18 ($r = .469$, $p < .01$), R20 ($r = .266$, $p < .01$), R21 ($r = .262$, $p < .01$), R22 ($r = .305$, $p < .01$), R23 ($r = .427$, $p < .01$) and R24 ($r = .444$, $p < .01$).

R14 (Failure to assign appropriate work meeting the qualifications of the employee or Assignment work that does not meet the qualification of the employee) was positively correlated with R1 ($r = .292$, $p < .01$), R2 ($r = .310$, $p < .01$), R3 ($r = .222$, $p < .05$), R4 ($r = .257$, $p < .01$), R5 ($r = .287$, $p < .01$), R6 ($r = .346$, $p < .01$), R7 ($r = .485$, $p < .01$), R8 ($r = .308$, $p < .01$), R9 ($r = .402$, $p < .01$), R10 ($r = .279$, $p < .01$), R11 ($r =$

.309, $p < .01$), R12 (r = .348, p < .01), R13 ($r = .409$, $p < .01$), R15 ($r = .398$, $p < .01$), R16 ($r = .283$, $p < .01$), R17 ($r = .214$, $p < .05$), R18 ($r = .229$, $p < .05$), R19 ($r = .402$, $p < .01$), R20 ($r = .402$, $p < .01$), R21 ($r = .520$, $p < .01$), R22 ($r = .525$, $p < .01$), R23 ($r = .604$, $p < .01$) and R24 ($r = .398$, $p < .01$).

R15 (Failure to clearly instruct employees by determining proper working method) was positively correlated with R1 ($r = .241$, $p < .01$), R2 ($r = .257$, $p < .01$), R3 ($r = .304$, $p < .01$), R4 ($r = .318$, $p < .01$), R5 ($r = .474$, $p < .01$), R6 ($r = .484$, $p < .01$), R7 ($r = .325$, $p < .01$), R8 ($r = .540$, $p < .01$), R9 ($r = .577$, $p < .01$), R10 ($r = .460$, $p < .01$), R11 ($r = .465$, $p < .01$), R12 (r = .603, p < .01), R13 ($r = .593$, $p < .01$), R14 ($r = .398$, $p < .01$), R16 ($r = .415$, $p < .01$), R17 ($r = .495$, $p < .01$), R18 ($r = .444$, $p < .01$), R19 ($r = .224$, $p < .05$), R21 ($r = .282$, $p < .01$), R22 ($r = .323$, $p < .01$), R23 ($r = .319$, $p < .01$) and R24 ($r = .405$, $p < .01$).

R16 (Failure to provide a safe working environment by performing checks and audits in the workplace) was positively correlated with R1 ($r = .353$, $p < .01$), R2 ($r = .441$, $p < .01$), R3 ($r = .460$, $p < .01$), R4 ($r = .429$, $p < .01$), R5 ($r = .312$, $p < .01$), R6 ($r = .391$, $p < .01$), R8 ($r = .407$, $p < .01$), R9 ($r = .291$, $p < .01$), R10 ($r = .421$, $p < .01$), R11 ($r = .348$, $p < .01$), R12 (r = .484, p < .01), R13 ($r = .604$, $p < .01$), R14 ($r = .283$, $p < .01$), R15 ($r = .415$, $p < .01$), R17 ($r = .544$, $p < .01$), R18 ($r = .558$, $p < .01$), R20 ($r = .210$, $p < .05$), R21 ($r = .222$, $p < .05$), R22 ($r = .333$, $p < .01$), R23 ($r = .385$, $p < .01$) and R24 ($r = .303$, $p < .01$).

R17 (Failure to provide risk assessment and emergency action plan) was positively correlated with R1 ($r = .350$, $p < .01$), R2 ($r = .402$, $p < .01$), R3 ($r = .402$, $p < .01$), R4 ($r = .388$, $p < .01$), R5 ($r = .387$, $p < .01$), R6 ($r = .375$, $p < .01$), R7 ($r = .255$, $p < .01$), R8 ($r = .625$, $p < .01$), R9 ($r = .414$, $p < .01$), R10 ($r = .531$, $p < .01$), R11 ($r = .565$, $p < .01$), R12 (r = .413, p < .01), R13 ($r = .418$, $p < .01$), R14 ($r = .214$, $p < .05$), R15 ($r = .495$, $p < .01$), R16 ($r = .544$, $p < .01$), R18 ($r = .674$, $p < .01$), R22 ($r = .233$, $p < .01$), R23 ($r = .223$, $p < .05$) and R24 ($r = .334$, $p < .01$).

R18 (Not preparing and using OHS caution and warning signs in the workplace) was positively correlated with Where the participants work ($r = .188$, $p < .05$), R1 ($r =$

.241, $p < .01$), R2 (2 $r = .371$, $p < .01$), R3 ($r = .331$, $p < .01$), R4 ($r = .241$, $p < .01$), R5 ($r = .437$, $p < .01$), R6 ($r = .432$, $p < .01$), R7 ($r = .260$, $p < .01$), R8 ($r = .582$, $p < .01$), R9 ($r = .479$, $p < .01$), R10 ($r = .512$, $p < .01$), R11 ($r = .503$, $p < .01$), R12 (r = .443, p < .01), R13 ($r = .469$, $p < .01$), R14 ($r = .229$, $p < .05$), R15 ($r = .444$, $p < .01$), R16 ($r = .558$, $p < .01$), R17 ($r = .674$, $p < .01$), R20 ($r = .178$, $p < .05$), R22 ($r = .324$, $p < .01$), R23 ($r = .222$, $p < .05$) and R24 ($r = .404$, $p < .01$).

R19 (Incautiousness of employees) was positively correlated with Where the participants work ($r = .180$, $p < .05$), R6 ($r = .217$, $p < .05$), R7 ($r = .212$, $p < .05$), R14 ($r = .402$, $p < .01$), R15 ($r = .224$, $p < .05$), R20 ($r = .852$, $p < .01$), R21 ($r = .745$, $p < .01$), R22 ($r = .695$, $p < .01$), R23 ($r = .594$, $p < .01$) and R24 ($r = .369$, $p < .01$).

R20 (Employee's disregard of the work or carelessness) was positively correlated with R3 ($r = .178$, $p < .05$), R6 ($r = .201$, $p < .05$), R7 ($r = .272$, $p < .01$), R9 ($r = .183$, $p < .05$), R13 ($r = .266$, $p < .01$), R14 ($r = .402$, $p < .01$), R16 ($r = .210$, $p < .05$), R18 ($r = .178$, $p < .05$), R19 ($r = .852$, $p < .01$), R21 ($r = .687$, $p < .01$), R22 ($r = .610$, $p < .01$), R23 ($r = .546$, $p < .01$) and R24 ($r = .335$, $p < .01$).

R21 (Doing some work outside of the task or authority of the employee) was positively correlated with Experience of the participants ($r = -.248$, $p < .01$), R1 ($r = .192$, $p < .05$), R2 ($r = .226$, $p < .05$), R5 ($r = .274$, $p < .01$), R6 ($r = .282$, $p < .01$), R7 ($r = .401$, $p < .01$), R8 ($r = .247$, $p < .01$), R9 ($r = .304$, $p < .01$), R10 ($r = .215$, $p < .05$), R11 ($r = .259$, $p < .01$), R13 ($r = .262$, $p < .01$), R14 ($r = .520$, $p < .01$), R15 ($r = .282$, $p < .01$), R16 ($r = .222$, $p < .05$), R19 ($r = .745$, $p < .01$), R20 ($r = .687$, $p < .01$), R22 ($r = .718$, $p < .01$), R23 ($r = .641$, $p < .01$) and R24 ($r = .417$, $p < .01$).

R22 (Employee's acting against the instructions) was positively correlated with Where the Participants work ($r = .231$, $p < .01$), R2 ($r = .288$, $p < .01$), R3 ($r = .254$, $p < .01$), R5 ($r = .236$, $p < .01$), R6 ($r = .311$, $p < .01$), R7 ($r = .385$, $p < .01$), R8 ($r = .270$, $p < .01$), R9 ($r = .252$, $p < .01$), R10 ($r = .297$, $p < .01$), R11 ($r = .220$, $p < .05$), R12 ($r = .258$, $p < .01$), R13 ($r = .305$, $p < .01$), R14 ($r = .525$, $p < .01$), R15 ($r = .323$, $p < .01$), R16 ($r = .333$, $p < .01$), R17 ($r = .233$, $p < .01$), R18 ($r = .324$, $p < .01$), R19 ($r = .695$,

$p < .01$), R20 ($r = .610$, $p < .01$), R21 ($r = .718$, $p < .01$), R23 ($r = .743$, $p < .01$) and R24 ($r = .450$, $p < .01$).

R23 (Employee's inexperience, ignorance or lack of knowledge and ability) was positively correlated with Where the Participants work ($r = .178$, $p < .05$), R2 *(*$r = .240$, $p < .01$), R3 ($r = .286$, $p < .05$), R6 ($r = .340$, $p < .01$), R7 ($r = .394$, $p < .01$), R8 ($r = .177$, $p < .05$), R9 ($r = .290$, $p < .01$), R10 ($r = .280$, $p < .01$), R11 ($r = .186$, $p < .05$), R12 (r = .356, p < .01), R13 ($r = .427$, $p < .01$), R14 ($r = .604$, $p < .01$), R15 ($r = .319$, $p < .01$), R16 ($r = .385$, $p < .01$), R17 ($r = .223$, $p < .05$), R18 ($r = .222$, $p < .05$), R19 ($r = .594$, $p < .01$), R20 ($r = .546$, $p < .01$), R21 ($r = .641$, $p < .01$), R22 ($r = .743$, $p < .01$) and R24 ($r = .428$, $p < .01$).

R24 (Improper use of personal protective equipment by employee) was positively correlated with R2 ($r = .274$, $p < .01$), R3 ($r = .292$, $p < .01$), R5 ($r = .525$, $p < .01$), R6 ($r = .613$, $p < .01$), R7 ($r = .242$, $p < .01$), R8 ($r = .316$, $p < .01$), R9 ($r = .425$, $p < .01$), R10 ($r = .255$, $p < .01$), and R11 ($r = .311$, $p < .01$), R12 (r = .261, p < .01), R13 ($r = .444$, $p < .01$), R14 ($r = .398$, $p < .01$), R15 ($r = .405$, $p < .01$), R16 ($r = .303$, $p < .01$), R17 ($r = .334$, $p < .01$), R18 ($r = .404$, $p < .01$), R19 ($r = .369$, $p < .01$), R20 ($r = .335$, $p < .01$), R21 ($r = .417$, $p < .01$), R22 ($r = .450$, $p < .01$) and R23 ($r = .428$, $p < .01$).

Table 3.4. *Correlations Table*

		1	2	3	4	5	6	7	8	9	10	11	12	13
1	Where the Participants work	1												
2	Experience	-.004	1											
3	R1	-.083	.057	1										
4	R2	-.006	-.023	.708**	1									
5	R3	-.043	.140	.590**	.639**	1								
6	R4	.000	.096	.595**	.504**	.665**	1							
7	R5	.181*	.026	.374**	.442**	.340**	.246**	1						
8	R6	.218*	.031	.384**	.496**	.417**	.309**	.776**	1					
9	R7	.081	-.052	.146	.245**	.159	.148	.345**	.281**	1				
10	R8	.138	.111	.482**	.396**	.348**	.448**	.510**	.493**	.281**	1			
11	R9	.131	-.039	.231*	.284**	.216*	.264**	.439**	.458**	.344**	.636**	1		
12	R10	.037	.173	.292**	.337**	.307**	.288**	.342**	.377**	.272**	.650**	.654**	1	
13	R11	.134	.001	.217*	.244**	.173	.142	.439**	.311**	.467**	.571**	.522**	.525**	1

Correlation is significant at the 0.05 level (2-tailed).

Correlation is significant at the 0.01 level (2-tailed).

Correlation Table (continued)

		1	2	3	4	5	6	7	8	9	10	11	12	13
14	R12	.105	.131	.202*	.315**	.358**	.391**	.312**	.338**	.385**	.393**	.420**	.482**	.421**
15	R13	.043	.039	.305**	.372**	.396**	.386**	.427**	.512**	.291**	.483**	.501**	.505**	.376**
16	R14	.053	-.011	.292**	.310**	.222*	.257**	.287**	.346**	.485**	.308**	.402**	.279**	.309**
17	R15	.134	.090	.241**	.257**	.304**	.318**	.474**	.484**	.325**	.540**	.577**	.460**	.465**
18	R16	.041	-.057	.353**	.441**	.460**	.429**	.312**	.391**	.142	.407**	.291**	.421**	.348**
19	R17	.082	.107	.350**	.402**	.402**	.388**	.387**	.375**	.255**	.625**	.414**	.531**	.565**
20	R18	.188*	.015	.241**	.371**	.331**	.241**	.437**	.432**	.260**	.582**	.479**	.512**	.503**
21	R19	.180*	-.156	.057	.089	.075	.036	.157	.217*	.212*	.083	.152	.046	-.038
22	R20	.148	-.151	.060	.130	.178*	.112	.169	.201*	.272**	.141	.183*	.157	.071
23	R21	.130	-.248**	.192*	.226*	.142	.116	.274**	.282**	.401**	.247**	.304**	.215*	.259**
24	R22	.231**	-.009	.127	.288**	.254**	.137	.236**	.311**	.385**	.270**	.252**	.297**	.220*
25	R23	.178*	-.081	.115	.240**	.186*	.135	.176	.340**	.394**	.177*	.290**	.280**	.186*
26	R24	.150	.009	.152	.274**	.292**	.154	.525**	.613**	.242**	.316**	.425**	.255**	.311**

Correlation is significant at the 0.05 level (2-tailed).

Correlation is significant at the 0.01 level (2-tailed).

Correlation Table (continued)

		14	15	16	17	18	19	20	21	22	23	24	25	26
14	R12	1												
15	R13	.637**	1											
16	R14	.348**	.409**	1										
17	R15	.603**	.593**	.398**	1									
18	R16	.484**	.604**	.283**	.415**	1								
19	R17	.413**	.418**	.214*	.495**	.544**	1							
20	R18	.443**	.469**	.229*	.444**	.558**	.674**	1						
21	R19	.076	.149	.402**	.224*	.122	.072	.138	1					
22	R20	.158	.266**	.402**	.153	.210*	.097	.178*	.852**	1				
23	R21	.155	.262**	.520**	.282**	.222*	.154	.140	.745**	.687**	1			
24	R22	.258**	.305**	.525**	.323**	.333**	.233**	.324**	.695**	.610**	.718**	1		
25	R23	.356**	.427**	.604**	.319**	.385**	.223*	.222*	.594**	.546**	.641**	.743**	1	
26	R24	.261**	.444**	.398**	.405**	.303**	.334**	.404**	.369**	.335**	.417**	.450**	.428**	1

Correlation is significant at the 0.05 level (2-tailed).

Correlation is significant at the 0.01 level (2-tailed).

3.3. Analysis of Variance (ANOVA) Test of Assessment of Scores

3.3.1. According to Experiences of Participants

It was observed that R16 "Failure to provide a safe working environment by performing checks and audits in the workplace" got the highest importance score from the participants who has 1-6 years' experience. R4 "Failure to ensure that working at height is carried out by using appropriate collective protection equipment" got the highest score from the participants who have 7-10 years' experience. R6 "Failure to properly use personal protective equipment by employees" got the highest score from the participants who have more than 10 years' experience. R7 "Negligence or error of third person or institutions other than casualty or employer (subcontractor)" had the lowest score from all of the groups (see Figure 3.1. and Table 3.5.).

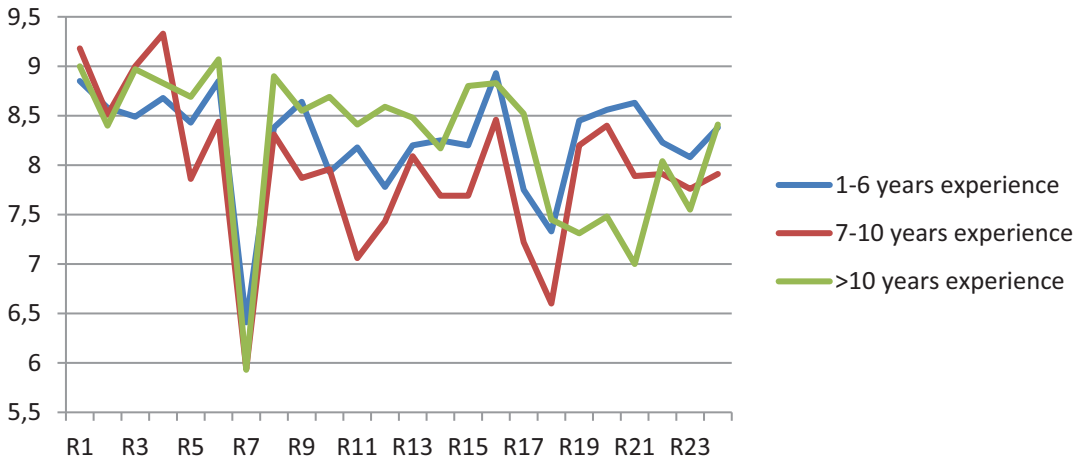

Figure 3.1. Mean Values According to Experiences of Participant

Table 3.5. *ANOVA test of accident reasons according to experiences of participants*

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24
1-6 years experience	8.85	8.58	8.49	8.68	8.43	8.85	6.41	8.38	8.64	7.93	8.18[a]	7.78[a]	8.20	8.25	8.20[a]	8.93	7.75[a]	7.33	8.45	8.56	8.63[ab]	8.23	8.08	8.38
7-10 years experience	9.18	8.51	9.00	9.33	7.86	8.44	5.94	8.31	7.87	7.96	7.06[ab]	7.43[ab]	8.09	7.69	7.69[ab]	8.46	7.22[ab]	6.60	8.20	8.40	7.89[a]	7.91	7.76	7.91
>10 years experience	9.00	8.40	8.97	8.83	8.69	9.07	5.93	8.9	8.55	8.69	8.41[ac]	8.59[ac]	8.48	8.17	8.80[ac]	8.83	8.52[ac]	7.45	7.31	7.48	7.00[ac]	8.04	7.55	8.41
F	0.67	0.09	1.22	2.43	2.41	1.51	0.45	1.06	2.68	1.88	4.53	4.46	0.44	1.10	3.65	1.35	3.95	1.98	2.36	2.50	5.29	0.27	0.53	0.91

Variance (ANOVA) test was carried out according to the participants' experiences on OHS. Participants were significantly different on R11, R12, R15, R17 and R21 dimensions.

The groups were significantly different from each other in R11 ($F(2, 121) = 4.53$, $p = .013$). Participants who have 7-10 years' experience in OHS area gave lower importance to R11 than participants who have more than 10 years' experience in OHS area ($p = .03$). 1-6 years' experience and 7-10 years' experience ($p = 0.057$) and 1-6 years' experience and more than 10 years' experience ($p = 1.00$) were not significantly different from each other.

The groups were significantly different from each other in R12 ($F(2, 121) = 4.46$, $p = .014$). Participants who have 7-10 years' experience in OHS area gave lower importance to R12 than participants who have more than 10 years' experience in OHS area ($p = .01$). 1-6 years' experience and 7-10 years' experience ($p = 0.973$) and 1-6 years' experience and more than 10 years' experience ($p = .155$) were not significantly different from each other.

The groups were significantly different from each other in R15 ($F(2, 122) = 3.65$, $p = .029$). Participants who have 7-10 years' experience in OHS area gave lower importance to R15 than participants who have more than 10 years' experience in OHS area ($p = .025$). 1-6 years' experience and 7-10 years' experience ($p = .526$) and 1-6 years' experience and more than 10 years' experience ($p = .544$) were not significantly different from each other.

The groups were significantly different from each other in R17 ($F(2, 122) = 3.95$, $p = .022$). Participants who have 7-10 years' experience in OHS area gave lower importance to R17 than participants who have more than 10 years' experience in OHS area ($p = .018$). 1-6 years' experience and 7-10 years' experience ($p = .623$) and 1-6 years' experience and more than 10 years' experience ($p = .366$) were not significantly different from each other.

The groups were significantly different from each other in R21 ($F(2, 121) = 5.29$, $p = .006$). Participants who have more than 10 years' experience in OHS area gave lower

importance to R21 than participants who have 1-6 years' experience in OHS area (p = .004). 1-6 years' experience and 7-10 years' experience (p = .262) and 7-10 years' experience and more than 10 years' experience (p = .182) were not significantly different from each other.

The differences between groups were not significant for R1 ($F(2, 121) = .67, p = .513$), R2 ($F(2, 121) = .09, p = .914$), R3 ($F(2, 122) = 1.22, p = .3$), R4 ($F(2, 120) = 2.43, p = .092$), R5 ($F(2, 121) = 2.41, p = .094$), R6 ($F(2, 121) = 1.51, p = .226$), R7 ($F(2, 118) = .45, p = .637$), R8 ($F(2, 121) = 1.06, p = .35$), R9 ($F(2, 120) = 2.68, p = .073$, R10 ($F(2, 121) = 1.88, p = .157$), R13 ($F(2, 121) = .44, p = .648$), R14 ($F(2, 122) = 1.1, p = .337$), R16 ($F(2, 122) = 1.35, p = .262$), R18 ($F(2, 121) = 1.98, p = .143$), R19 ($F(2, 120) = 2.36, p = .099$), R20 ($F(2, 121) = 2.5, p = .087$), R22 ($F(2, 121) = .27, p = .766$, R23 ($F(2, 121) = .53, p = .591$), R24 ($F(2, 121) = .91, p = .407$)**.**

As the comparison results of the participants' scores to the accidents according to their experience on OHS by using ANOVA test; 5 over 24 reasons were found significantly different from each other. It was observed that for other 19 accident reasons, the experience factor didn't affect much the way participants evaluated the reasons.

3.3.2. According to Where the Participants Work

It was observed that R7 “Negligence or error of third person or institutions other than casualty or employer (subcontractor)” had the lowest score from all of the groups. R1 “Failure to provide all kinds of machines, tools, equipment, materials and working methods in accordance with the work and legislation” got the highest importance score from both the participants who work in state agencies and universities. R4 “Failure to ensure that working at height is carried out by using appropriate collective protection equipment” got the highest score from the participants who work in private sector (see Figure 3.2. and Table 3.6.).

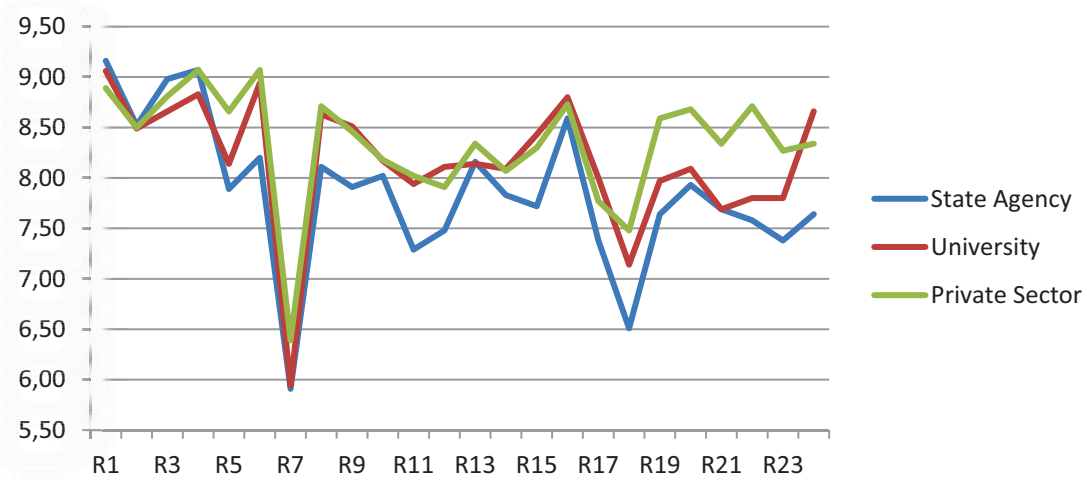

Figure 3.2. Mean Values According to Where the Participants Work

Table 3.6. *ANOVA test of accident reasons according to where the participants work*

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24
State Agency	9.16	8.52	8.98	9.07	7.89	8.20[ab]	5.91	8.11	7.91	8.02	7.29	7.48	8.16	7.83	7.72	8.59	7.38	6.51	7.64	7.93	7.69	7.58[ab]	7.38	7.64
University	9.06	8.49	8.66	8.83	8.14	8.94[a]	5.94	8.63	8.51	8.17	7.94	8.11	8.14	8.09	8.43	8.80	8.00	7.14	7.97	8.09	7.69	7.80[a]	7.80	8.66
Private Sector	8.89	8.50	8.81	9.07	8.66	9.07[ac]	6.39	8.71	8.46	8.18	8.02	7.91	8.34	8.07	8.30	8.73	7.77	7.48	8.59	8.68	8.34	8.71[ac]	8.27	8.34
F	0.42	0.01	0.37	0.31	2.12	3.47	0.47	1.37	1.50	0.10	1.31	1.42	0.15	0.23	1.78	0.22	0.94	2.27	2.06	1.49	1.36	3.79	1.99	2.88

Variance (ANOVA) test was carried out according to where the participants work. Participants were significantly different on R6 and R22 dimensions.

The groups were significantly different from each other in R6 ($F(2, 121) = 3.47$, $p = .034$). Participants who work for State Agencies gave lower importance to R6 than the ones who work at Private sector ($p = .046$). The opinions of the participants who work at Universities and Private sector ($p = 1.00$), and State Agencies and Universities ($p = .15$) were not significantly different from each other.

The groups were significantly different from each other in R22 ($F(2, 121) = 3.79$, $p = .025$). Participants who work for State Agencies gave lower importance to R22 than the ones who work at Private Sector ($p = .029$). The opinions of the participants who work at Universities and Private sector ($p = .152$), and State Agencies and Universities ($p = 1.00$) were not significantly different from each other.

The differences between groups were not significant for R1 ($F(2, 121) = .43$, $p = .655$), R2 ($F(2, 121) = .01$, $p = .995$), R3 ($F(2, 122) = .37$, $p = .695$), R4 ($F(2, 120) = .31$, $p = .736$), R5 ($F(2, 121) = 2.12$, $p = .125$), R7 ($F(2, 118) = .47$, $p = .628$), R8 ($F(2, 121) = 1.37$, $p = .258$), R9 ($F(2, 120) = 1.50$, $p = .228$), R10 ($F(2, 121) = .10$, $p = .902$), R11 ($F(2, 121) = 1.31$, $p = .275$), R12 ($F(2, 120) = 1.42$, $p = .245$), R13 ($F(2, 121) = .15$, $p = .858$), R14 ($F(2, 122) = .23$, $p = .795$), R15 ($F(2, 122) = 1.78$, $p = .174$), R16 ($F(2, 122) = .22$, $p = .803$), R17 ($F(2, 121) = .94$, $p = .394$), R18 ($F(2, 121) = 2.27$, $p = .108$), R19 ($F(2, 120) = 2.06$, $p = .132$), R20 ($F(2, 121) = 1.49$, $p = .230$), R21 ($F(2, 121) = 1.38$, $p = .262$, R23 ($F(2, 121) = 1.99$, $p = .142$), R24 ($F(2, 121) = 2.88$, $p = .06$).

As the comparison results of the participants' scores to the accidents according to where they work; only 2 over 24 reasons were found significantly different from each other. It was observed that for other 22 accident reasons, where the participants work didn't affect much the way participants evaluated the reasons.

3.4. Factor Analysis

The principal component analysis (PCA) with Promax rotation technique was carried out. The Kaiser-Meyer Olkin Measure that indicates the sampling adequacy was .858 and the Barlett's test of sphericity, that shows the correlation matrix produced by the items is factorable, was significant (df = 276, $p < .001$). Twenty-four factors were entered. Among 24 items R7, R16 and R24 were eliminated, as they were cross-loaded into two factors.

The PCA with promax rotation yielded a three-factor solution for the ARIS with remaining 21 items. The three factors explained the 59.76 % of the total variance (see Table 3.7.).

The first factor was composed of 11 items, which were about the organizational or managerial accident reasons. The factor was named as "Organizational or Managerial Reasons". The communalities ranged between .460 and .651. The item with the highest communality value was R8 "Failure to provide working at height training for employees". The initial eigenvalue of the first factor was 9.21 and explained 38.39 % of the variance.

The second factor was composed of 6 items, which were about the accident reasons which were occurred because of the employees who cause the accident themselves. So, the factor was named as "Personal Reasons". The communalities ranged between .490 and .806. The item with the highest communality value was R19 "Incautiousness of employees". The initial eigenvalue of the second factor was 3.18 and explained 13.26 % of the variance.

The third factor was composed of 4 items which were about the environmental accident reasons. So, the factor was named as "Environmental Reasons". The communalities ranged between .651 and .725. The item with the highest communality value was R4 "Failure to ensure that working at height is carried out by using appropriate collective protection equipment". The initial eigenvalue of the third factor was 1.95 and explained 8.12 % of the variance.

Table 3.7. *Factor Analysis on Accident Reasons*

	Component			
	A	B	C	
	(O/MR)	(PR)	(ER)	Communalities
R11	.918			.612
R9	.874			.631
R10	.794			.566
R15	.762			.574
R8	.755			.651
R18	.754			.556
R17	.692			.566
R12	.657			.471
R13	.612			.559
R5	.558			.460
R6	.452			.508
R7	.441*	.346*		.352
R24	.413*	.361*		.423
R19		.970		.806
R21		.886		.761
R20		.880		.694
R22		.830		.736
R23		.771		.669
R14		.551		.490
R1			.896	.714
R3			.874	.694
R4			.830	.725
R2			.812	.651
R16	.378*		.380*	.471

Note: The factor "Organizational or Managerial Reasons" is represented as O/MR.
The factor "Personal Reasons" is represented as PR.
The factor "Environmental Reasons" is represented as ER.
*Item which was cross-loaded into two factors.

3.5. Analysis of Variance (ANOVA) Test of Accident Reasons' Importance Scale Factors

Table 3.8. *ANOVA Test of Accident Reasons' Importance Scale Factors*

		M	*p*	*F*
A (O/MR)	State Agency	7.72	.210	2.00
	University	8.20		
	Private Sector	8.26		
	Total	8.05		
B (PR)	State Agency	7.73	.867	2.04
	University	7.91		
	Private Sector	8.44		
	Total	8.03		
C (ER)	State Agency	8.90	.789	.113
	University	8.76		
	Private Sector	8.81		
	Total	8.83		

Three groups\factors which were derived from the factor analysis of 24 items were run ANOVA test. The differences between groups were not significant for any of factors: O/MR ($F(2, 122) = 2.00$, $p = .139$), PR ($F(2, 122) = 2.04$, $p = .135$) and E ($F(2, 122) = .113$, $p = .893$).

CHAPTER 4

DISCUSSION

4.1. Overview

In this study, it is aimed to observe if participants have different perspectives to the accident reasons or not according to two characteristics; their work experiences on OHS and in which sector they work.

In the following section, the summary and discussion of the results in terms of descriptive analyses, correlation results, assessment of scores by using ANOVA tests and factor analysis are discussed. In addition to these, the contributions of the present study, limitations and suggestions for future studies are also addressed.

4.2. Summary and Discussion of the Results

Because falling from a height is one of the most common forms of occupational accidents resulting in fatalities in Turkey and all around the world, this study was based on occupational accidents in the form of falls from a height. For the study, 100 inspection reports of occupational accidents that happened as falling from a height were examined and 24 items were listed as reasons for those accidents. AEF was created with the approval of two senior OHS experts and the supervisor of this thesis study. 125 participants who were all OHS professionals from different sectors with different experience durations evaluated those 24 reasons via AEFs. After converting the results of AEFs into the AET, the results were analyzed with a statistic program. In the end, it was observed; if work experience of the participant or where the participant works affected their aspect of evaluation of the accident reasons.

4.2.1. Discussion of Descriptive Analyses

All the researches were examined in two contexts:

- according to experience of the participant
- where the participant works

As the mean values are the average values that the participants gave to an accident reason and the standard deviation values show how spread out the data set around this mean values; It was observed from the Table 3.2. and Table 3.3. that; the groups gave similar importance to most of the accident reasons. The values went parallel in general. The groups were homogeneous and the members of the groups had the same approach to the accident reasons.

Groups' evaluations went parallel in general. R7 "Negligence or error of third person or institutions other than casualty or employer (subcontractor)" and R18 "Not preparing and using OHS caution and warning signs in the workplace" were given the lowest scores in both contexts, from all groups. The research in terms of frequency revealed R7 as the least frequent accident reason occurring in 6 of 100 cases. Also, R18 was 4th from last in terms of frequency (see Table 2.2. and Table 2.3.). As R7 and R18 were rare cases, participants might have given lower scores to them.

4.2.2. Discussion of Correlations (past tense)

According to the correlation results, there were found 47 strong correlations, 115 moderate correlations and 78 weak correlations in general. Strong correlations examined in this topic.

Although Where the Participants work has not positively or negatively strong correlation with any other matters, it has positively and moderate correlation with R6 "Failure to properly use personal protective equipment by employees" ($r = .218$, $p < .05$) and R22 "Employee's acting against the instructions" ($r = .231$, $p < .01$).

It is expressed that the incidence of severe injuries at the workplace decreases more than 25 per cent when personal safety equipment is used (Jarl, 1989). It can be detected

that making the employees use their PPEs by solving those two accident reasons would reduce the severity of the accidents. This situation increases those accident reasons' importance.

Experience has not positively or negatively strong correlation with any other matters. But, according to experiences of the participants, correlation analyzes followed a parallel course with ANOVA test in terms of negative and moderate correlation.

Experience factor is found negatively correlated with R21 "Doing some work outside of the task or authority of the employee" ($r = .262$, $p < .01$) as it is significant in ANOVA test, too.

R1 "Failure to provide all kinds of machines, tools, equipment, materials and working methods in accordance with the work and legislation" was positively and strongly correlated with R2 "Failure to periodically control of the used machinery, vehicles, equipment, materials and working methods", R3 "(Access Roads, Vehicles and Platforms and Passages between Floors, etc.) Failure to eliminate falling risk in passings" and R4 "Failure to ensure that working at height is carried out by using appropriate collective protection equipment". In the title 2.2.2. Categorization and Frequencies of Accident Reasons, R1, R2, R3 and R4 those were delivered as environmental reasons. Also, in the factor analysis of this study, those four accident reasons were the items which were yielded in factor C: Environmental Reasons. These alignments showed that four accident reasons were correlated as all of them were environmental. Those four accident reasons were not strongly correlated with any other reasons in other categories.

R5 "Failure to provide personal protective equipment to employees" was positively and strongly correlated with R6 "Failure to properly use personal protective equipment by employees", R8 "Failure to provide working at height training for employees" and R24 "Improper use of personal protective equipment by employee". Proper usage of PPEs is a very important topic on OHS. It is expressed that the incidence of severe injuries at the workplace decreases more than 25 per cent when personal safety equipment is used (Jarl, 1989). In the factor analysis of this study,

except from R24, other three of those four accident reasons were the items which were yielded in factor A: Organizational or Managerial Reasons. This alignment showed that R5, R6 and R8 were correlated as all of them were organizational or managerial reasons. Considering the teaching proper usage of PPE was a part of working at height trainings. This situation showed that R24 was also related to proper usage of PPEs.

R6 “Failure to properly use personal protective equipment by employees” was positively and strongly correlated with R13 “Failure to conduct the study under the supervision and control of a competent person” and R24 “Improper use of personal protective equipment by employee”. As R6 and R24 were directly related to proper usage of PPEs, there was a significant relation between those two accident reasons. Beside many of other benefits, conducting study under the supervision provides the proper usage of PPEs by employees. This may be the reason R6 was found correlated with R13.

R8 “Failure to provide working at height training for employees” was positively and strongly correlated with R9 “Failure to provide vocational training to employees”, R10 “Inadequate OHS training for employees”, R11 “Lack of essential health report of employees”, R15 “Failure to clearly instruct employees by determining proper working method”, R17 “Failure to provide risk assessment and emergency action plan” and R18 “Not preparing and using OHS caution and warning signs in the workplace”. R8, R9 and R10 were directly related to employees’ trainings. Turkmen’s study reveals that 24.58% of total accidents in construction sector happens because of the lack of OHS, start-up and vocational trainings and those reasons are evaluated as three of twelve underlying reasons of accident in construction sector (Türkmen, 2016). According to OHS legislation in Turkey, employers are obligated to take all precautions including supplying protective equipment, training and information for employees (Law no.6331, 2012). In the title 2.2.2. Categorization and Frequencies of Accident Reasons, R8, R9, R10, R11, R15, R17 and R18 were delivered as organizational reasons. Also, in the factor analysis of this study, those seven accident reasons were the items, which were yielded in factor A: Organizational or Managerial

Reasons. These alignments showed that those four accident reasons were correlated, as all of them were organizational or managerial reasons.

R9 “Failure to provide vocational training to employees”, R10 “Inadequate OHS training for employees” and R12 “Management uncoordination in studies” were positively and strongly correlated with R13 “Failure to conduct the study under the supervision and control of a competent person”. In addition to the aforementioned study of Türkmen on trainings; establishing a proper OHS organization, set-up and ensuring participation of employees in OHS activities are obligations of employers (Law no.6331, 2012). In the title 2.2.2. Categorization and Frequencies of Accident Reasons, R9, R10, R12 and R13 were delivered as organizational reasons. Also, in the factor analysis of this study, those accident reasons were the items which were yielded in factor A: Organizational or Managerial Reasons. These alignments showed that those accident reasons were correlated, as all of them were organizational or managerial reasons.

R13 “Failure to conduct the study under the supervision and control of a competent person” was positively and strongly correlated with R15 “Failure to clearly instruct employees by determining proper working method” and R16 “Failure to provide a safe working environment by performing checks and audits in the workplace”. In the title 2.2.2. Categorization and Frequencies of Accident Reasons, R13, R15 and R16 were delivered as organizational reasons. Also, in the factor analysis of this study, those three accident reasons were also yielded in factor A: Organizational or Managerial Reasons. This situation is expounded that supervision, control, check, instruct and audit were necessary actions for a safe work environment. Providing those are also the duty of employee as the factor analysis and OHS Law no.6331 pointed out.

R14 “Failure to assign appropriate work meeting the qualifications of the employee or assignment work that does not meet the qualification of the employee” was positively and strongly correlated with R21 “Doing some work outside of the task or authority of the employee”, R22 “Employee’s acting against the instructions” and R23

“Employee's inexperience, ignorance or lack of knowledge and ability”. According to Heinrich; 88% of occupational accidents are caused by unsafe acts of persons, 10% of them are caused by unsafe equipment and 2% inevitable (Heinrich, 1931). Although it was a start of thinking how to make systems and people safer, now some other theoreticians claim that the main accident reasons are not because of employees’ fault, they are system’s or management’s fault, (Deming, 1986). In either way there is always a human factor in the accidents. In the title 2.2.2. Categorization and Frequencies of Accident Reasons, R21, R22 and R23 were delivered as personal reasons. In the factor analysis of this study, R14 was also yielded in factor B: Personal Reasons as other items R21, R22 and R23 were yielded in the same factor. These alignments showed that those accident reasons were correlated, as all of them were personal reasons.

Similarly R19 “Incautiousness of employees” was positively and strongly correlated with R20 “Employee’s disregard of the work or carelessness”, R21 “Doing some work outside of the task or authority of the employee”, R22 “Employee’s acting against the instructions” and R23 “Employee's inexperience, ignorance or lack of knowledge and ability”. In the title 2.2.2. Categorization and Frequencies of Accident Reasons, R19, R20, R21, R22 and R23 were delivered as personal reasons. Also, in the factor analysis of this study, these five accident reasons were yielded in factor B: Personal Reasons. These alignments showed that those accident reasons were correlated, as all of them were personal reasons.

4.2.3. Discussion of the Analysis of Variance (ANOVA) Test of Assessment Scores

4.2.3.1. According to Experiences of Participants

In the title 2.2.2. Categorization and Frequencies of Accident Reasons, R7 was delivered as the least frequent accident reason. Rare cases may be considered less important by the participants. This may be the reason it got the lowest score from all participants’ groups.

In OHS literature related to construction sector “Inadequate audit and supervision” and “Lack of collective protection measurements” were revealed as two most common

occurred accident reasons (Taşdöken, 2015). Also "Employees' unwilling to use necessary equipment with some excuses" and "Lack of personal and collective preventive measurements" were suggested as the most important reasons for the accidents in construction sector (Hergüner, 2013).

Similar to those studies, the current study shows that R4 "Failure to ensure that working at height is carried out by using appropriate collective protection equipment", R6 "Failure to properly use personal protective equipment by employees" and R16 "Failure to provide a safe working environment by performing checks and audits in the workplace" got the highest importance scores from the groups.

As participants' scores to the accidents were compared according to their experience on OHS by using ANOVA test, participants were significantly different on 5 of 24 accident reasons which were; R11 "Lack of Essential Health Report of Employees", R12 "Management uncoordination in studies", R15 "Failure to clearly instruct employees by determining proper working method", R17 "Failure to provide risk assessment and emergency action plan" and R21 "Doing some work outside of the task or authority of the employee". For other 19 accident reasons, the experience factor didn't affect much the way participants evaluated the reasons. This means participants with different work experiences on OHS have similar approaches to the cases.

According to the Analysis of Variance (ANOVA) test; participants who have 7-10 years' experience in OHS area gave lower importance to R11 "Lack of essential health report of employees" than participants who have more than 10 years' experience in OHS area. The reason of this may be; participants who have 7-10 years' experience may think; comparing with other accident reasons, Health Report is not very necessary to prevent occupational accidents. Participants who have more than 10 years' experience may think that; providing health report is a primer and legally mandatory document and it indicates all safety measurements are probably neglected, too. Also, as most of them started to work on OHS area before the legislation was regulated on this way. (6331-4-ç) Since then, the number of lack of essential health report of employee cases may be decreased.

Participants who have 7-10 years' experience in OHS area also gave significantly lower importance to R12 "Management uncoordination in studies" than participants who have more than 10 years' experience in OHS area. This variance between two groups with different experience durations may be because the participants with more than 10 years' experience have witnessed more occupational accidents which happened because of lack of coordination in management. Also, with OHS regulation dated 29 December 2012 which says providing coordination and cooperation is an obligation of employers, participants who are that generation's members haven't experience as many accidents with this reason as the participants who have more than 10 years' experience (ÇSGB, 2012). Since then, the number of occupational accidents which happens because of Management uncoordination in studies may be decreased.

The results of ANOVA show that participants who have 7-10 years' experience in OHS area gave lower importance to R15 "Failure to clearly instruct employees by determining proper working method" than participants who have more than 10 years' experience in OHS area. This variance between the groups may be because the participants with more than 10 years' experience have witnessed more occupational accidents which happened because of failure to clearly instruct employees by determining proper working method. The reason of this situation may be because with the law numbered 6331, employers are obligated to give proper instructions to employees (Law no.6331, 2012). Also with the article 19 (2), the employees are obligated to follow the instructions of employers (Law no.6331, 2012). Since then, the number of occupational accidents which happens because of failure to clearly instruct employees by determining proper working method may be decreased.

Participants who have 7-10 years' experience in OHS area gave lower importance to R17 "Failure to provide risk assessment and emergency action plan" than participants who have more than 10 years' experience in OHS area. The reason of this situation may be because after the law numbered 6331 came into force, risk assessment and emergency action plan became mandatory and this may decreased the accidents which happen because of not providing risk assessment and emergency action plan. So

participants with much experience may give more importance as they experienced more cases happens that way (Law no.6331, 2012).

Participants who have more than 10 years' experience in OHS area gave lower importance to R21 "Doing some work outside of the task or authority of the employee" than participants who have 1-6 years' experience in OHS area. Construction sector where falls from height usually occur is one of the most common sectors that unskilled employers work with no diploma or license. Before the Law No. 5544 on Vocational Qualifications Authority (VQA) came into force on 21st of September in 2006 and then the law No.6331 on OHS came into force on 1st of January 2013; it was very common to see an employee without any qualification documented or not working in the construction. This may be the reason the participants with more than 10 years' experience don't give as much importance as the participants who have 1-6 years' experience give.

It is observed that for other 19 accident reasons, the experience factor didn't affect much the way participants evaluated the reasons. The differences between groups were not significant for R1 "Failure to provide all kinds of machines, tools, equipment, materials and working methods in accordance with the work and legislation", R2 "Failure to periodically control of the used machinery, vehicles, equipment, materials and working methods", R3 "(Access Roads, Vehicles and Platforms and Passages between Floors, etc.) Failure to eliminate falling risk in passings", R4 "Failure to ensure that working at height is carried out by using appropriate collective protection equipment", R5 "Failure to provide personal protective equipment to employees", R6 "Failure to properly use personal protective equipment by employees", R7 "Negligence or error of third person or institutions other than casualty or employer (subcontractor)", R8 "failure to provide working at height training for employees", R9 "Failure to provide vocational training to employees", R10 "Inadequate OHS training for employees", R13 "Failure to conduct the study under the supervision and control of a competent person", R14 "Failure to assign appropriate work meeting the qualifications of the employee or assignment work that does not meet the qualification of the employee", R16 "Failure to provide a safe working environment by performing

checks and audits in the workplace", R18 "Not preparing and using OHS caution and warning signs in the workplace", R19 "Incautiousness of employees", R20 "Employee's disregard of the work or carelessness", R22 "Employee's acting against the instructions", R23 "Employee's inexperience, ignorance or lack of knowledge and ability" and R24 "improper use of personal protective equipment by employee". This may be a sign of people are becoming to have the same perspective and sensitivity about OHS.

4.2.3.2. According to Where the Participants Work

In title 2.2.2. Categorization and Frequencies of Accident Reasons, R7 was delivered as the least frequent accident reason. This showed that rare cases may be considered less important by the participants, as seen in the previous chapter. This may be the reason it got the lowest score from all participants' groups.

In Taşdöken's study one of the most frequent accident reasons was revealed as "Lack of collective protection measurements" (Taşdöken, 2015). Also in Hergüner's study, "Failure to ensure that working at height is carried out by using appropriate collective protection equipment" was defined as one of the most important accident reasons (Hergüner, 2013). Relevantly, the current study shows R4 "Failure to ensure that working at height is carried out by using appropriate collective protection equipment" got the highest score from the participants who work in private sector.

Additionally, as participants' scores to the accidents were compared according to where the participants work by ANOVA test, participants were significantly different on 2 of 24 accident reasons; R6 "Failure to properly use personal protective equipment by employees" and R22 "Employee's acting against the instructions". For other 22 accident reasons, where the participants work didn't affect much the way participants evaluated the reasons. This means participants from different workplaces had similar approaches to the cases.

Although at other accident reasons about using PPE; R5 "Failure to provide personal protective equipment to employees" and R24 "Improper use of personal protective

equipment by employee", there were no difference on the evaluations; participants who work for State Agencies gave lower importance to R6 "Failure to properly use personal protective equipment by employees" than the ones who work at Private Sector. It is a fact that failure of using PPE is a major accident reason. It seems the occupational safety experts think making the employees use PPE is an important responsibility of mostly employers themselves.

Also, the groups were significantly different from each other in R22 "Employee's acting against the instructions". Participants who work for State Agencies gave lower importance to R22 "Employee's acting against the instructions" than the ones who work at Private Sector. As the participants from the private sector experience the daily working life, they may have experienced employees acting against the instructions.

The differences between groups were not significant for R1 "Failure to provide all kinds of machines, tools, equipment, materials and working methods in accordance with the work and legislation", R2 "Failure to periodically control of the used machinery, vehicles, equipment, materials and working methods", R3 "(Access Roads, Vehicles and Platforms and Passages between Floors, etc.) Failure to eliminate falling risk in passings", R4 "Failure to ensure that working at height is carried out by using appropriate collective protection equipment", R5 "Failure to provide personal protective equipment to employees", R7 "Negligence or error of third person or institutions other than casualty or employer (subcontractor)", R8 "Failure to provide working at height training for employee", R9 "failure to provide vocational training to employees", R10 "Inadequate OHS training for employees", R11 "Lack of essential health report of employees", R12 "Management uncoordination in studies", R13"Failure to conduct the study under the supervision and control of a competent person", R14 "Failure to assign appropriate work meeting the qualifications of the employee or assignment work that does not meet the qualification of the employee", R15 "Failure to clearly instruct employees by determining proper working method", R16 "Failure to provide a safe working environment by performing checks and audits in the workplace", R17 "Failure to provide risk assessment and emergency action plan", R18 "Not preparing and using OHS caution and warning signs in the

workplace", R19 "Incautiousness of employees", R20 "Employee's disregard of the work or carelessness", R21 "Doing some work outside of the task or authority of the employee", R23 "Employee's inexperience, ignorance or lack of knowledge and ability" and R24 "Improper use of personal protective equipment by employee".

Considering participants from State Agencies as the lawgiver and law enforcement side, universities as theoretical side and Private sector as practical side is not a very long shot. These three pots are essential to keep OHS up. As the comparison results of the participants' scores to the accidents according to where they work; only 2 over 24 reasons were found significantly different from each other. It is observed that for other 22 accident reasons, where the participants work, didn't affect much the way participants evaluated the reasons. It showed three pots of OHS had similar point of view on OHS cases.

4.2.4. Discussion of Factor Analysis

According to the factor analysis; R5, R6, R7 and R14 are not in the same groups as they were categorized in the title 2.2.2. Categorization and Frequencies of Accident Reasons. Also, from the factor analysis, it is observed that there are three variables who is under influence of more than one factor; R7, R16 and R24.

As R5 "Failure to provide personal protective equipment to employees" was considered as an environmental reason in Table 2.2., it is under Column B: Organizational Reasons in Table 3.7.. The reason of this may be; R5 can also be thought as a managerial accident reason as the management is legally obligated to provide PPE to all employees.

As R6 "Failure to properly use personal protective equipment by employees" was considered as an environmental reason in Table 2.2.. Categorization and Frequencies of Accident Reasons, it is under Column B: Organizational Reasons in Table 3.7.. The reason of this may be R6 can also be thought as a managerial accident reason as the management is legally obligated to provide PPEs to all employees and make employees to use those PPEs in the right way.

As R7 “Negligence or error of third person or institutions other than casualty or employer (subcontractor)” was considered as an environmental reason in Table 2.2., it is under both of Column B: Organizational and Column C: Personal Reasons in Table 3.7.. The reason of this may be R7 can be thought as a managerial accident reason as the management is legally obligated to provide safe work environment. Also R7 can be thought personal as a third person is involved to the accident.

As R14 “Failure to assign appropriate work meeting the qualifications of the employee or Assignment work that does not meet the qualification of the employee” was considered as an organizational reason in Table 2.3., it is under Column B: Personal Reasons in Table 3.7.. The reason of this may be; R14 can also be a personal accident reason as a result of assigning inappropriate employee to the job.

As R16 “Failure to provide a safe working environment by performing checks and audits in the workplace” was considered as an organizational reason in in Table 2.3., it is under both of Column A: Environmental and Column B: Organizational Reasons in Table 3.7.. The reason of this may be; R16 is an environmental factor which happens in work environment and which have to be run by managerial or organizational regulations like checks and audits.

As R24 “Improper use of personal protective equipment by employee” was considered as a personal reason in Table 2.4., it is under both of Column B: Organizational Reasons and Column C: Personal Reasons in Table 3.7.. The reason of this may be; using PPE properly is the obligation of the employee but the management is legally obligated to provide PPEs to all employees and make employees to use those PPEs in the right way.

4.2.5. Discussion of the Analysis of Variance (ANOVA) Test of Accident Reasons’ Importance Scale Factors

In the result of ANOVA test of accident reasons’ importance scale factors, there were no significant difference found between three groups of OHS professionals from state

agencies, universities and private sector. That showed that participants didn't have different OHS perceptions.

4.3. Overall Discussion and Implications of the Results

In a study which was derived from reviewing 297 articles and basing on 75 articles which are about falling from a height accidents' reasons it is revealed that; Risky activities, Individual Characteristics like lack of education, experience, training or unsafe behavior and carelessness; Site Conditions; Organization/Management factors like: lack of proper/safe equipment; Agent like improper position or defective equipment and Weather/Environmental Conditions are leading factors for falling from heights accidents (Nadhim et al., 2016). This inference is consistent with the categorization of the accident reasons.

The occupational health and safety is a major issue not only terms of wellbeing at work but also in terms of economic and organizational well-being of companies. It is an area that has been related to many disciplines. The main purpose is to prevent or increase occupational accidents and diseases. Just making legal arrangements are not enough to access this purpose. In order to build a solid OHS basis, a complete security culture needs to be settled.

To use a common way to define the accident reasons; to make the accident data to be able to be analyzed easier; to ensure more systematic and proportionate way for inspection penalties, legal provisions and corrective actions and furthermore to make preventive measures possible to be used in all kinds of accidents; it would be very useful to do accident reason analyses for each matters in table named "Distribution of Persons Having Work Accident and Deceased Persons Due To Work Accident By The Last Event Deviating From Normality And Leading to the Accident and Gender" in annuals of Social Security Institution statistics (SGK, 2019). The subtitles which may be run this kind of analysis from the table are; deviation due to electrical problems, explosion, fire; deviation by overflow, overturn, leak, flow, vaporization, emission; breakage, bursting, splitting, slipping, fall, collapse of material agent; loss of control (total or partial) of machine, means of transport or handling equipment,

handheld tool, object, animal; slipping - stumbling and falling - fall of persons; body movement without any physical stress (generally leading to an external injury); body movement under or with physical stress (generally leading to an internal injury); shock, fright, violence, aggression, threat, presence.

4.4. Contributions of the Study

This study aims to serve realistic outcomes basing on inspector reports of real cases. With 100 accident reports, this study has one of the richest sources in OHS literature in Turkish.

125 participants involved to the study. The participants have been studying in OHS area actively. Thus provides reliable outcomes.

Since the logic of this study is applicable to other sectors and other types of accidents, it contributes specifically to the construction sector and OHS in general, in terms of research and literature.

4.5. Limitations and Suggestions for Future Studies

The first limitation and the first difficulty which was faced in the current study is; it is quite difficult to reach the accident reports of inspectors. It is a long term process to get legal permissions to reach the reports. Also, as the reporting system has changed over the years, there isn't just one archive in a specific agency. In addition, this first obstacle mentioned makes also difficult to carry out the same study periodically. If it was possible to carry out the work again at certain intervals, it could be observed whether the causes of the accident changed or not over time.

Moreover it was also a challenge auto reach qualified participants. Someone who intend to run this kind of study need to have a serious network to reach. If a random platform is used to reach the participant, an unqualified person can get involved to the study and as a result, the quality of the study decreases. Although running this study with 125 participants is an accomplishment; this number was compromised in numbers of participants to keep the data qualified. Better results could be achieved if there were more participants.

In the current study, employees who had accidents were all insured. As not all employees are insured in Turkey, the sample of the study does not exactly overlap with the reality.

In Turkey, not all accidents are reported. In the study, all 100 cases were reported fatal or limb loss accidents. There were no near-miss accidents. So, this study is represents only the reported accidents which occur as falling from a height. More realistic results could be achieved if near-misses and less severe accidents were taken into account.

In the study, gender differences were not taken into account. Although there were detailed information such as the date of accident; the altitude where was fallen; the age, education status and gender of the employee who had accident, none of those information including the gender of the employee was analyzed.

Lastly, it wasn't examined in the study if the occupational physicians had different approaches to the accident reasons. In addition to OHS professionals from the state agencies, universities and private sector; if occupational physicians' would be included to that data, the study would be more diversified.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

As falling from heights is the most fatal of occupational accident reasons and the second most fatal reason of accidents in general, it is expected to contribute OHS researches in a very positive way.

As the construction sector keeps developing itself and consequently the number of accidents which occur as falling from heights increases; the number of the studies about this issue also is rapidly increasing in the world (Nadhim et al., 2016). As, there is still not enough study in this area in Turkey, this thesis will serve as an example for the studies carried out nationally.

Although Taşdöken based her master thesis to 30 expertise reports depending on real cases (Taşdöken, 2015), that much inspection reports haven't been handled in an academic thesis to have a research about accidents reasons before. Because the data of this study are based on real cases, the thesis presents realistic outcomes to reach.

Although there are some studies based on expert reports which presented on courts or Social Security Institution reports; with 100 accident reports, this study has one of the richest sources in OHS literature.

In case of evaluation of the realistic data; with 125 participants and all participants being OHS professionals in construction sector, it is expected the evaluation to be reliable.

As the study focused on one type of accidents, it set an example for other accidents which occur in different ways. There may be other studies on the accidents which occur in other ways in future. Also the study can be applied to other sectors.

5.2. Recommendations

Although in terms of the accident inspection reports, it is difficult to reach the accidents' data, in order to increase the significance and reliability of the study, as much data as possible should be obtained and reviewed. Then, it should be observed whether they have reached a common result or not. Also, with plenty of data, to run the study periodically may provide to see if there would be progress or decline in the sense of OHS.

In the study it was observed that many OHS professionals weren't interested in attending to OHS literature studies. Therefore, reaching the participants became a challenge and the time for that process became longer. If the attention and incline of OHS professionals to OHS literature studies increase, it can be easier to get a richer source of participants. With more participants, the outcome of the study would be more reliable and significant.

Because it is a known fact that all employees are not insured and the near-miss cases are not recorded, generally it isn't able to run a deeper study in OHS platform in Turkey. In the current study, all the sufferers of accidents were insured and more than half of the accidents were fatal. So, those data can't represent all accidents which occur as falling from a height. To run in near-misses and the data of accidents of uninsured employees to the study would provide a more realistic outcome.

In the study, all valuable data could not be processed in order not to spread the subject out. The data such as gender of the employee who had the accident, the altitude of falling for each case, the time or day of the accident would be analyzed.

Occupational physicians' approaches to the accident reasons weren't researched in the study. It would be a valuable assessment to conduct in order to observe if there was any difference in the point of views of occupational health and occupational safety professionals.

In the study, one of the outcome of the analysis was that the causes of accidents are interrelated and one solution may solve multiple problems. This means the prioritization of solutions is a very key issue for efficient results on OHS.

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APPENDICES

A. Informed Consent Form

ARAŞTIRMAYA GÖNÜLLÜ KATILIM FORMU

Bu araştırma, ODTÜ Psikoloji Bölümü öğretim elemanlarından Prof. Dr. Türker Özkan danışmanlığında Fen Bilimleri Enstitüsü, İş Sağlığı ve Güvenliği Bölümü'nde yüksek lisans öğrencisi Deniz Akarsu tarafından yürütülmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır.

Çalışmanın Amacı Nedir?

Çalışmanın amacı, yüksekten düşme şeklinde gerçekleşen iş kazalarına ait sebeplerin incelenmesi, değerlendirmeye katılan İş Sağlığı ve Güvenliği profesyonellerinin kazaya sebep olan faktörlere bakış açılarının ve çalıştıkları yerlere ve İSG alanındaki tecrübe sürelerine göre fark olup olmadığının incelenmesidir.

Bize Nasıl Yardımcı Olmanızı İsteyeceğiz?

Çalışma kapsamında sizden bir anket doldurmanız istenmektedir. Anket uygulaması 15 dakika sürmektedir.

Sizden Topladığımız Bilgileri Nasıl Kullanacağız?

Araştırmaya katılımınız tamamen gönüllülük temelinde olmalıdır. Çalışmada, kimlik belirleyici hiçbir bilgi istenmemektedir. Anket formları gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir. Elde edilecek bilgiler sadece bilimsel yayımlarda kullanılacaktır.

Katılımınızla ilgili bilmeniz gerekenler:

Çalışma genel olarak kişisel rahatsızlık verecek bir etkileşim içermemektedir. Ancak, katılım sırasında herhangi bir nedenden ötürü kendinizi rahatsız hissederseniz çalışmayı istediğiniz zaman bırakmakta serbestsiniz.

Araştırmayla ilgili daha fazla bilgi almak isterseniz:

Bu çalışmaya katıldığınız için şimdiden çok teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için araştırmacılar ile iletişim kurabilirsiniz.

Deniz Akarsu (deniz.akarsu@csgb.gov.tr)

Bu çalışmaya tamamen gönüllü olarak katılıyorum ve istediğim zaman yarıda kesip çıkabileceğimi biliyorum. Verdiğim bilgilerin bilimsel amaçlı yayımlarda kullanılmasını kabul ediyorum. (Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

İsim Soyisim Tarih İmza

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B. Accident Evaluation Form

YÜKSEKTEN DÜŞME KAZALARINDA NEDENLERİN DEĞERLENDİRİLMESİ FORMU

a. Çalıştığınız kurum
   - o Kamu
   - o Üniversite
   - o Özel Sektör

b. Kaç yıldır İSG ile ilgili çalışıyorsunuz?
   - o 1-6 yıl
   - o 7-10 yıl
   - o 10 yıldan fazla

Aşağıda yüksekten düşme kazalarına ait yapılan bir incelemede tespit edilmiş hatalar listelenmiş bulunuyor. Lütfen bu hatalara en mühim 10 puan, en az mühim olan 1 puan olacak şekilde puan veriniz.

1. Yapılan işe ve mevzuata uygun her türlü makine, araç, ekipman, malzeme ve çalışma yöntemlerin sağlanmaması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

2. Kullanılan makine, araç, ekipman, malzeme ve çalışma yöntemlerinin periyodik kontrolünün yapılmamış olması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

3. (Ulaşımda kullanılan yol, araç ve platformlar ile katlar veya ara geçitler vb.) Geçişlerde düşme riskinin ortadan kaldırılmaması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

4. Yüksekte yapılan çalışmaların uygun toplu koruma araçları kullanılarak yapılmasının sağlanmaması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

5. Çalışanlara kişisel koruyucu donanımların verilmemesi

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

6. Çalışanların kişisel koruyucu donanımları uygun biçimde kullanmasının sağlanmaması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

7. Olayda kazazede ve işveren (taşeron) dışında üçüncü şahıs ya da kurumların ihmal veya hatasının olması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

8. Çalışana yüksekte çalışma eğitimi verilmemesi

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

9. Çalışana gerekli mesleki eğitim verilmemesi

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

10. Çalışana yeterli İSG eğitimi verilmemesi

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

11. Çalışanın gerekli sağlık raporunun olmaması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

12. Çalışmalarda yönetim içi koordinasyon sağlanmaması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

13. Çalışmanın ehil bir kişinin gözetim ve kontrolü altında yapılmasının sağlanmaması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

14. Çalışanların vasıflarına uygun görev verilmemesi veya uymayan görev verilmesi

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

15. Uygun çalışma yöntemi belirlenerek çalışanlara açık bir şekilde talimat verilmemesi

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

16. İşyerinde kontrol ve denetim yaparak güvenli çalışma ortamının tam anlamıyla sağlanmaması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

17. Risk değerlendirmesi ve acil durum eylem planı yapılmaması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

18. İSG ikaz ve uyarı levhaları hazırlanmasının ve kullanılmasının sağlanmaması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

19. Çalışanın tedbirsizliği

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

20. Çalışanın görevini önemsememe veya dikkatsizliği

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

21. Çalışanın görev veya yetkisi dışında bir iş yapması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

22. Çalışanın talimatlara aykırı hareket etmesi

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

23. Çalışanın tecrübesizlik, bilgisizlik veya bilgi ve kabiliyet eksikliği

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

24. Çalışanın kişisel koruyucu donanımları uygun biçimde kullanmaması

	1	2	3	4	5	6	7	8	9	10	
en az mühim	○	○	○	○	○	○	○	○	○	○	en mühim

C. Accident Evaluation Table

			Accident Reasons (R1-R24)										
	WORK	**EXPERİENCE**	**R1**	**R2**	**R3**	**R4**	**R5**	**R6**	**R7**	**R8**	**R9**	**R10**	**R11**
1	State Agency	7-10 years	10	8	9	10	9	10	7	8	7	8	6
2	State Agency	7-10 years	10	8	7	10	6	6	5	8	8	10	5
3	Academic	7-10 years	9	6	5	7	4	6	2	6	3	4	4
4	Academic	7-10 years	8	8	8	9	10	10	8	10	10	10	10
5	State Agency	7-10 years	10	9	10	10	5	5	5	10	5	10	10
6	State Agency	7-10 years	9	9	10	10	9	9	8	9	8	7	8
7	Private Sector	7-10 years	10	10	10	10	10	10	10	10	10	10	10
8	Private Sector	1-6 years	10	10	10	10	10	10	10	10	10	10	10
9	State Agency	1-6 years	9	9	10	10	8	8	7	10	10	10	10
10	State Agency	7-10 years	10	10	10	10	8	9	7	9	9	10	9
11	State Agency	>10 years	10	9	10	10	5	8	2	8	6	9	5
12	State Agency	>10 years	10	10	10	7	10	10	6	8	8	7	10
13	State Agency	7-10 years	10	10	10	10	10	10		10	5	8	9
14	Academic	>10 years	8	8	8	8	6	9	3	6	6	6	5
15	State Agency	7-10 years	7	7	9	9	8	8	7	7	7	7	7
16	State Agency	7-10 years	10	8	10	10	8	5	6	9	9	5	5
17	Academic	1-6 years	9	9	10	10	8	8	5	8	9	9	6
18	Academic	1-6 years	8	7	9	8	6	7	5	7	9	7	8

Accident Evaluation Table (continued)

19	Academic	>10 years	10	10	10	10	10	10	6	10	8	10	10
20	Academic	7-10 years	10	10	9	10	10	10	8	10	9	8	9
21	Academic	>10 years	10	10	8	5	8	9	3	10	10	10	5
22	Academic	7-10 years	9	10	10	9	8	9	5	9	9	9	6
23	Academic	>10 years	7	5	10	10	10	10	5	10	10	10	10
24	Academic	>10 years	10	10	10	10	9	10	10	10	10	10	10
25	Academic	>10 years	9	9	9	9	9	10	2	9	8	9	5
26	Academic	>10 years	10	10	10	10	7	10	8	10	10	10	10
27	Academic	1-6 years	10	10	9	8	6	8	1	8	8	8	8
28	Academic	>10 years	7	7	6	6	9	8	8	9	9	8	8
29	Academic	>10 years	10	10	8	9	10	10	4	8	9	5	9
30	State Agency	>10 years		7									
31	State Agency	7-10 years	8	6	6	9	4	3	3	6	7	6	4
32	State Agency	7-10 years	8	7	10	10	3	5	4	9	9	9	6
33	Private Sector	>10 years	10	9	10	10	10	10	10	10	10	10	10
34	Academic	7-10 years	10	7	5	9	7	8	4	10	8	7	5
35	Academic	>10 years	10	10	10	10	8	8	6	10	10	10	10
36	State Agency	1-6 years	10	9	8	8	10	9		6		7	6
37	Private Sector	7-10 years	10	10	10	10	10	10	8	10	10	10	8
38	State Agency	7-10 years	10	5	9	9	9	9	8	9	8	8	5
39	State Agency	7-10 years	9	9	9	10	8	5	6	8	5	8	10
40	State Agency	1-6 years	10	10	10	10	10	10	10	10	10	10	10
41	Academic	7-10 years	10	10	10	10	8	10	10	10	10	10	10
42	Private Sector	>10 years	10	8	10	10	10	8	1	10	8	10	10

Accident Evaluation Table (continued)

43	Private Sector	>10 years	8	7	9	10	8	8	5	9	9	9	4
44	Private Sector	>10 years	9	8	7	7	10	8	1	10	6	10	10
45	Private Sector	>10 years	10	6	10	10	10	10	10	10	6	4	10
46	Private Sector	7-10 years	10	10	10	9	10	10	8	8	9	9	10
47	Private Sector	1-6 years	10	8	10	10	9	10	5	8	5	6	6
48	Academic	>10 years	9	10	9	9	10	10	8	8	8	8	8
49	Private Sector	1-6 years	9	10	9	8	9	10	7	8	7	7	10
50	Private Sector	1-6 years	9	9	9	9	8	8	7	9	8	8	8
51	Private Sector	1-6 years	7	6	6	9	7	8	6	9	9	9	7
52	State Agency	>10 years	10	9	9	8	10	10	10	10	10	10	10
53	Private Sector	>10 years	10	10	10	10	10	10	10	6	10	10	10
54	Private Sector	1-6 years	10	10	9	10	6	10	7	10	10	10	10
55	Private Sector	>10 years	8	8	8	9	8	9	5	9	9	8	6
56	Private Sector	>10 years	9	8	10	10	8	9	6	7	9	8	8
57	Private Sector	1-6 years	6	8	9	10	7	6	6	6	8	5	6
58	Private Sector	>10 years	10	10	10	10	10	10	9	10	9	10	9
59	State Agency	7-10 years	7	7	8	9	7	7	6	7	7	7	7
60	State Agency	7-10 years	8	6	9	8	4	8	3	7	7	7	4
61	State Agency	7-10 years	10	10	10	10	10	10		10	10	10	10
62	State Agency	1-6 years	10	10	10	10	10	10	5	10	10	10	10
63	State Agency	7-10 years	8	10	8	10	9	9	8	10	8	8	8
64	Private Sector	1-6 years	9	8	9	7	7	7	8	10	7	7	10
65	State Agency	7-10 years	7	7	7	8	7	9	4	8	8	8	4
66	Academic	>10 years	10	10	10	10	10	10	10	10	10	10	8

Accident Evaluation Table (continued)

67	State Agency	1-6 years	9	9	9	9	9	9	8	8	7	7	7
68	Private Sector	>10 years	10	10	10	10	10	10	10	10	10	10	10
69	Private Sector	7-10 years	8	9	10	9	10	10	6	10	10	9	10
70	Private Sector	7-10 years	10	10	9	10	5	7	5	8	9	6	7
71	State Agency	7-10 years	10	10	8	10	3	3	7	3	3	3	1
72	Academic	>10 years	10	7	10	10	6	7	2	10	10	10	10
73	State Agency	1-6 years	9	10	7	8	10	9	8	10	9	7	10
74	State Agency	1-6 years	3	1	2	1	3	2	5	1	8	6	10
75	Private Sector	>10 years	3	3	3	2	5	4	4	3	2	3	4
76	Private Sector	1-6 years	8	8	8	8	7	8	6	8	8	8	7
77	Academic	7-10 years	10	9	10	10	10	10	6	10	10	10	10
78	Academic	7-10 years	7	7	10	10	7	10	1	4	5	6	1
79	Academic	7-10 years	10	8	10	10	7	7	6	9	9	7	7
80	Academic	1-6 years	8	9	8	7	10	10	7	7	8	6	5
81	Academic	1-6 years	9	10	10	10	9	10	9	10	10	10	10
82	Private Sector	1-6 years	9	8	10	10	10	9	6	9	8	9	10
83	Private Sector	7-10 years	8	9	6	9	7	10	2	10	10	10	8
84	State Agency	7-10 years	10	7	10	10	5	5	2	7	6	9	5
85	State Agency	7-10 years	10	9	10	9	7	8	2	6	8	6	4
86	State Agency	7-10 years	10	10	10	10	9	9	8	10	10	10	10
87	State Agency	7-10 years	9	10	9	10	8	9	9	10	8	10	8
88	State Agency	7-10 years	10	10	10	6	10	10	5	8	8	8	8
89	Private Sector	1-6 years	7	7	9	7	9	9	1	6	6	5	3
90	State Agency	7-10 years	9	8	9	9	9	10	7	8	9	9	8

Accident Evaluation Table (continued)

91	State Agency	7-10 years	10	8	10	10	8	8	2	6	6	5	4
92	Private Sector	7-10 years	8	9	10	10	7	9	8	7	7	5	6
93	Private Sector	>10 years	10	10	10	10	10	10	1	10	10	10	10
94	State Agency	1-6 years	8	8	10	8	7	10	8	10	10	8	8
95	Academic	1-6 years	10	5	5	10	10	10	4	10	10	5	10
96	Private Sector	1-6 years	10	10	8	10	8	9	8	8	8	7	5
97	Private Sector	1-6 years	9	9	8	9	7	8	5	9	7	7	9
98	Academic	1-6 years	10	9	6	10	8	8	6	10	10	8	10
99	State Agency	7-10 years	10	10	10	10	8	10	2	3	3	3	3
100	Private Sector	1-6 years	10	10	10	10	10	10	5	10	10	6	10
101	State Agency	7-10 years	10	10	10	10	10	10	5	10	10	10	10
102	State Agency	7-10 years	10	10	10	10	10	10	5	10	8	8	5
103	Private Sector	1-6 years	9	8	7	7	9	10	8	8	10	10	4
104	Academic	1-6 years	9	9	9	8	9	9	7	8	8	8	8
105	State Agency	1-6 years	8	8	6	7	9	10	6	9	10	8	9
106	State Agency	1-6 years	10	10	10	10	10	10	10	10	10	10	10
107	State Agency	7-10 years	10	9	8	8	9	9	9	8	9	9	9
108	State Agency	7-10 years	7	7	9	9	6	7	5	6	8	8	5
109	Private Sector	7-10 years	8	7	8	10	8	9	7	7	7	7	8
110	Private Sector	7-10 years	10	10	10	10	10	10	10	10	10	10	10
111	Private Sector	7-10 years	10	8	10	10	8	10	8	10	10	8	10
112	Academic	1-6 years	9	8	7	7	9	9	7	7	8	8	8
113	Private Sector	7-10 years	9	9	10	10	10	10	8	10	10	10	9
114	Private Sector	1-6 years	10	9	9	10	10	10	8	10	9	9	9

Accident Evaluation Table (continued)

115	Academic	7-10 years	9	7	9	8	7	9	8	8	6	9	8
116	Private Sector	1-6 years	7	8		9	10	10	4	7	10	7	5
117	State Agency	1-6 years	10	10	10	10	10	10	2	10	10	10	10
118	Private Sector	7-10 years	10	10	10	8	10	10	2	10	7	7	4
119	Private Sector	1-6 years	7	8	6	7	8	9	7	5	7	9	8
120	Private Sector	7-10 years	7	3	3	6	8	7	7	9	8	8	8
121	State Agency	7-10 years	10	9	9	9	8	9	6	6	7	8	6
122	Academic	7-10 years	9	9	10	8	7	9	7	7	7	7	7
123	Academic	1-6 years	10	10	10	8	7	7	10	6	6	6	10
124	Private Sector	1-6 years	10	9	10	10	8	10	6	10	10	10	7
125	Academic	>10 years	4	4	6	7	6	8	7	8	8	8	10

Accident Evaluation Table (continued)

Accident Reasons (R1-R24)												
R12	**R13**	**R14**	**R15**	**R16**	**R17**	**R18**	**R19**	**R20**	**R21**	**R22**	**R23**	**R24**
6	7	7	7	7	8	3	7	7	7	7	7	8
8	7	7	6	10	7	4	10	10	10	7	10	4
5	6	4	7	8	6	5	8	6	5	5	6	6
9	9	6	9	7	7	8	5	8	8	6	10	10
8	8	5	1	10	9	5	2	10	5	5	5	4
5	5	7	7	7	7	3	7	5	9	7	6	8
10	10	10	10	10	10	10	10	10	7	10	10	10
10	10	10	10	10	10	10	5	5	10	10	10	10
9	10	10	9	10	10	9	10	10	9	10	9	9
8	9	9	8	10	8	8	9	9	9	9	10	9
6	9	9	9	9	10	6	6	6	6	8	8	9
5	6	8	8	8	7	7	6	6	7	7	7	10
8	8	6	8	9	10	8	4	4	5	5	2	6
8	5	6	9	9	7	6	9	9	4	9	6	7
6	7	6	7	8	8	6	7	7	7	7	7	8
8	7	6	9	5	7	5	10	10	7	6	4	5
8	10	8	9	10	6	4	8	10	9	7	9	9
7	6	7	8	9	6	7	8	9	8	9	9	9
10	10	10	10	10	10	10	8	8	6	10	10	10
9	7	8	9	9	10	9	8	8	9	9	8	10
8	8	8	9	8	9	9	10	8	8	9	8	8
8	10	9	9	7	6	5	10	10	9	7	9	9

Accident Evaluation Table (continued)

10	10	5	10	10	10	10	5	10	1	1	1	10
10	10	10	10	10	10	10	10	10	10	10	10	10
8	9	7	8	8	8	8	7	6	6	9	7	9
10	10	10	10	10	10	7	10	10	10	10	10	9
8	6	8	5	10	10	10	10	10	8	8	8	10
10	10	10	10	8	7	5	5	6	7	7	8	9
6	9	10	7	10	7	6	8	8	8	8	9	10
		10	9	9								
7	8	4	6	7	6	4	7	5	3	4	6	3
9	7	7	9	7	7	6	8	8	7	8	8	4
8	9	9	10	9	9	9	10	10	9	10	9	10
6	7	7	9	9	6	5	7	7	6	6	5	6
9	6	9	9	9	10	9	1	3	4	3	4	2
9	10	10	9	9	4	5	9	10	8	9	10	10
8	10	10	10	10	6	8	8	9	9	10	9	9
5	7	5	5	6	5	5	3	4	4	4	3	8
6	7	5	9	10	10	7	5	5	8	8	5	5
10	10	10	10	10	10	8	10	10	10	10	10	10
10	10	8	10	10	10	10	10	10	10	10	7	8
7	7	8	7	8	9	8	8	8	8	10	8	8
8	9	10	9	10	10	7	9	10	6	9	9	5
8	7	2	7	8	7	8	8	8	8	8	2	6
10	10	10	10	10	8	7	10	10	10	10	10	8
8	9	8	8	8	10	7	8	8	6	7	8	9

Accident Evaluation Table (continued)

8	10	8	10	10	8	6	8	8	8	7	8	8
8	7	9	9	7	7	5	7	8	8	8	5	10
8	7	10	9	8	7	7	10	10	10	10	10	9
8	9	9	10	10	9	8	8	8	9	9	8	8
8	7	7	7	8	8	10	9	8	8	9	7	9
10	10	9	9	8	10	7	10	10	10	10	10	10
10	10	10	7	10	10	7	10	10	10	10	10	10
10	10	10	10	10	10	10	5	5	5	5	10	7
8	7	7	7	8	6	6	6	5	7	7	6	8
10	10	8	10	9	8	8	6	8	6	6	6	7
10	10	6	10	10	7	7	10	10	10	10	7	10
10	10	10	10	10	9	9	10	9	9	10	9	9
7	8	9	8	9	9	7	9	9	8	9	9	8
5	8	5	6	7	7	6	9	9	9	9	9	8
9	10	10	10	10	10	10		10	10	10	10	10
10	10	10	10	10	10	10	7	8	10	10	7	10
8	7	8	9	8	8	7	9	9	7	8	8	8
7	7	8	8	8	7	6	10	10	9	10	8	8
7	8	7	8	8	6	5	8	8	8	7	7	7
10	10	10	10	10	10	10	8	8	10	10	10	10
7	7	7	9	9	9	7	9	9	8	8	8	8
10	10	10	10	10	10	9	9	9	9	9	9	10
7	10	9	9	10	10	9	10	10	10	10	8	10
4	7	6	6	6	5	6	4	7	5	6	3	7

Accident Evaluation Table (continued)

7	3	10	1	3	1	1	3	3	3	3	3	3
9	7	8	10	8	7	4	5	4	8	8	8	9
6	9	10	5	9	7	10	7	10	9	7	7	8
6	3	6	6	6	2	2	6	6	8	4	5	5
3	2	3	2	3	3	3	8	8	5	7	6	3
8	6	8	8	8	7	6	8	8	8	8	7	8
7	7	9	7	9	8	6	10	10	10	10	10	10
7	8	7	5	8	4	2	10	10	9	7	8	9
8	8	8	7	8	8	7	10	10	9	8	8	7
7	6	7	6	9	7	6	9	9	7	6	9	9
10	10	10	10	10	10	9	10	10	9	10	9	9
10	10	9	9	9	7	7	10	10	10	10	9	10
7	10	8	8	9	7	6	10	10	10	10	10	10
3	7	10	5	10	7	8	10	10	8	8	7	8
6	8	6	6	9	6	5	3	3	3	5	4	9
8	10	9	9	10	3	9	7	8	7	8	6	6
10	9	10	9	10	9	9	10	10	10	9	9	10
5	10	10	10	6	8	5	10	10	9	8	8	10
6	6	5	5	8	8	10	8	8	7	4	5	9
9	10	10	8	10	8	8	8	9	9	8	10	9
6	6	8	8	10	5	3	8	8	8	7	8	5
6	7	8	7	8	6	2	10	10	10	10	10	9
10	10	1	10	10	10	7	1	1	2	2	5	10
8	10	10	8	10	6	6	10	10	10	10	8	10

Accident Evaluation Table (continued)

5	5	10	10	5	7	4	10	7	10	3	3	10
6	6	5	7	9	9	8	9	8	9	8	7	7
7	9	10	7	10	9	7	9	10	10	8	10	6
8	10	10	8	10	10	8	10	10	10	10	10	10
10	10	7	5	10	1	3	6	6	5	6	8	6
10	10	10	10	10	10	10	10	10	10	10	10	10
9	10	10	10	9	10	8	9	9	10	9	9	9
10	10	8	10	10	8	8	10	10	10	10	10	10
8	9	9	8	7	2	4	10	10	10	10	9	6
7	7	7	7	7	7	6	7	7	7	8	7	9
5	9	6	5	8	8	7	5	5	7	6	6	8
10	10	10	10	10	9	10	10	10	10	10	10	10
	8	8	9	9	9	9	10	9	9	9	9	8
8	7	6	7	8	5	7	10	10	8	10	8	9
8	4	8	7	5	6	6	10	10	8	10	9	7
10	10	10	10	10	7	10	10	10	10	10	10	10
8	10	8	8	8	8	10	10	10	10	10	10	10
6	8	9	8	8	7	7	8	7	7	7	6	8
9	10	10	10	10	10	9	10	10	9	9	10	10
8	8	9	9	9	10	8	9	10	10	9	10	10
9	9	8	8	10	8	8	10	10	10	10	10	9
5	8	8	8	8	6	9	10	10	8	10	9	10
9	10	2	10	10	10	10	3	3	3	3	3	3
4	4	6	5	10	7	10	9	7	6	10	7	10

Accident Evaluation Table (continued)

6	7	7	7	7	5	4	8	9	8	8	8	7
7	9	9	8	7	5	6	8	8	9	8	9	7
8	8	8	9	8	8	7	10	10	9	9	9	9
8	10	6	8	9	7	10	10	10	9	8	9	9
6	6	6	6	10	9	6	6	6	9	9	8	6
7	7	9	8	9	7	5	10	10	10	10	10	3
10	9	9	9	9	9	9	2	1	1	8	9	8

Accident Evaluation Table (continued)

D. Sample Accident Stories

PLATFORM-İSKELE

- Kaza tarihi olan 19.11.2014 günü saat 15:00 sularında, binanın batı cephesindeki çift kolonlu (mast) cephe platformu ile 1. kat da dahil olmak üzere 6. kata kadar, sol ve sağ dairelere en az iki palet seramik fayans yayılı şekilde taşınmıştır. Bu taşıma işlemi 5 kez platforma yüklenen iki adet paletle (2x1664 kg=3328 kg ağırlıkla) yapılmıştır. Taşıma işleminin 5. kez yapılması sırasında platform bu ağırlıklara dayanamayarak ortadan (en zayıf nokta) kırılarak ikiye ayrılmış ve platform üzerinde bulunan çalışanlar, 6. kat seviyesinden aşağıya düşmüşlerdir. Düşme sonucu çalışanlardan … hayatını kaybetmiş, …, … ve … yaralanmıştır.
- İşyeri işçilerinden …, 05.12.2008 günü saat 08:10 sıralarında B Blok 4. kat dış cephede iskele üzerinde boya yaparken dengesini kaybederek aşağıya düşerek hayatını kaybetmiştir.

YÜKLEME

- … işyerinde bakımı yapılan müşteri toz altı kaynak makinesinin aracı ile almaya gelen ve işyeri sokak cephesinden yana önüne park eden aracın kasasına olaya konu toz altı kaynak makinesini binanın giriş üstü 1. katı korkuluksuz balkon kısmından tek başına yüklemek isteyen büro elemanı kazalı …'in dengesinin bozulması ile 3.7 m. yükseklikten zemine çakılarak ağır yaralanıp ölmüştür.

ELEKTRİK

- 21. Yapılan incelemede, kaza günü saat 15.00 sıralarında işyerinde elektrikler kesilmiş ve jeneratör devreye girmiştir. 16.15 gibi işçi … atölyeden … arızayı aramış ve arıza ekibinin yola çıktığını öğrenmiştir. Daha sonra işçi … ve işçi … kamyonların eksik parçalarını değiştirmek için çalışmaya başlamışlar ve işçi … tekrar … arızayı aramıştır. Ünite Müdürü … hava limanına gitmek için işyerinden ayrılırken "…'ı arayın, bana bilgi verin"

demiştir. Saat 17.30'da kamyonlarla işi biten işçi …, …'ı 3. kez ofisten aramıştır. …, "Elektrik sorununuz giderildi, enerjiyi verdik" demiştir. Bunun üzerine elektrik gelmediği için işçi … bina içindeki ana sigortaya bakmış ve sorun olmadığını belirtmiştir. Daha sonra … ve … dışarıdaki trafolara bakmaya giderler. Elektrik direğinin arabayla yakınına gidilemediği için 30 metre kadar uzağına arabayı park etmişler ve yürüyerek direğin yanına gelmişlerdir. Direğin tepesine bakmışlar, 3 tane sigorta telinden bir tanesinin karardığını görmüşlerdir. İşçi … işçi …'e " sigortayı indirip kaldıracağım sen de elektrik akımının geçip geçmediğine bak" demiştir. İşçi … direğin tepesindeki fincanlardan kıvılcım çıktığını görmüş, söylemiş ve şirketi aramak için arabaya yönelmiştir. Arabadan telsizi alıp arkasını döndüğünde, …'ı direğin tepesindeki fincanların arasında görmüştür. O anda elektriğe çarpılan işçi … aşağı düşmüştür.

- … elektrik ile ilgili arızayı gidermek için şantiyeye ait alçak gerilim hattı direğine çıktığında, üzerinden geçen …'a ait … trafo ve … trafoları besleyen yüksek gerilim hattından gelen elektriğe çarpılarak direkten yere düşmesi sonucu vücudunun çeşitli bölgelerinde yanıklar ve bacağında kırık oluşmuştur.

YÜKLEME, TRANSPALET, FORKLİFT

- İşyerinde, metalden yapılmış muhtelif makine parçaları kaynak ve montaj işleri yapılmaktadır. Kazanın meydana geldiği 1.2.1990 günü de fazla mesai yapılarak (Pazar günü) çimento fabrikası için çeşitli makine parçalarının kaynak ve montaj işlerine devam edilmiş ve bir taraftan da kamyona yüklenerek parçaların taşınması işi yapılmıştır. İşin acil olması nedeniyle yükleme işine, havanın karardığı bir saat olan 17:00'den sonra da devam edilmiştir. Metal parçalar, 2,5 tonluk paletli hidrolik forklift tarafından kaldırılmakta v kamyonun kasası üzerinde bulunan ve aralarında kazazede işçi …'nun da bulunduğu 3 işçinin yardımı ile kamyona indirilmektedir. Kazanın meydana geldiği saat 20:00 sıralarında işçi …, yüklenen makina parçaları ile yaklaşık iki metre yüksekliği bulmuş olan kamyon kasası üzerinden düşer.

- 15.11.2012 tarihinde Cuma günü, markete gelen ürünlerin yağmurlu havada yük kamyonundan boşaltılması sırasında, kamyon karüseri içinde su damacana paketlerinin transpalet ile boşaltılması sırasında, kamyon karüseri transpaletin …'e çarpması ve dengesini kaybetmesi sonucu düşmesi, ayağının tranpaletle lift olarak isimlendirilen kamyona yük yükleme ve boşaltmada kullanılan kaldıraç arasına sıkışarak baş aşağı asılı kalması şeklinde meydana gelmiştir.

ÇÖP TOPLAMA

- 26.12.2006 günü saat 21.00 'de işçiler işbaşı yaparlar. Çöp toplama ve taşıma kamyonunda çalışan…, …, … ve … isimli işçiler Dikmen semtinde çalışmaya başlarlar. 27.l2. 2006 günü saat 01:00 sıralarında yolun buzlu ve fazla meyilli olması nedeniyle kamyon kayarak kontrolden çıkar ve sol ön tarafının bir apartmanın merdivenine çarpar. Araç geldiği yöne dönerek durur ve arka sağ darafı da duvara çarpar. Bu çarpmanın etkisiyle araç arkasındaki ayakta durma yerinde duran …, … ve …, araçtan düşerek çeşitli yerlerinden yaralanırlar.

TEMİZLİK

- 29.06.2007 tarihinde saat 10:30 sularında temizlik işi için inşaatın son katına çıkan kazazede yerde bulunan atıkları kucağında taşırken eni 50 cm, boyu 250 cm derinliği 5,5 metre olan elektrik şaft boşluğundan aşağıya düşüyor.
- Santrall işlerinde çalışmak üzere işe başlayan … süpürge ve kürekle temizlik yapması söylendiği için yağmur nedeniyle ıslak olan mekanda düşerek yaralanmıştır.

KAZI

- Daha önce kazılmış olan kanala 120 cm. çapında toplam 110 cm. yüksekliğinde ve iki parçadan oluşan menholün kepçe kovasına bağlanarak yerleştirilmek istendiği sırada askıda olan menholün devrilmesi ve o anda menhol içinde bulunan … ile birlikte aşağı düşmesi
- …ltd şti nin kanal çalışması sırasında görevli … eksklavatörle 3 m

derinliğindeki kazı içerisindeki delinmiş boruya müdahale edip geri çukurdan çıkarken dengesini kaybedip geri düşerek sol köprücük kemiğini kırmıştır.

MADEN

- İşçi … kömür besleme sahası 2 nolu vibro silosuna düşerek vefat etmiştir.

E. Debriefing Form Interview

KATILIM SONRASI BİLGİ FORMU

Bu araştırma, ODTÜ Psikoloji Bölümü öğretim elemanlarından Prof. Dr. Türker Özkan danışmanlığında Fen Bilimleri Enstitüsü, İş Sağlığı ve Güvenliği Bölümü'nde yüksek lisans öğrencisi Deniz Akarsu tarafından yürütülmektedir. Çalışmanın amacı; yüksekten düşme şeklinde gerçekleşen iş kazalarının edinilen müfettiş raporları incelenerek tespit edilen 24 temel sebebi incelendiğinde, inceleyen kişilerin çalıştığı yer ve iş tecrübesine göre bakış açılarının farklı olup olmadığını araştırmaktır.

Kaza sebeplerine çok yönlü bakabilmek ve risk değerlendirmesinin daha ilk adımında tehlike tanımlamasını en doğru bir şekilde yapabilmek, kazaya sebep olan faktörlerin müdahale önceliğinin de doğru şekilde belirlenebilmesine sebep olacaktır. Böylelikle çalışmanın nihayetinde tarafların değerlendirmelerinin anlamlı bir şekilde farklı ya da aynı oluşunu yorumlayarak bu durumların sebebini anlamak ve iş kazalarının önlenmesinde faydalı olabilecek dönüşümleri ve gelişmeleri sağlayıcı adımlar önermek amaçlanmıştır.

Bu çalışmadan alınacak ilk verilerin Eylül 2019 sonunda elde edilmesi amaçlanmaktadır. Elde edilen bilgiler sadece bilimsel araştırma ve yazılarda kullanılacaktır. Çalışmanın sağlıklı ilerleyebilmesi ve bulguların güvenilir olması için çalışmaya katılacağını bildiğiniz diğer kişilerle çalışma ile ilgili detaylı bilgi paylaşımında bulunmamanızı dileriz. Bu araştırmaya katıldığınız için tekrar çok teşekkür ederiz.

Araştırmanın sonuçlarını öğrenmek ya da daha fazla bilgi almak için araştırmacıya başvurabilirsiniz.

Deniz Akarsu (deniz.akarsu@csgb.gov.tr)

Çalışmaya katkıda bulunan bir gönüllü olarak katılımcı haklarınızla ilgili veya etik ilkelerle ilgi soru veya görüşlerinizi ODTÜ Uygulamalı Etik Araştırma Merkezi'ne iletebilirsiniz (ueam@metu.edu.tr).

F. Ethical Permission

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04 EKİM 2019

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr. Türker ÖZKAN

Danışmanlığını yaptığınız **Deniz AKARSU'nun "Yüksekten Düşme Şeklinde Gerçekleşen İş Kazalarının Değerlendirmesinde Değerlendiricinin Çalıştığı Kurum veya İş Tecrübesi Faktörü"** başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve **342 ODTÜ 2019** protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız.

Prof. Dr. Tülin GENÇÖZ
Başkan

Prof. Dr. Tolga CAN
Üye

Doç.Dr. Pınar KAYGAN
Üye

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Dr. Öğr. Üyesi Şerife SEVİNÇ
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