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## ANALYSIS OF OCCUPATIONAL HEALTH AND SAFETY DATA BETWEEN 2003 -2015 IN TURKEY

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## ABSTRACT

**Purpose** - The aim of this study was to analyse the officially recorded data of Turkey on occupational accidents by covering various kinds of data between the years 2003 - 2015. By this study a view is aimed to be taken over Turkey's behaviour on occupational health and safety.

**Methodology** – In this study, the statistical yearbook of the Social Security Institution (SSI) of the Republic of Turkey has been used as a data source. These data are arranged yearly and the trend is evaluated.

**Findings**- The number of occupational accidents had fluctuations as increases and decreases between the years 2003-2012. After the year 2012, the number of occupational and fatal accidents had increased more than twice. The occupational accidents have occurred at the highest rates in the most populated and industrialized two cities in Turkey. Economic activities having the highest percentage of occupational accidents has been determined and interpreted.

**Conclusion**- Occupational accidents can be reduced by taking effective and preventive measures. There are some tasks that should be fulfilled in order to create a secure work place by employers and employees. Employers should apply occupational health and safety legislation and take preventative measures and train the employers regularly against work related accidents. Furthermore, employees should be conscious and careful about the accidents and fulfill their obligations regarding to work safety while working. Public institutions should work more on creating a secure work place and creating a culture of work safety.

**Keywords:** Occupational accident, safety, statistics, occupational safety and health, Turkey.

**JEL Codes:** I18, J28, J89

## 1. INTRODUCTION

Occupational health and safety (OHS) is a complex phenomenon in working life. Prevention of work accidents is one of the major goals in occupational safety but it is extremely difficult without understanding the causes of accidents (Salguero, 2015). Statistical data on occupational accidents have great importance in evaluation of preventive measures (Palvic, 2011).

The European Statistics on Accidents at Work (ESAW) project was launched in 1990, to harmonize data on accidents at work. In 2001, 'European Statistics on Accidents at Work - Methodology', was published by Eurostat, which is the statistical office of the European Union. Its task is to provide the European Union with statistics at European level that enable comparisons between countries and regions. At international level, International Labour Organization (ILO) aims to promote rights at work, encourage decent employment opportunities, enhance social protection and strengthen dialogue on work-related issues. Although there are slight differences between the ILO and the ESAW classification schemes, they organize statistical results at international level. In Turkey, the statistical data about the occupational health and safety is collected and published by the Social Security Institution of the Republic of Turkey, which is an official agency of the government. After the year 2012, SSI started to publish the data of OHS according to ESAW methodology. The aim of this process is to compare the statistical data of occupational accidents and their causes between the European countries and Turkey more accurately. In Turkey, there has been a growing awareness about occupational health and safety after the Law 6331. The Occupational Health and Safety Law No. 6331 was prepared based on the principles of the EU Directive No. 89/391 and was enacted on 30 June 2012. In the following years, a number of secondary legislation complementary to the

OHS Law has been enacted. Despite some substantial improvements achieved, the rate of accidents is still significantly high. Occupational accidents lead to many fatal and nonfatal injuries in Turkey (Unsar, 2009). The Social Security Institution of the Republic of Turkey reported that 241,547 insured worker suffer from work accidents in 2015, while the number of death cases was 1,252. Before the Law 6331, employers were obliged to report occupational accidents and occupational diseases to both the Social Security Institution and the related regional/provincial directorate of the Turkish Labour Agency. The Law 6331 eliminated the requirement to report to the Turkish Labour Agency. Occupational accidents and diseases have to be reported online to the SSI within 3 days from date when the occupational accident happened and the date that the occupational disease was diagnosed and reported to the employer, respectively. The employer must report the occupational accidents to the SSI in a standard information form electronically via online submission. Since 2013, the work accident notification forms have been received on electronic environment and the work accident insurance data have published in accordance with the European Union. If the resumption of work occurred 3 days after the work accident, the accident was added to the work accident statistics. In case of fatal accident at work, the definition adopted by the ESAW project is that of 'accidents at work leading to the death of the victim within a year (after the day) of the accident'. In practice the majority of the Member States send the cases of fatal accidents at work counted in their national statistics. In fact, the majority of the accidental deaths occur either immediately at the time of the accident, or within a few days or a few weeks after the accident.

According to the Article 13 of the Social Security and General Health Insurance Law No. 5510, work accident is the incident which occurs; a) when the insurance holder is at the workplace, b) due to the work carried out by the employer or by the insurance holder if he/she is working on behalf of own name and account, c) for an insurance holder working under an employer, at times when he/she is not carrying out his/her main work due to the reason that he/she is sent on duty to another place out of the workplace, d) for a nursing female insurance holder at times allocated for nursing her child as per labour legislation, e) during insurance holder's going to or coming from the place, where the work is carried out, on a vehicle provided by the employer, and which causes, immediate or delayed, physical or mental handicap in the insurance holder. According to the Article 14 of the Social Security and General Health Insurance Law No. 5510, occupational disease is defined as temporary or permanent disease, physical or mental handicapped status, caused by a reason reiterated due to the quality of the work made or worked by the insurance holder or by the working conditions. It is obligatory to determine that an occupational disease is developed in the insurance holder by the Institution's Health Committee after; examining the health committee report, and the medical documents the report is based on, prepared duly by the providers of healthcare services authorized by the Institution, if found necessary by the Institution, examining the inspection reports, and other necessary documents, which show the working conditions at the workplace and the medical consequences based on this. Permanent absence from work is defined that the insurance holder, whose earning power in the profession, due to the disease or disabilities caused by work accident or occupational disease, is determined to be reduced by 10% by the Institution's Health Committee based on reports issued by the health committees of health - care service providers authorized by the Institution, shall be qualified for permanent incapacity income (5510 numbered laws' 19th article). As a result of permanent absence from work, employee become unable to do his/her work and retires or starts to work in an inactive position. The worker who are permanently absent from work is called permanent disabled employee.

The statistical study of occupational accidents is an important way to describe the general assessment of the occupational accidents. This study aims to examine the official data of fatal and nonfatal occupational accidents covering all economic activities, age ranges, incidence rate and weight rate of work accidents, occupational diseases, permanently disabled employees, type of injuries, injured part of the bodies, and the cities in which the accidents occur.

## **2. DATA AND METHODOLOGY**

In this study, the statistical yearbook of the Social Security Institution of the Republic of Turkey has been used as a data source. SSI is a public institution that gathered and published the work accidents and occupational diseases statistics in all provinces and in many criteria like economic activities, gender, the number of fatal and nonfatal accidents, and distributions of temporary and permanent incapacity data. The incidence rate of work accidents is calculated in two different methods in the SSI yearbook. One of the methods represents the incidence rate of work accident per 1,000,000 work hours. The second method represents incidence rate of work accident per 100 persons. They are calculated as follows:

$$\text{Incidence rate of work accident per 1,000000 work hours} = \text{NEI} / (\text{NDPA} * 8) * 1,000,000 \quad (1)$$

$$\text{Incidence rate of work accident per 100 persons} = \text{NEI} / (\text{NDPA} * 8) * 225,000 \quad (2)$$

NEI is the number of employment accidents and NDPA is the number of days of premium accrued represents total days worked by all insured persons during calendar year. In the first method, NDPA is multiplied by 8 hours per day and multiplied by 1,000,000 as base for proportion of number of accidents per 1,000,000 working hours. In the second method, NDPA is multiplied by 8 hours per day and multiplied 225,000 base for 100 equivalent full time insured person (working 45 hours per week, 50 weeks per year). The weight rate of accidents is calculated in two different methods. One of the

methods represents the number of lost workdays per 1,000,000 working hours while the other method represents the number of lost hours per 100 working hours because of employment accidents. They are calculated as follows:

$$\text{Weight rate of work accident (Days)} = \text{TLD} / (\text{NDPA} * 8) * 1,000,000 \quad (3)$$

$$\text{Weight rate of work accident (Hours)} = (\text{TLD} * 8) / (\text{NDPA} * 8) * 100 \quad (4)$$

$$\text{TLD} = (\text{Duration of temp. Incapacity as day}) + (\text{Total degree of permanent Incapacity} * 75) + (\text{Number of death} * 7,500) \quad (5)$$

TLD is the number of total lost working days because of employment accidents. NDPA is number of days of premium accrued represents total days worked by all insured persons during calendar year. In the first method, NDPA is multiplied by 8 hours per day and multiplied by 1,000,000 as base for proportion of number of total lost workdays per 1,000,000 working hours. In the second method, NDPA is multiplied by 8 hours per day and multiplied base for proportion of number of total lost hours per 100 working hours.

### 3. FINDINGS AND DISCUSSIONS

The number of compulsory insured employee, the number of employment accidents, the number of occupational diseases, the number of the death cases and the number of the permanently disabled employee in Turkey between 2003 and 2015 are shown in Table 1. The number of insured employee increased each year. The average number of compulsory insured employee between 2003 and 2015 was 9,661,332, while the average number of employment accidents was 107,126, the number of occupational diseases was 544, the number of the death cases was 1,196 and the number of the permanently disabled employee was 1,926. It is seen that the number of employment accidents in 2013 is 2.5 times higher than the year 2012. The main reason of this increase is the change of the methodologies in the work accident case number statistics. Since 2013, the work accident notification forms have been received on electronic environment and the work accident insurance data have been published by European Union Standards taken into consideration. The number of fatal cases due to occupational accidents and diseases has shown fluctuations, however it has started to increase last two years. Although the number of occupational accidents and deaths increase, the number of insured employees has been increasing every year. Under this circumstance, it could be more reliable to evaluate the percentages of employment accidents, occupational diseases and fatal cases. Table 1 shows the percentages of employment accidents, occupational diseases, death cases and permanently disabled employee in Turkey. The data of Table 1 is arranged according to article 4-1/aof act 5510. The percentage of employment accidents has been decreasing until the year 2010, and then it remains constant until the year 2013. In 2013, the percentage increase by 2.4 times and continue to increase in 2014 and 2015.

**Table 1: The Percentages of Employment Accidents and Cases**

Year	Number of compulsory insured employee <sup>a</sup>	Number of employment accidents	Percentage of employment accidents <sup>b</sup>	Number of occupational diseases	Percentage of occupational diseases <sup>c</sup>	Number of death cases <sup>d</sup>	Percentage of death cases <sup>c</sup>	Number of permanently disabled employee <sup>e</sup>	Percentage of permanently disabled employee <sup>c</sup>
2003	5,615,238	76,668	1.37	440	0.57	810	1.06	1,451	1.89
2004	6,181,251	83,830	1.36	384	0.46	841	1.00	1,421	1.70
2005	6,918,605	73,923	1.07	519	0.70	1,072	1.45	1,374	1.86
2006	7,818,642	79,027	1.01	574	0.73	1,592	2.01	1,953	2.47
2007	8,505,390	80,602	0.95	1,208	1.50	1,044	1.30	1,956	2.43
2008	8,802,989	72,963	0.83	539	0.74	866	1.19	1,694	2.32
2009	9,030,202	64,316	0.71	429	0.67	1,171	1.82	1,885	2.93
2010	10,030,810	62,903	0.63	533	0.85	1,454	2.31	2,085	3.31
2011	11,030,939	69,227	0.63	697	1.01	1,710	2.47	2,216	3.20
2012	11,939,620	74,871	0.63	395	0.53	745	1.00	2,209	2.95
2013	12,484,113	191,389	1.53	351	0.18	1,360	0.71	1,694	0.89
2014	13,240,122	221,366	1.67	494	0.22	1,626	0.73	1,509	0.68
2015	13,999,398	241,547	1.73	510	0.21	1,252	0.52	3,596	1.49

<b>Total</b>	<b>1,392,632</b>	<b>7073</b>	<b>15,543</b>	<b>25,043</b>
<b>Average</b>	<b>9,661,332</b>	<b>107,126</b>	<b>544</b>	<b>1,196</b>

a Number of compulsory insured persons under Article 4-1/a of Act 5510

b Percentage of employment accidents is calculated with respect to number of compulsory insured employee

c Percentages are calculated with respect to the number of employment accidents

d Number of death cases including employment accidents and occupational disease

e Number of permanent incapacity including employment accidents and occupational disease

The percentage of the death cases has shown fluctuations by decreasing and increasing between the years 2003 and 2015. The maximum percentage was 2.47 in 2011, while the minimum percentage was 0.71 in 2013. In 2015, the number and the percentage of death cases was 1,252 and 0.52% respectively. Since the number of compulsory insured employee increased, the percentage of death cases was lower than the other years. According to SSI records, 7,073 occupational disease cases are determined in last 13 years. The average number of occupational diseases is 544 between the years 2003 and 2015. In 2007, 1,208 cases were recorded as occupational disease, which is the highest amount. Although there has been the perception that Turkey has a good performance regarding occupational diseases, the reality is that the occupational diseases have not been reported. Furthermore, 25,043 permanently disabled employees were reported in last 13 years. The average number of permanently disabled employees is 1,926 between the years 2003 and 2015. The distribution of the number of employment accidents cases of insured employee by the age groups and its percentages between 2003 and 2015 are shown in Table 2. The data of Table 2 is arranged according to article 4-1/aof act 5510. Throughout the years, the highest numbers of occupational accidents are observed in the 25-44 age group since this is the age range in which the highest number of insured employees exists. The 19-24 age group has the second highest number of percentages and the age group 18 and below shows the lowest percentage of accidents between the years 2003-2015. Thus it is observed that most of the accidents happen between the ages 25-44. In 2015, the highest percentage of accidents is 64.38 at the 25-44 age group and the second highest percentage is 18.66 at the 19-24 age group.

**Table 2: The dDtribution of the Number of Employment Accidents of Insured Employee by the Age Groups and Its Percentages**

Year	Age of workers 18 and below		Age of workers 19-24		Age of workers 25-44		Age of workers 45 and above	
	Number of workers	Percentage	Number of workers	Percentage	Number of workers	Percentage	Number of workers	Percentage
2003	223	0.29	9,982	13.02	60,138	78.44	6,325	8.25
2004	1,009	1.20	15,285	18.23	62,248	74.26	5,288	6.31
2005	1,232	1.67	16,343	22.11	52,465	70.97	3,883	5.25
2006	2,789	3.53	19,965	25.26	52,803	66.82	3,470	4.39
2007	3,906	4.85	22,886	28.39	50,917	63.17	2,893	3.59
2008	4,045	5.54	23,062	31.61	43,484	59.60	2,372	3.25
2009	352	0.55	9,724	15.12	48,402	75.26	5,848	9.09
2010	234	0.37	9,353	14.87	47,278	75.16	6,038	9.60
2011	349	0.50	10,810	15.62	50,752	73.31	7,316	10.57
2012	508	0.68	12,043	16.08	53,664	71.68	8,656	11.56
2013	2,844	1.49	40,199	21.00	127,536	66.64	20,810	10.87
2014	3,394	1.53	46,671	21.08	145,171	65.58	26,130	11.80
2015	9,622	3.98	45,081	18.66	155,505	64.38	31,339	12.97

Percentages are calculated with respect to total number employment accidents. Incidence rate and weight rate of work accidents are shown in Table 3 which is arraged accordingly to article 4-1/a of act 5510. The incident rates have been gradually decreasing until 2013. In 2013, the incident rates have been doubled. In terms of weight rate of work accidents, the rates decreased until the year 2005, afterwards there are fluctuations between the years 2006 – 2012. Slight increases are observed at the weight rate and incidence rate of work accidents between 2013 and 2015.

**Table 3: The Incidence Rate and Weight Rate of Work Accidents**

Year	Incidence rate of work accident <sup>a</sup> (per 1000000 work hours)	Incidence rate of work accident <sup>b</sup> (per 100 person)	Weight rate of work accident <sup>c</sup> (Days)	Weight rate of work accident <sup>d</sup> (Hours)
2003	5.46	1.23	847	0.68
2004	5.52	1.24	791	0.63
2005	4.27	0.96	782	0.63
2006	4.03	0.91	961	0.77
2007	3.61	0.81	634	0.51
2008	3.10	0.70	519	0.42
2009	2.76	0.62	641	0.51
2010	2.46	0.55	706	0.56
2011	2.45	0.55	721	0.58
2012	2.43	0.55	395	0.32
2013	5.88	1.32	507	0.41
2014	6.51	1.47	514	0.41
2015	6.77	1.52	565	0.45

a This method represents the number of accidents per 1.000.000 working hours

b This method represents the number of accidents per 100 full-time workers

c This method represents the number of lost workdays per 1.000.000 working hours

d This method represents the number of lost hours per 100 working hours because of employment accidents

The distribution of the number of insured employee having work accidents by provinces is shown in Table 4 that is prepared according to article 4-1/a act of 5510. Although there are 81 provinces in Turkey, most of the work accidents happen in Istanbul, Izmir, Ankara, Bursa, Kocaeli, Manisa provinces. Between the years 2003 and 2009, the work accident rate had varied between Izmir and Istanbul. After 2009, Istanbul had the highest work accident rate across the country. In 2015, the number of occupational accidents in Istanbul was 56,623. The number of accidents in Istanbul was two times higher than in Izmir, and equivalent to the summation of the accident records in Ankara, Bursa and Kocaeli. During the last 13 years, 829,708 occupational accidents have occurred in Istanbul, Izmir, Ankara, Bursa, Kocaeli, and Manisa. This value was 59.6% of the total occupational accident cases in the 81 provinces in Turkey between 2003 and 2015.

**Table 4: The Distribution of the Number of Insured Employee having Work Accidents by Provinces**

Year	Istanbul	Izmir	Ankara	Bursa	Kocaeli	Manisa	Other provinces
2003	9,144	10,560	2,933	6,903	6,795	3,428	36,905
2004	9,205	11,199	3,539	8,341	7,792	4,185	39,569
2005	9,697	9,258	3,278	7,440	6,941	5,487	31,822
2006	10,422	9,651	3,404	8,091	7,201	6,623	33,635
2007	10,197	9,832	3,569	8,394	7,532	5,073	36,005
2008	8,489	10,095	3,472	7,150	3,601	6,145	34,011
2009	8,901	7,461	2,234	5,884	2,577	4,600	32,659
2010	7,991	7,942	2,715	7,580	3,203	5,604	27,868
2011	9,303	7,852	2,625	5,450	4,738	5,629	33,630
2012	9,450	7,596	3,081	9,303	3,052	7,227	35,162

<b>2013</b>	37,076	19,429	14,368	12,530	12,476	10,706	84,804
<b>2014</b>	46,559	20,814	16,133	15,595	15,300	11,283	95,682
<b>2015</b>	56,623	22,572	76,668	17,801	17,426	9,285	41,172
<b>Total</b>	<b>233,057</b>	<b>154,261</b>	<b>138,019</b>	<b>120,462</b>	<b>98,634</b>	<b>85,275</b>	<b>562,924</b>

The distribution of economic sectors according to the number of accidents of insured employee between the years 2003 and 2015 is given at the Table 5. The data of Table 5 is also arranged according to article 4-1/a of act 5510. The given economic sectors are achieved from SSI and selected due to the most occupational accidents occurrence. There are seven main economic sectors defined on the Table 5 and the rest of the sectors are gathered in the column named as 'others'. These sectors are, manufacture of fabricated metal products, except machinery and equipment, construction of buildings, manufacture of basic metals, manufacture of textiles, manufacture of food products, manufacture of other non-metallic mineral products, mining of coal and lignite and others. Between the years 2003 and 2004 the highest occupational accidents are observed in the sector of manufacture of fabricated metal products, except machinery and equipment. Throughout the years 2003 to 2008 there had been some small fluctuations, but between the years 2009 and 2011 there was a distinctive decrease in the number of occupational accidents. Between the years 2005 and 2008 the number of accidents among the sectors seemed to be increasing while the number of accidents at the manufacture sector of food products decreased. According to the SSI economic sector numbers between 2003 and 2015, the first three sectors with the highest percentage of occupational accidents are 'manufacture of fabricated metal products except machinery and equipment', 'mining of coal and lignite' and 'construction of buildings'.

**Table 5: Distribution of the number of insured having work accident by classification of economic activity**

Year	Manufacture of fabricated metal products, except machinery and equipment	Construction of buildings	Manufacture of basic metals	Manufacture of textiles	Manufacture of food products	Manufacture of other non-metallic mineral products	Mining of coal and lignite	Other Sectors
<b>2003</b>	9,682	8,198	4,453	7,382	2,892	4,657	5,647	33,757
<b>2004</b>	11,584	8,106	5,636	6,839	3,074	5,626	5,481	37,484
<b>2005</b>	10,283	6,480	4,964	5,869	2,334	4,891	6,011	33,091
<b>2006</b>	11,039	7,143	5,506	5,155	2,452	5,311	6,722	35,699
<b>2007</b>	11,224	7,615	5,923	5,639	2,438	5,087	6,293	41,317
<b>2008</b>	6,971	4,550	4,029	3,641	1,910	3,504	5,728	47,180
<b>2009</b>	7,314	3,497	4,819	3,771	2,484	3,569	8,193	30,669
<b>2010</b>	6,918	3,056	4,621	3,474	2,422	3,861	8,150	30,401
<b>2011</b>	7,268	3,836	3,836	3,239	2,590	4,240	9,217	33,565
<b>2012</b>	7,045	4,511	4,938	5,127	2,972	3,733	8,828	37,717
<b>2013</b>	15,699	14,286	12,061	10,996	9,111	9,213	11,289	148,435
<b>2014</b>	18,529	13,508	12,357	12,128	10,971	10,244	10,026	133,603
<b>2015</b>	19,221	7,498	12,529	12,041	12,003	10,242	7,429	160,584

Table 6 whose data is taken under article 4-1/a of act 5510, shows the type of injuries resulted from occupational accidents between the years 2003 and 2015. For SSI started using ESWA methodology in 2013, there has been a significant change at statistical data. Some of the categories under the heading of the type of injuries have changed. New categories have been added and some of the categories are removed. The new main headings are 'Effects of temperature extremes, light and

'radiation', 'Effects of sound, vibration and pressure' and 'Shock'. 'Wounds and superficial injuries' is the most occurred accident, followed by 'dislocations, sprains and strains' and 'bone fractures'. In case of these categories no fluctuations are observed between the years 2003 and 2015. However, on the other categories fluctuations can be seen from year to year. Two categories named as 'Crushed and contusions' and 'Contamination of the body or the eye with a foreign object' for the years 2013 and 2015 have no available data.

**Table 6: Distribution of the number of insured having work accident by type of injury**

Year	Wounds and superficial injuries	Disloca-tions, sprains and strains	Bone fractures	Burns, scalds and frost-bites	Poison-ings and infec-tions	Concus-sion and internal injuries	Type of injury unknown or unspecified	Other specified injuries not included under other headings	Crushed and contusions	Contami-nation of the body or the eye with a foreign object	Others
2003	28,586	11,468	8,470	2,932	508	224	1,171	1,380	18,499	2,870	560
2004	32,974	12,513	7,631	2,940	367	131	946	1,200	22,295	2,833	0
2005	28,410	9,944	7,446	2,774	150	91	1,463	900	20,887	1,858	0
2006	30,130	8,707	9,626	2,846	103	102	1,675	2,772	21,532	1,534	0
2007	35,863	7,455	10,188	2,513	270	152	1,850	3,947	17,257	1,094	13
2008	33,281	5,162	9,871	2,065	94	108	1,675	4,239	15,591	877	0
2009	26,743	4,389	9,184	1,524	74	114	2,423	4,452	14,697	715	1
2010	24,833	5,553	8,531	1,762	245	61	2,003	2,404	16,462	1,049	0
2011	26,154	7,279	10,027	1,964	191	56	3,249	1,124	18,051	1,132	0
2012	36,405	6,579	7,433	1,246	273	149	12,874	1,691	7,250	971	0
2013	85,469	27,305	16,172	4,794	1,857	924	9,459	42,876	N/A	N/A	2,533
2014	101,158	31,571	17,202	5,626	4,075	895	10,697	47,389	N/A	N/A	2,753
2015	112,397	35,858	18,131	6,277	2,450	920	11,232	51,432	N/A	N/A	N/A

Table 7 reflects the number of accidents at work by part of the body injured between the years 2003 and 2015. The data of Table 7 is prepared according to article 4-1/aof act 5510. The same change on calculations in others statistics change of the methodology through ESAW has caused an increase at the figures. That is why as it is done in other tables, to evaluate the numbers in their related methodologies would give a more accurate view. There had been a difference in coding after 2013 and this coding became the same as in Eurostat. SSI classified body parts affected from occupational accidents in 8 categories. The categories are listed as 'upper extremities'; 'lower extremities'; 'other parts of body injured', 'not mentioned'; 'head'; 'part of body injured, not specified, back including spine and vertebra in the back'; 'whole body and multiple sites, not further specified'; 'torso and organs, not further specified and neck, inclusive spine and vertebra in the neck'. Before changing the statistics as ESAW methodology between the years 2003 and 2012, the highest values are seen in 2004. However, to have a more accurate view, the numbers after 2013 are more significant. As it can be seen from Table 7 the most injured part of bodies is 'upper extremities' and 'lower extremities'.

**Table 7: Distribution of the Number of Insured having Work Accident by Injured Part of the Body**

Year	Upper Extremities, not further specified	Lower Extremities, not further specified	Other Parts of body injured, not mentioned above	Head, not further specified	Part of body injured, not specified	Back, including spine and vertebra in the back	Whole body and multiple sites, not further specified	Torso and organs, not further specified	Neck, inclusive spine and vertebra in the neck
2003	39,747	19,340	391	7,454	470	3,934	1,888	2,497	427
2004	44,198	22,058	454	7,673	691	3,981	2,211	2,091	473
2005	39,791	19,272	505	5,865	1,260	3,610	1,287	2,003	330
2006	42,697	20,355	542	5,549	2,533	3,658	1,317	1,767	609
2007	43,290	20,207	3,508	4,239	1,697	2,572	1,258	1,907	340
2008	38,992	16,650	5,397	4,527	1,228	2,586	1,238	2,041	304
2009	32,636	16,604	3,431	4,113	1,770	1,964	1,249	2,152	394
2010	34,151	14,855	1,485	5,028	1,326	2,308	887	2,461	402
2011	36,885	16,984	714	5,843	2,375	2,909	1,272	1,810	435
2012	36,248	14,541	2,851	5,337	8,887	3,218	1,443	1,646	700
2013	73,550	36,969	34,387	23,049	9,821	4,700	3,643	4,111	1,159
2014	85,566	42,223	39,298	26,349	11,013	5,615	5,086	4,823	1,393
2015	94,014	46,710	42,946	29,062	11,285	5,973	4,723	5,344	1,490

The statistical study of occupational accidents is a good way to describe and assess the occupational safety profile of a country .According to the 2012 statistical data of Eurostat 2.5 million non-fatal accidents and 3,515 fatal accidents occurred in 28 member states of the European Union. According to the statistical data of the Social Security Institution of the Republic of Turkey, there has been a significant increase of non-fatal and fatal occupational accidents in Turkey since 2013. The number of nonfatal occupational accidents in 2013 was 2.5 times higher than the year 2012. However, it is difficult to compare the data before and after 2013 (Unsar (2009), Turkan (2016)). Statistically significant differences were established in methodologies of the reported non-fatal and fatal occupational accidents. There is an inconsistency in the data of the statistical yearbooks of the Social Security Institution of the Republic of Turkey. In 2013, The Occupational Health and Safety Law No. 6331 imposed on employers to report all accidents on electronic environment. In addition to that the Social Security Institution of the Republic of Turkey started to record and publishes the work accident insurance data by European Union standards so the occupational accidents resulting in more than three consecutive days of work absence were included. Furthermore, the records of fatal occupation accidents include the cases where death occurred within a year after the accident. As a result of these changes, a significant increase was observed in the number of occupational accidents.

There are several contradictory interpretations of the relationship between age and occupational accidents at work (Burt, 2015). Some researchers have found no significant differences in work accidents among the various age groups (Macedo, 2015). Others have found a higher accident rate for workers in the intermediate groups; those age 28-47 (Root, 1981). In Turkey, the relationship between the age of employees and the number of accidents showed that the employees at the age group 25-44 have more work accidents than the other age groups. Although the number of insured employee is highest at this age group, this is not enough to explain the highest number in occupational accidents. Employees at the age group 25-44 are generally reckless, have dangerous jobs and don't have enough experience. On the other hand, age group older than 45 have lower accidents rates because they are experienced, mature, and are mindful of workplace hazards. Older workers still have accidents because of declining reflexes, hearing, and vision.

In case of occupational diseases, the majority of the occupational diseases, and the death cases due to occupational diseases and the permanent incapacity cases were not sufficiently recorded (Ceylan, 2015) in Turkey. Because of the difficulty in the determination of background conditions causing occupational diseases, recording may not be possible in some of the cases. Another reason is the lack of institutions and doctors with the authority to make medical diagnosis on occupational diseases. In Turkey, there are only three occupational disease hospitals in Ankara, Istanbul and Zonguldak. These three occupational diseases hospitals were not enough and efficient to trace an occupational disease for 81 cities in Turkey. Moreover, they were not reachable for all employees to confirm an occupational disease. In these circumstances a new regulation has been adjusted in the year 2013 to identify new authorized health care providers for tracing and diagnosis of occupational diseases. The authorization was given by the Health Ministry. According to the new regulation the occupational diseases and injury claims can be also made to training and research hospitals, government hospitals and medical faculty hospitals.

Incidence rate of work accidents is an alternative way to analyse the information on accidents at work. It expresses the number of accidents in relation to the number of persons employed. According to the ESSAW Methodology, the incidence rate is defined as the number of accidents at work per 100,000 persons in employment. Eurostat publishes standardized incidence rates to take account of differing industrial backgrounds across member states. Across the EU-28 there were, on average, 1702 non-fatal accidents per 100,000 persons employed in 2012. In case of Turkey, incidence rate of work accidents is calculated per 100 workers in the annuals of SSI as explained in methodology part. The occupational accident incidence rate is 1.52 per 100 workers (1,520 per 100,000) for all sectors in Turkey in 2015. The incidence rates in Turkey seem lower than EU-28 countries. However, Turkey's situation is much worse than all European countries. The majority of occupational accidents occurred in Turkey are not reported to the SSI. Thus, the official data is not reliable.

When the distribution of the work accidents throughout Turkey was analysed, it was observed that most of the accidents happened in Istanbul, Izmir, Ankara, Bursa, Kocaeli and Manisa provinces. This observation can probably be explained by the population and economic activities in these cities. Generally, the number of occupational accidents is higher in the industrialized and populated cities. According to the statistics of Turkish Statistical Institute, 18.5% of Turkey's population lives in Istanbul. Approximately 38% of the Turkey's population inhabits in these 6 cities that have the highest number of occupational accident statistics. According to the survey of Socio-Economic Development Ranking Survey of Provinces and Regions the most developed provinces are Istanbul, Ankara, Izmir, Kocaeli, Antalya and Bursa. Furthermore, there are several construction sites in Istanbul. Since the construction sector has one of the highest numbers of accidents, this causes a rise in the accident rates in Istanbul.

According to the 2013 statistical data of Eurostat, the economic sectors are classified also as manufacture, construction, manufacture of basic metals, manufacture of textiles, manufacture of food products, manufacture of other non-metallic mineral products, mining of coal and lignite and others. Because of the changed methodology of statistical data, it's hard to compare the data before 2013. The Eurostat data covers 28 EU countries non-fatal accidents. The most significant data is on mining of coal and lignite, the number of non-fatal accidents on mining sector is 3 times higher than the number in EU28. The following economic sector on non-fatal accidents is textile manufacturing. The numbers of occurred non-fatal accidents are nearly the same with EU28 and Turkey. According to the 2012 statistical data of Eurostat, the type of injuries is classified under the same categories as SSI. The figures are given for EU- 28 by their percentages at the related year. Wounds, dislocations & sprains, concussions& internal injuries and bone fractures are the first four injured part of the body in EU-28, relatively with 29.7%, 25.5%, 15.9% and 11.3%. The statistics of SSI for 2012 shows a different ranking of injured parts such as wounds, other specified injuries not included under other headings, bone fractures and crushed & contusions. According to SSI the percentage is 48.6% and then as second the category named other specified injuries not included under other headings is coming. Afterwards the other headings percentages are at most 9% level. This may show that the officially told numbers are may not classified as under the related headings. To have nearly the half of the injuries just for the wounds may need a re-check while the injuries are claimed.

The highest statistics for the number of accidents at work by part of the body injured were listed as 'upper extremities', 'lower extremities' and 'back including spine and vertebra in the back' for EU15. In another report that has been published

from 'Health and Safety Authority' stated as that the percentage of accidents at work by part of the body injured between the years 2011 – 2012 is as 23% back, 7% hand, 7% leg, 6% shoulder, 6% arm, 9% fingers and 7% ankle (HAS, 2013). As it is observed in Turkey, upper and lower extremities have the highest percentages in body part that is injured by occupational accidents.

#### **4. CONCLUSION**

Looking at the overall progress, Turkey has gone through a comprehensive transformation in terms of work health and safety measures especially since 2008 (Ceylan, 2012). In this sense, Turkey has just recently started to seriously debate the necessary precautions to ensure the security of workers. Nevertheless, the new legislation in accordance with the EU standards has not prevented work accidents; and it even failed to generate a stable decrease in such accidents. Since workers perform highly hazardous jobs every day, over time their routine generates a lack of attention towards their own security. Therefore, it is crucial to provide regular and serious training to those workers in order to increase awareness about work safety and fatal accidents. Moreover, it is also important that authorities conduct regular inspections and increase sanctions to ensure that employers and workers are aware of their responsibilities and carry out their duties

Occupational accidents lead to serious problems in Turkey with the results of deaths, injuries or disabilities. Totally 1,392,632 employment accidents, 7,073 occupational diseases, 15,543 death cases and 25,043 permanently disabled employees were reported between the years 2003 and 2015. The results of this study shows that with the growing number of compulsory insured employee, there exists an increase in the number of fatal and nonfatal occupational accidents and the incidence rate of work accidents last two years. In Turkey, the workers are insured under three different categories according to the Article 4-1/a, 4-1/b, 4-1/c of Act 5510. In 2015, the total number of insured persons under Article 4-1/a, 4-1/b, 4-1/c of Act 5510 was 20,773,227. The number of compulsory insured persons under Article 4-1/a of Act 5510 was 13,999,398. Those employed by one or more employer through a service contract are subjected to the Article 4-1/a. Those who are income tax payers in real or ordinary procedure due to commercial earnings or self - employment income are subjected to the Article 4-1/b. Who are active in the public administrations are subjected to 4-1/c. The statistics of occupational accidents and diseases covers only the employees under Article 4-1/a. Thus, in case of the occupational accidents and diseases there is a lack of information in the statistical data of the insured persons under Article 4-1/b, 4-1/c. Losses which are not reflected on the statistical data of SSI must also be taken into consideration. These statistical figures indicate that there are problems in detection and notification of occupational accidents and diseases.

The International Labour Organization estimates that occupational accidents and work-related diseases cause over 2.3 million fatalities annually, of which over 350,000 are caused by occupational accidents and close to 2 million by work-related diseases in the world. As a result of the data in the world, it could be easily concluded that the data recorded in Turkey does not project the real fact.

Enforcement of the Occupational Health and Safety Law No. 6331, and the enacted secondary legislations that are complementary to the OHS Law have immense importance in the prevention of occupational accidents. Most accidents could be prevented through implementation and controlling of existing regulations. However, the sanctions of the Ministry of Labour and Social Security are considered as inadequate. To achieve an overall assessment on occupational accidents in Turkey, it is necessary that all occupational accidents are reported but there are discrepancies and inconsistencies at SSI statistical yearbooks. The methodology and accuracy of occupational accidents' data collection has a major importance. The record managing system of occupational accidents with the Eurostat methodology is indispensable. Since the statistical data of occupational accidents is one of the indicators of the quality of safety and health at work, the occupational health and safety professionals should take it into account in planning and implementing the national policies on safety and health at work. The number of occupational accidents could be decreased by the establishment of a safety culture together with occupational health and safety professionals, employers and employees. Apart from the change of SSI calculation, to prevent or reduce the number of occupational accidents; the root factors causing the accidents should be identified with researches and analysis. Improvements in the system are necessary, corrective measures should be taken and whether the measures are applied effectively or not should be checked regularly. These corrective measures can be evidence based developments as Yranheikki and Savolainen have explained to put the safety culture in order for long term satisfaction and also improved safety working conditions (Yranheikki (2000), O'Toole (2000), Koradeca (2001)). The problem which is usually seen in Turkey is, although the corrective measures are determined importance to the applications are not given. One of the important actions in the occupational safety is to review the corrective measures regularly and check whether the measures are applied effectively or not. The success in the prevention of the accidents depends on this process. Occupational accidents can be reduced by taking effective and preventive measures. There are some tasks should be fulfilled in order to create a secure work place by employers and employees. Employers should apply occupational health and safety legislation and take preventative measures and train the employers regularly against work related accidents. Furthermore, the employers are responsible for applying the identified precautions. Employees should be conscious and

careful about the accidents and 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.

## REFERENCES

- Salguero F., Suarez M., Romero J. C. (2015). Analysis of investigation report on occupational accidents. *Safety Science*. 72, 329-336.
- Pavlic M., Likar B., Pavlic A., Markic M. (2011). Managing occupational injuries recorded in Slovenia from 1948 to 2008. *Safety Science*. 49, 834-842.
- Turkkan A., Pala K., (2016). Trends in occupational injuries and fatality in Turkey. *International Journal of Occupational Safety and Ergonomic*. 22:4, 457-462.
- Unsar S., Sut N. (2009). General assessment of the occupational accident that occurred in turkey between the years 2000 and 2005. *Safety Science*. 47, 614-619.
- Burt C. (2015) New Employee Safety: Risk Factors and Management Strategies. *Springer International Publishing*. 163.
- Macedo C., Silva L. (2005). Analysis of occupational accidents in Portugal between 1992 and 2001. *Safety Science*. 43, 269-286.
- Root N. (1981). Injuries at work are fewer among older employee. *Monthly Labor Review*. 30-34.
- Ceylan H. (2015). The hidden problem of Turkish occupational health and safety system: occupational disease. *Journal of Environmental Science, Computer Science and Engineering & Technology*. 4, 0188-0206.
- HAS, the Health and Safety Authority. (2013) *Summary of Injury, Illness and Fatality Statistics 2011 – 2012*. ISBN No: 978-1-84496-182-5.
- Ceylan H., (2012). Analysis of occupational accidents according to the sector in Turkey. *Gazi University Journal of Science*. 25(4), 909-918.
- Yranheikki E., Savolainen H. (2000). Special international report: occupational safety and health in Finland. *Journal of Safety Research*. 31(4), 177-183.
- O'Toole M. (2000). The relationship between employee' perception of safety and organization culture. *Journal of Safety Research*. 33, 231-243.
- Koradecka D., Dryzek H. (2001). Occupational Safety and Health in Poland. *Journal of Safety Research*. 32, 187-208.
- [http://ec.europa.eu/eurostat/statistics-explained/index.php/Accidents\\_at\\_work\\_statistics#Main\\_statistical\\_findings](http://ec.europa.eu/eurostat/statistics-explained/index.php/Accidents_at_work_statistics#Main_statistical_findings)
- [http://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms\\_220535.pdf](http://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_220535.pdf).
- [http://www.ab.gov.tr/files/ardb/evt/2\\_turkiye\\_ab\\_iliskileri/2\\_2\\_adaylik\\_sureci/2\\_2\\_8\\_diger/tckb\\_sege\\_2013.pdf](http://www.ab.gov.tr/files/ardb/evt/2_turkiye_ab_iliskileri/2_2_adaylik_sureci/2_2_8_diger/tckb_sege_2013.pdf).