

Analysis of Fatal Occupational Accidents in Turkey for the Year 2013

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Abstract — Losses resulting from occupational accidents can be considered into two main categories as pecuniary losses and intangible losses. According to ILO criteria, overall cost of work accidents is almost 4% of the gross national product in Turkey. It equals to 32 billion dollars in 2013. However, major aspects in occupational accidents are intangible losses as fatalities, heavy injuries and loss of limbs other than pecuniary losses. Because human life is above all than economical values. Approximately 1000 to 1500 employees die, 2000 to 2500 become permanently disabled and thousands get injured in varied degrees because of occupational accidents each year in Turkey. In this study, fatal occupational accidents in Turkey are analyzed which were happened in 2013 in order to draw attention to this problem by using official references. In addition, Turkey is compared with Germany which is an exemplary country in fatal occupational accidents. In conclusion, several suggestions are developed under possible solution aspects.

Keywords — *Fatal occupational accidents; Turkey; Germany.*

I. INTRODUCTION AND OBJECTIVES

The most important results of occupational accidents are; death, injury or permanent disability of workers. Each year, a considerable number of people die or become permanently disabled due to preventable occupational accidents in Turkey. In addition, serious financial losses and social problems of occupational accidents are also another crucial consequences [1]. This facts underline the importance of accident prevention with precautionary measures by use of the examination of previous statistical accident data.

With annual average of 92.551 occupational accidents and 1.284 deaths, Turkey still faces an important problem [2,3,4,5,6]. The country exercises one of the lowest performances in job safety among the European Union countries.

Occupational accidents can be reduced by paying attention to the subject and taking effective and preventive measures. There are some tasks which

should be fulfilled in order to create a secure work place by employers, employees and associated public institutes. Employers should give importance to occupational health and safety, take preventative measures and train the employers regularly against work related accidents. Furthermore, the employers are responsible for applying the identified precautions. Personnel should be conscious and careful about the accidents and should fulfill their obligations regarding to work safety while working. Public institutions should work on creating a secure work place and creating a culture of work safety. Also one of the public agency's duties is to inspect whether the employers obey the legal statute about work safety [1].

In this study, fatal occupational accidents in Turkey are analyzed which were happened in 2013 in order to draw attention to this problem by using official references. In addition, Turkey is compared with Germany which is an exemplary country in fatal occupational accidents. In conclusion, several suggestions are developed under possible solution aspects.

II. GENERAL ASSESSMENT OF OCCUPATIONAL ACCIDENTS IN TURKEY

Occupational accidents must be reported to Social Security Institution (SSI) by using a standard form in Turkey. In this study, the statistical yearbooks regularly published by SSI have been used as a data source. The most comprehensive data related to occupational accidents is gathered and published by SGK which is a public institution. In the yearbooks, the occupational accidents occurring in all provinces are presented numerically in terms of many criteria [2,3,4,5,6,7].

The table 1 shows number of insured workers, number of accidents, number of deaths and permanent incapacities resulting from occupational accidents and n'of lost working days because of occupational accidents in Turkey for the last 5 years. As it can be seen from the table, Turkey is not in a good position compared to developed countries [2,3,4,5,6,7].

TABLE I. THE ANNUAL DISTRIBUTION OF THE OCCUPATIONAL ACCIDENT DATA IN TURKEY

Year	N'of Insured Workers	N'of Occupational Accidents	Deaths Resulting From Occupational Accidents	Permanent Incapacities Resulting From Occupational Accidents	N'of Total Lost Working Days Because of Occupational Accidents
2009	9.030.202	64.316	1.171	1668	14.952.106
2010	10.030.810	62.903	1.444	1976	18.020.346
2011	11.030.939	69.277	1700	2093	20.361.472
2012	11.939.620	74.871	744	2036	12.180.052
2013	12.484.113	191.389	1360	1660	16.519.380

It is not true to compare the countries, sectors or facilities with each others according to absolute data obtained from recorded accident numbers, number of cases of death or permanent incapacity or the number of lost working days; because countries, sectors, or the factories do not have the same number of workers. For this purpose comparison criterias determined by ILO are used [1]. This criterias are as follows:

- ✓ General Incidence Rate value represents the number of accidents for 1.000 workers in one calendar year.
- ✓ Fatal Incidence Rate value represents number of deaths resulting from occupational accidents per 1.000.000 workers in one calendar year.
- ✓ Accident weight rate value represents the number of lost workdays per 1.000.000 working hours in one calendar year because of occupational accidents.

According to data gathered for the years 2009-2013, general incidence rate, fatal incidence rate and accident weight rate values calculated for Turkey are given in Table 2 [2,3,4,5,6]. As it can be seen from the table, there has been a serious deterioration in 2013 compared to 2012 according to all of the three criteria. These figures indicate that work-related problems of Turkey are worsened day by day.

TABLE II. GENERAL INCIDENCE RATE, FATAL INCIDENCE RATE AND ACCIDENT WEIGHT RATE VALUES CALCULATED FOR OCCUPATIONAL ACCIDENTS OF TURKEY.

Year	General Incidence Rate	Fatal Incidence Rate	Accident Weight Rate
2009	6,2	129,7	641
2010	5,5	144,0	706
2011	5,5	154,1	721
2012	5,5	62,3	395
2013	13,2	108,9	507

III. ANALYSIS OF FATAL OCCUPATIONAL ACCIDENTS FOR THE YEAR 2013

A. Distribution of the deceased persons due to occupational accident by Gender

According to SSI statistics, 24 women and 1336 men, 1360 people died at total in Turkey due to occupational accidents in 2013 (Table 3) [2]. According to official figures, 9 women and 735 men, 744 people died at total in 2012[3]. It means that there is an increase as 83 % in 2013 compared to 2012. From this point of view, it is probable to conclude as:

- ✓ There is a serious increase in fatal work accidents in Turkey.
- ✓ The 83% rate of increase be explained that some fatalities might not be officially recorded in 2012 even there was not big change in OHS mechanism.
- ✓ It is crucial to review all regulations especially in Construction and Mining sectors which carry more risks in terms of fatal occupational accidents [8].

When fatal occupational accidents are assessed from gender point of view, approximately 2% of the fatal accidents are formed by females in 2012. There are two reasons behind it. Firstly, males mainly work in heavy and dangerous sectors as Construction and Mining compared to females. Secondly, unofficial works are more common for females. In other words, female fatalities cannot be officially recorded in a complete basis. When we look at SSI 2013 Statistics, female fatalities are only 24 people. Especially, seasonal agricultural workers were out in SSI Statistics. It means that female fatalities are not recorded very well; women are unofficially working in worst conditions, in other saying, woman labor force pale into insignificance. "Residence Services" which are well known as woman labor force, are excluded in Occupational Health and Safety Law no. 6331[9], it is not obvious in Social Insurance and General Insurance Law no.5510 [10].

Almost half of the women workers are employed in agricultural sector while many also work as unpaid family workers. The woman is involved in everything

related to agriculture in the fields, vineyards and gardens from planting to harvesting and marketing besides taking every responsibility for her home and children. In recent years, women have turned to seasonal employment in agriculture and other fields as casual workers because agents of production need cheap labour nationwide. Women agricultural workers suffer from various occupational accidents. However, there is not much recorded information about these accidents. Road accidents of buses carrying women workers are just one example.

15 percent of women workers work in industrial fields while 35 percent of them are employed in services. Such sectors as education, commerce, textile, municipalities and public services, accommodation, entertainment, health, food and chemistry are among the most notable ones. Most of these women, who are employed as casual workers, also do domestic work for free. They work in factories and workshops as well as at home. They knit and sew, do needlework, assemble electronic appliances, clean houses and nurse the elderly. They work extra hours irregularly without any social security and social benefits and suffer from various accidents. Road accidents of buses carrying women workers and falls while cleaning windows are just a few examples.

TABLE III. DISTRIBUTION OF THE DECEASED PERSONS DUE TO OCCUPATIONAL ACCIDENT BY GENDER (2013).

	N'of Fatality
Male	1.336
Female	24
Total	1.360

B. Distribution of the deceased persons due to occupational accident by Age Groups

According to statistics of SSI, in 2013, distribution of deceased persons due to occupational accident by age groups is seen on Table 4 [2].

TABLE IV. DISTRIBUTION OF THE DECEASED PERSONS DUE TO OCCUPATIONAL ACCIDENT BY GENDER (2013).

Age Groups	N'of Fatality
14-15	0
16-17	19
18-25	222
26-35	358
36-45	365
46-55	294
56-65	94
66+	8

Turkish law defines "those who are 14 years old but under 15 years old, and who finished her/his basic education" as children workers; and "those who are over 15 and under 18 years old" as young workers[11]. However, children enter the labor market at an earlier age to "earn their bread".

No child worker died in 2013 according to official records when Table 4 is reviewed!; number of young worker fatalities is only 19. Unfortunately, these figures do not reflect the reality. Unofficial workers are

broad since it is strictly prohibited to employ children younger than 14 years old and to employ children and youths in heavy and dangerous working fields [11].

According to "National Children's Rights Strategy and Action Plan" prepared by Ministry of Family and Social Policies by the end of 2013, 893 thousands of children work among 15 million 247 thousands children aged between 6 and 17. 292 thousands children aged between 6 to 14 work even it is strictly prohibited. Schooling decreases when the children work. According to the report, 20 % of 292 thousands children do not continue compulsory education. There is not a big difference in high school education either. 66 % of the children aged between 15 to 17 do not go to high school [12].

Age of retirement is defined under law considering divers status and conditions in Turkey. Until 8th of September, 1999, retirement age for woman was 38 and 43 for men. However, retirement age and pension liabilities have been escalated following the changes after 1999 and Social Insurance and General Insurance Law which came into force in 2008. Age of retirement will gradually be 65 as of 1st of January, 2048.

From this viewpoint, it is extremely possible to say that a major part of the 102 death cases over age of 55 that given in Table 4 is consist of currently retired employees or the employees have earned retirement. Also, a major part of 294 deceased persons in the age range 46-55 is either currently retired employees or the employees have earned retirement again. So, one of each dying 5-6 workers are labors that must be retire if their social security conditions that are provided, or work due to the poverty after retirement (because of gradual transition). The factors like that age-related reflex and mental weakness, lack of rest and lack of nutrition are utilized as the points caused that old employees are exposed to more occupational accidents.

C. Distribution of the deceased persons due to occupational accident by working period of the insured at the last workplace

According to statistics of SSI, in 2013, distribution of deceased persons due to occupational accident by working period of the insured at the last workplace is seen on Table 5 [2]. According to this table, 18 employees deceased in the first day of work. This interesting situation originates from later insuring of employees in same industries such as Construction in Turkey. Normally, it can be insured immediately when uninsured employee has an accident, thus it can be utilized as employee just started working in that day. In addition, it is noticeable result that 876 of 1360 deceased persons in 2013 have not completed the first year in the last workplace.

TABLE V. DISTRIBUTION OF DECEASED PERSONS DUE TO OCCUPATIONAL ACCIDENT BY WORKING PERIOD OF THE INSURED AT THE LAST WORKPLACE(2013).

Working Period of The Insured at The Last Workplace	N'of Fatality
1 Day	18
2-7 Day	86
8 - 30 Days	177
More than a month-3 months	226
More than 3 Months - 1 Year	369
More than a year- 2 Years	142
More than 2 years-5 Years	127
More than 5 years-10 Years	59
10+ Years	40
Unknown	116

D. Distribution of the deceased persons due to occupational accident by firm size

According to statistics of SSI, in 2013, distribution of deceased persons due to occupational accident by firm size is seen on Table 6 [2]. Enterprises are divided into 4 categories regarded as the employment size.

- ✓ Enterprises which employ less than 10 Employees named as Micro Scale Enterprises.
- ✓ Enterprises which employ including 10 less than 50 Employees named as Small Scale Enterprises.
- ✓ Enterprises which employ including 50 less than 250 Employees named as Medium Scale Enterprises.
- ✓ Enterprises which employ more than 250 Employees named as Large Scale Enterprises.

According to this classification;

- ✓ 303 death cases in Micro Scale Enterprises,
- ✓ 504 death cases in Small Scale Enterprises ,
- ✓ 348 death cases in Medium Scale Enterprises
- ✓ 109 death cases in Large Scale Enterprises

occurred in 2013. That is only 8% of all deaths were experienced in Large Scale Enterprises.

TABLE VI. DISTRIBUTION OF DECEASED PERSONS DUE TO OCCUPATIONAL ACCIDENT BY FIRM SIZE(2013).

Firm Size	Number of Insured In Workplace	N'of Fatality
Micro Scale Enterprises	1-3 Employees	119
	4-9 Employees	184
Small Scale Enterprises	10-20 Employees	207
	21-49 Employees	297
Medium Scale Enterprises	50-99 Employees	164
	100-199 Employees	145
	200-249 Employees	39
Large Scale Enterprises	250-499 Employees	65
	500-999 Employees	39
	1000 + Employees	41
Unknown size	Unknown size	60

E. Distribution of the deceased persons due to occupational accident by Months

According to statistics of SSI, in 2013, distribution of the deceased persons due to occupational accident by Months is seen on Table 7 [2]. Fatal occupational accidents are found to increase with July, especially with the need for seasonal work period. It is known that deaths resulting from occupational accidents are concentrated in areas of seasonal employment, where trade unions do not exist and in areas under precarious working conditions.

TABLE VII. DISTRIBUTION OF DECEASED PERSONS DUE TO OCCUPATIONAL ACCIDENT BY MONTHS (2013).

Months	N'of Fatality
January	108
February	82
March	84
April	108
May	103
June	107
July	129
August	124
September	140
October	118
November	124
December	133
Total	1.360

F. Distribution of the deceased persons due to occupational accident by Sectors

Fatal occupational accidents are listed in SSI Statistics specified as 99 sub-sectors specified according to NACE. 10 sub-sectors are shown in Table 8 which is leading in fatal occupational accidents [2]. When it is carefully considered, 3 sub-sectors among 10 shown in the table are linked to construction sector. 521 fatalities among 1360 were occurred in construction sector in 2013. Consequently, the most fatal sector is construction sector. Again, Transportation and Mining sectors are following where fatal activities are broadly seen.

TABLE VIII. DISTRIBUTION OF DECEASED PERSONS DUE TO OCCUPATIONAL ACCIDENT BY SECTORS (2013).

Classification of Economic Activity (NACE Rev.2) (Sectors)	N'of Fatality
41-Construction of buildings	296
49-Land transport and transport via pipelines	183
42-Civil engineering	121
43-Specialised construction activities	104
23-Manufacture of other non-metallic mineral products	48
05-Mining of coal and lignite	36
10-Manufacture of food products	35
25-Manufacture of fabricated metal products, except machinery & equipment	35
46-Wholesale trade, except of motor vehicles and motorcycles	35
47-Retail trade, except of motor vehicles and motorcycles	35

G. Distribution of the deceased persons due to occupational accident by Province

Fatalities resulting from occupational accidents in 2013 with respect to provinces according to SSI Statistics are shown in Table 9 [2]. Istanbul, the heart of industry, is leading where most of the fatalities occurred almost in each and every sector in Turkey. Accidents in mining in Zonguldak and Manisa; hospitality sector in Antalya; agriculture in Adana, Muğla, Aydın, Şanlıurfa and Mersin; organized industry in Ankara, Gaziantep, Tekirdağ, Samsun, Malatya, Kayseri and Malatya; metal industry in Bursa; chemistry in Kocaeli; nutrition in Konya and shipyarding in İzmir. Accidents in the sectors as seasonal agriculture, construction, energy, transportation and hospitality sectors happen each and every city of Turkey.

TABLE IX. DISTRIBUTION OF DECEASED PERSONS DUE TO OCCUPATIONAL ACCIDENT BY PROVINCE (2013).

Provinces	N'of Fatality
İstanbul	218
Ankara	116
İzmir	82
Antalya	62
Bursa	44
Konya	40
Gaziantep, Kayseri	37
Mersin	34
Kocaeli	33
Adana	29
Hatay, Manisa	28
Tekirdağ	26
Muğla, Şanlıurfa	22
Zonguldak	20
Eskişehir, Samsun	19
Aydın, Diyarbakır	18
Sakarya	17
Kahramanmaraş, Nevşehir	15
Van	14
Denizli, Elazığ, Erzurum, Sivas	13
Balıkesir, Kütahya, Karabük	12
Bilecik, Kırklareli, Tokat	11
Malatya, Trabzon, Şırnak, Osmaniye	10
Artvin, Çanakkale	9
Bolu, Mardin	8
Adıyaman, Afyonkarahisar, Kastamonu, Ordu, Uşak, Karaman	7
Giresun, Aksaray, Kırıkkale, Batman	6
Amasya, Erzincan, Isparta, Kars, Niğde, Sinop, Yozgat, Iğdır	5
Burdur, Çankırı, Edirne, Kırşehir, Siirt, Düzce	4
Çorum, Gümüşhane, Bartın	3
Bingöl, Muş, Rize, Ardahan, Yalova, Kilis	2
Bitlis	1
Ağrı, Hakkari, Tunceli, Bayburt	0

IV. COMPARISON OF TURKEY AND GERMANY IN TERMS OF THE FATAL OCCUPATIONAL ACCIDENTS

The countries becoming prominent regarding OHS are foremost northern countries (Sweden, Norway, Switzerland, Finland) and Germany, United Kingdom, United States of America, Japan and Canada. Germany is a country in which OHS mechanisms operate wholesomely. The demographic structure is similar to Turkey; it has the population of approximately 82 million. Its economy depends on mainly industry. In this regard, it is the most suitable country when compared to Turkey [13].

As the DGUV (Deutsche Gesetzliche Unfallversicherung - The German Social Accident Insurance) statistics are evaluated in terms of occupational accidents, data seen in Table-10 are obtained [14, 15, 16, 17, 18]. The Annual Distribution of The Occupational Accidents Data in Germany

Year	N' of Insured Workers	N' of Occupational Accidents	Deaths Resulting From Occupational Accidents
2009	36.462.823	1.064.712	818
2010	36.941.169	1.178.432	886
2011	37.475.591	1.107.477	892
2012	37.957.013	1.061.365	886
2013	38.873.944	1.060.181	772

According to data of DGUV in Germany, in the last 5 years, 5.472.167 occupational accident occurred. This means that, 1.094.433 occupational accidents were recorded per year on average in Germany. Again according to DGUV data, in Germany, in the last 5 years, 4.254 employees lost their lives as a result of occupational accidents. This means that in Germany 851 die of occupational accidents per year.

It is not so meaningful to compare the data of occupational accident of two countries by considering only absolute numbers. For example, as in 2013 Turkey had employees of approximately 12,5 million; in Germany this number is approximately 39 million. Due to this fact, Fatal Incidence Rate of Occupational Accidents (FIROA) comparison criteria will be used in this study. FIROA is a comparison criteria indicating how many of 1.000.000 employees dies due to occupational accident in a calendar year.

- ✓ FIROA represents number of deaths resulting from occupational accidents per 1.000.000 workers in one calendar year.

FIROA values calculated for Turkey and Germany are given in Table-11. According to the Table-11, Turkey shows a much worse performance than Germany in terms of fatal occupational accidents (FIROA). On the average in the last 5 years, the possibility of death as a result of occupational accident for Turkish worker is 5 times of the possibility of death of German worker. In other words, if there is a healthy OSH mechanisms in Turkey as Germany, 4 out of every 5 deaths could have been prevented.

TABLE X. FIROA VALUES CALCULATED FOR TURKEY AND GERMANY

Year	FIROA values (TURKEY)	FIROA values (GERMANY)
2009	129,7	22,4
2010	144,0	24,0
2011	154,1	23,8
2012	62,3	23,3
2013	108,9	19,9

V. DISCUSSION OF RESULTS AND RECOMMENDATIONS

Turkey has taken solid steps on occupational safety since 2006. But these steps are not enough to download fatal accidents to the desired level. The fatal accidents reveal that Turkey has to take additional measures to prevent work-related deaths. According to Turkish Statistics Institute (TurkStat), Turkey is the country with the third largest number of workplace fatalities in the world and the country with the highest number of workplace deaths in Europe in 2013.

Human life is very precious and over all kinds of economic values. For this reason, in this study, fatal occupational accidents were analyzed that occur in Turkey in 2013. The findings obtained from the study are summarized below:

- ✓ One thousand-three hundred-and-sixty people died in work-related accidents in 2013.
- ✓ According to data released by the Labor and Social Security Ministry in 2013, 525 work accidents happen daily in Turkey, four of which, on average, are fatal.
- ✓ According to the ILO criterion, it is estimated that the total annual cost of work accidents in Turkey at 32 billion \$ for 2013[19, 20].
- ✓ Turkey has seen a rise in the number of work-related fatalities. In 2012, there were 774 recorded deaths resulting from occupational accidents. However, in 2013, the number of work-related deaths ballooned to 1360 with an increase of 83 percent with respect to 2012. According to unofficial figures announced by İstanbul Workers' Health and Job Safety Assembly number of fatalities as a result of work-related accidents in 2014 in Turkey has increased to 1886.
- ✓ Most of the work-related deaths occur in the Construction and Mining sectors in Turkey. Approximately 39% of all fatalities occurred in the just construction sector. Five hundred-twenty-one construction workers died in 2013; most of the deaths were the result of falls. Increasing the usage of formwork and scaffolding systems would significantly reduce the occupational hazards of working on a construction site.
- ✓ According to TurkStat data, nineteen children died in work-related incidents in 2013. On the other hand, one hundred and two workers 55 and older died on the job in the same period.
- ✓ Most of the fatal work accidents took place in the provinces of İstanbul, Ankara, Izmir, Antalya and Bursa.
- ✓ Male workers constitute a large portion (98%) of the deceased persons due to occupational accidents. There are two basic reasons for this reality. Firstly, Male employees are more preferred

for the dangerous and very dangerous jobs. Secondly, the rate of unregistered employment is high in the Female employees in some dangerous sectors, especially agriculture.

- ✓ According to TurkStat data, 85% of all deaths resulting from occupational accidents occur in enterprises with less than 250 employees. OSH measures should be revised in micro, small and medium scale enterprises.
- ✓ Experience is one of the most important factors influencing fatal accidents. The number of workers who lost their lives in the first working day is 18 and in the first month is 281.
- ✓ Unfortunately all accidents that occur in general of Turkey can not be recorded. Underreporting, as in all over the world, emerges as an important problem for Turkey as well. While about 1.060.000 accidents have proceed to records per year in Germany which has 82 million of population, Turkey with a population of 78 million only approximately proceed to records of 170.000 accidents, is the most important indicators of this. For this reason, it is an undeniable fact that the real situation of Turkey in terms of occupational accidents are worse than the numbers given in this study.

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