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Evaluation of Occupational Accidents' Statistics in Turkey

Ibrahim Çınar,[1] Cem Şensöğüt[2*]

[1] Konya Technical University, Mining Engineering Department, Konya,Turkey
[2*] Kütahya Dumlupinar University, Mining Engineering Department., Kütahya,Turkey

* Email: cem.sensogut@dpu.edu.tr

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Abstract: In this work, the statistics of occupational accidents occurring in Turkey were evaluated by using SSI (Social Security Institution of Turkey) statistics between 2007-2021 and the European Union (EU) Statistical Office (EUROSTAT) data between 2011-2020. Additionally, this has been evaluated by comparing the statistics of occupational accidents in the European Union (EU) countries and Turkey, and it is observed that the measures taken to prevent fatal occupational accidents are not at a sufficient level compared to EU countries. However, the improvement in the occupational accident severity rate provided by the legal regulations made in 2012 indicates that more favorable working environments can be provided in the long run.

Keywords: Work accident, loss of work day, work accident frequency, severity rates

Introduction

While developing technology and industrialization play a major role in the progress of countries, this situation should not bring some negligence in terms of occupational safety. Employees should not have an understanding of business life compromised by factors such as fear of unemployment, unauthorized organizations, security concerns, unregistered workers, child labor and employee welfare.

Every year, 374 million occupants are injured by work accidents in the world, which means that more than 1 million people are exposed to occupational accidents in 24 hours. However, 2.78 million workers loose their lives every year from work-related accidents and occupational diseases (2.4 million of which are disease-related). According to studies, economic loss due to job-related accidents and diseases is estimated at 4% of the global gross product (ILO, 2019).

The Framework Directive 89/391/EEC has been published on measures to promote positive effects on the health and safety of employees in European Union workplaces. Thus, employers are obliged to keep a list of work-related accidents that result in an occupant being incapacitated for more than three days (Offical Journal, 1989). The European Statistics on Accidents at Work (ESAW) project was put into use in 1990 in order to harmonize the data on occupational accidents with all accidents causing an absenteeism for more than three days. Data on EU countries are kept by the EU Statistical Office (EUROSTAT) (EUROSTAT, 2013).

Although the studies for Turkey's accession to the European Union started in 1963, the start of full negotiations took place in 2005, thus accelerating the work on occupational health and safety. Occupational Health and Safety Law No. 6331 was launched on 30/06/2012 to ensure occupational health and safety and to reduce work accidents in Turkey. In the use of the law mentioned, there are many obligations such as personnel training, worker health, risk assessment, monitoring of workers (Official Gazette, 2012).

Work Accidents

While the International Labor Organization (ILO) defines a job related accident as an unexpected and unplanned event that causes a certain damage or injury, the World Health Organization (WHO) identifies it as an unplanned, causing often personal injury, damage to machinery, tools and equipment, and production failure for a while.

It is necessary to evaluate the social and economic dimensions of occupational accidents in terms of employee, workplaces and economics. The most important result of occupational accidents is indisputably the death of the worker, permanent or temporary incapacity for work. In terms of workplace, losses in production and workforce will cause interruption of production, adversely affecting production costs and decreasing efficiency. Finally, the country's economy will be affected negatively with results such as decrease in capacity, lost working days, loss of national resources, cost of social security system.

The causes of occupational accidents have been investigated by many researchers, and there has been a widespread belief that most of the occupatonal accidents are caused by preventable human-being error (Murphy, 1994; McKenna, 1983).

It has been tried to determine the personal and environmental factors that are effective in the occurrence of accidents and cause injury or death in many research works. These can be listed as age and experience, occupation, working position and body part exposed to the accident (Butani, 1988; Hansen, 1989; Sari et al., 2004).

Evaluation of Statistics

Work accident frequency rate can be expressed as how many insured persons have occupational accidents per 1 000 000 working hours worked in a calendar year, as well as how many insured persons have occupational accidents per 100 full-time workers (Brancoli, 1983; Anon, 1990; Nenonen et al. , 2014; SSI, 2023).

WAFR: WAIP/(PAND*8)*1 000 000 (1)

WAFR: WAIP/(PAND*8)*225 000 (2)

Where;

WAFR: work accident frequency rate,

WAIP: Number of insured persons who had a work accident,

PAND: The total number of days for which premium accrues is multiplied by 8 hours of full work per day to find the total working hours of all insured persons in a year.

While the calculation is made to find the number of insured people who have a job-related accident in one million working hours worked in the 1st equation, it is calculated by assuming that 100 full-time insured employees work 45 hours a week and 50 weeks a year in the 2nd equation. In this rate calculation, the shift time of that country is taken into account. For example, the weekly shift duration of 45 hours in Turkey is calculated as 40 hours in the United States (Pala, 2001).

Work accident severity rate, on the other hand, can be calculated as how many work days are lost due to occupational accidents in 1 000 000 hours worked in a year, or it can also be expressed as how many hours are lost in every 100 hours worked.

WASR: TLD/(PAND*8)*1 000 000 (3)

WASR: TLD/(PAND*8)*100 (4)

Where;

WASR: work accident severity rate,

TLD: Total loss of days as a result of work accident (temporary incapacity periods + total degrees of permanent incapacity * 75 + number of death cases * 7500)

While the calculation is made to find the work hours lost due to work accident in 1 000 000 work hours worked in Equation 3, work hours lost due to work accidents in 100 work hours worked in Equation 4 are calculated.

The number of fatal occupational accidents in the European Union countries between 2011 and 2020 is given in Table 1, and the frequency of occupational accidents is given in Table 2 (EUROSTAT, 2023).

Table 1. Number of fatal work accidents in EU countries (2011-2020).

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
EU- 27 countries	3.947	3.757	3.408	3.562	3.643	3.336	3.272	3.332	3.408	3.357(b)
Belgium	75	49	66	52(b)	64	64	59	77	52	54(b)
Bulgaria	94	98	87	117	95	81	93	87	85	88(b)
Czechia	150	113	113	118	132	106	95	123	95	108(b)
Denmark	44	47	39	38	28	34	28	37	39	39(b)
Germany	507	516	466	527	477	450	430	397	416	371(b)
Estonia	19	14	20	16	17	26	8	12	15	10(b)
Ireland	49	43	40	47	49	43	41	34	41	41(b)
Greece	37	26	22	28(b)	28	33	32	37	35	33(b)
Spain	365(b)	299	270	280	344	296	317	323	347(b)	392(b)
France	559	576	553	589(b)	595	595	585(b)	615	803	541(b)
Croatia	38	54	29	26	30	33	37	44	43	45(b)
Italy	621	604	517	522	543	481	484	523	491	776(b)
Cyprus	5	9	9	5	4	5	2	9	10	16(b)
Latvia	34	35	31	41	26	38	21	30	29	22(b)
Lithuania	51	58	58	55	45	44	33	37	37	38(b)
Luxembourg	11	14	6	10	13	22	10	16	12	7(b)
Hungary	81	65	55	81	86	83	80	79	84	64(b)
Malta	1	7	4	4	5	7	1	4	3	7(b)
Netherlands	48	35	42	45(b)	35	36	43	45	37	23(b)
Austria	117	144	143	126	134	109	96	124	106	85(b)
Poland	404	350	277	263	304	243	270	211	184	190(b)
Portugal	192	169	160	160	161	138	140	103	104	131(b)
Romania	297	276	269	272	281	236	241	235	227	179(b)
Slovenia	19	22	20	25	23	14	16	15	15	17(b)
Slovakia	38	53	55	40	55	45	43	40	33	32(b)
Finland	33	36	22	35	35	35	23	25	29	24(b)
Sweden	58	45	35	40	34	37	44	50	36	24(b)
Iceland	0	0	0	2	2	4	2	3	2	3(b)
Norway	54	37	48	61(b)	40	45	44	37	33	41(b)
Switzerland	56	65	77	74	53	79	37	51	56	45(b)
United Kingdom	194	161	271	239	260	252	280	249	:	:

: not available
(b) break in time series

Table 2. Work accidents frequency rates in EU countries (2011-2020).

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
EU- 27 countries	2,3	2,14	1,92	2	2,01	1,84	1,79	1,77	1,74	1,77(b)
Belgium	2,77	1,78	2,46	1,28(b)	1,41	1,8	1,68	1,91	1,27	1,33(b)
Bulgaria	3,63	3,82	3,35	4,45	3,57	3	3,4	3,14	3,37	3,68(b)
Czechia	3,2	2,4	2,29	2,37	2,76	2,07	1,82	2,59	2,01	2,3(b)
Denmark	1,64	1,75	1,45	1,4	1,02	1,23	0,92	1,28	1,43	1,34(b)
Germany	1,18	1,18	1,04	1,15	1,02	0,96	0,89	0,78	0,79	0,73(b)
Estonia	3,12	2,24	3,22	2,56	2,93	4,45	1,21	1,81	2,51	1,73(b)
Ireland	2,65	2,34	2,13	2,46	2,51	2,14	1,87	1,51	1,77	1,79(b)
Greece	0,9	0,69	0,63	0,79(b)	1,19	1,29	1,22	0,97	0,92	0,88(b)
Spain	2,5(b)	2,16	1,88	1,93	2,3	1,92	1,99	1,96	1,78(b)	2,06(b)
France	3,09	3,07	2,96	2,7(b)	2,57	2,74	2,64(b)	2,74	3,53	2,54(b)
Croatia	2,69	3,87	2,09	1,94	2,16	2,37	2,63	3,04	2,96	2,89(b)
Italy	2,71	2,64	2,31	2,34	2,42	2,11	2,1	2,25	2,1	3,39(b)
Cyprus	1,5	2,74	2,47	1,74	1,29	1,4	0,54	2,29	2,45	4,45(b)
Latvia	4,21	4,12	3,59	4,5	3,32	4,22	2,29	3,27	2,78	2,47(b)
Lithuania	4,06	4,98	4,49	4,74	3,84	3,69	2,77	3,05	3,01	3,17(b)
Luxembourg	2,73	3,38	1,6	2,55	3,3	6,32	2,74	4,22	3,13	1,71(b)
Hungary	2,41	1,68	1,4	2,22	2,29	2,14	2,01	1,97	2,09	1,63(b)
Malta	0,59	4,59	2,27	2,2	2,69	3,65	0,45	1,68	1,18	2,68(b)
Netherlands	0,52	0,49	0,5	0,64(b)	0,5	0,5	0,59	0,6	0,48	0,3(b)
Austria	3,01	3,44	3,43	3,06	3,23	2,91	2,53	2,87	2,49	2,36(b)
Poland	2,5	2,3	1,83	1,75	1,89	1,54	2	1,56	1,1	1,35(b)
Portugal	5,07	4,8	3,61	3,56	3,54	3	2,94	2,12	2,12	2,72(b)
Romania	6,37	5,78	5,6	5,5	5,56	4,52	4,49	4,33	3	3,31(b)
Slovenia	2,35	2,61	2,38	3,09	2,79	1,65	1,85	1,67	1,61	1,85(b)
Slovakia	1,56	2,17	2,36	1,69	2,67	2,13	2	1,83	1,5	1,49(b)
Finland	1,33	1,45	0,9	1,44	1,44	1,43	0,93	0,99	1,13	0,95(b)
Sweden	1,25	0,98	0,77	0,87	0,73	0,77	0,9	1,01	0,72	0,49(b)
Iceland	0	0	0	1,14	1,09	2,1	1,03	1,51	0,99	1,54(b)
Norway	2,12	1,43	1,85	1,71(b)	1,48	1,66	1,59	1,31	1,09	1,45(b)
Switzerland	1,5	1,72	2,02	1,91	1,34	1,97	0,91	1,24	1,35	1,08(b)
United Kingdom	0,68	0,55	0,92	0,81	0,83	0,8	0,88	0,78	:	:

: not available
(b) break in time series

In 27 European Union member states and 4 non-member European countries (England left in 2020), it is noteworthy that while the number of fatal work accidents in the last 10 years has decreased significantly in Poland, Portugal and Norway, the change in other countries is not very clear. This situation is reflected in the total number of fatal job-related accidents in the European Union countries.

Similarly, in the 10-year period, the occupational accident frequency rates decreased from 2.5 to 1.35 in

Poland, from 5.07 to 2.72 in Portugal, from 6.37 to 3.31 in Romania and from 1.25 to 0.49in Sweden, only Cyprus showed a negative rise from 1.5 to 4.45. However, in general, it is possible to talk about a decreasing trend for accident frequency rates in all European countries.

The occupational accident frequency and severity rates calculated for the year 2021 in Turkey are given in Table 3 (SSI, 2023).

Table 3. Work Accident Frequency and Weight Rates in 2021.

Number of insured persons who had an occupational accident	511 084		Temporary incapacity for work (days)	4 650 312	
Total number of premium accrued days	5 205 921 298		Total permanent incapacity for work	95 360	
Work accident frequency rate	every 1,000,000 working hours	12,27	Number of deaths	1 382	
	every 100 people	2,76	Work accident weight rate	Day	532
				Hour	0,426

The frequency of work accidents in Turkey between the years 2007-2021 is given in Figures 1a and 1b for every 1 000 000 working hours and every 100 persons.

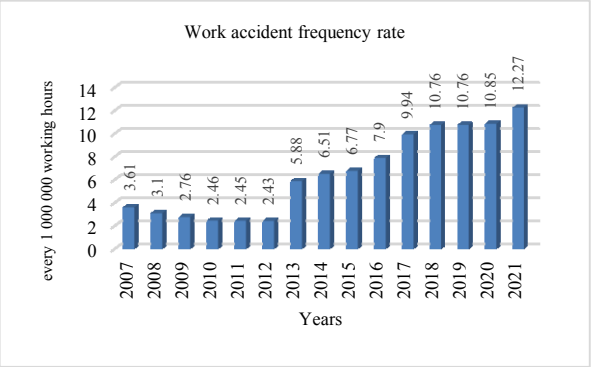

Fig. 1a Work accident frequency rate (every 1 000 000 working hours).

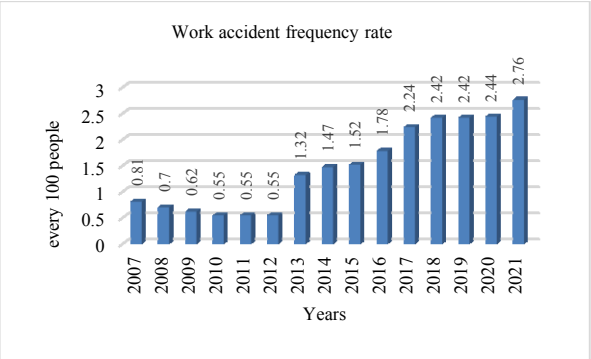

Fig. 1b Work accident frequency rate (per 100 people).

Here, after 2012, an increase process is observed in the frequency rates of occupational accidents that occur both in every 1 000 000 working hours and every 100 people. This situation can be attributed to the increasing labor force in Turkey in parallel with the developing economic process, as well as the fact that in parallel with the law numbered 6331 enacted in 2012, a healthier recording of work accidents or the improvement expected from the law can only show its effect in the medium or long term.

Work accident severity rates in Turkey between the years 2007-2021 are given in Figures 2a and 2b as days and hours.

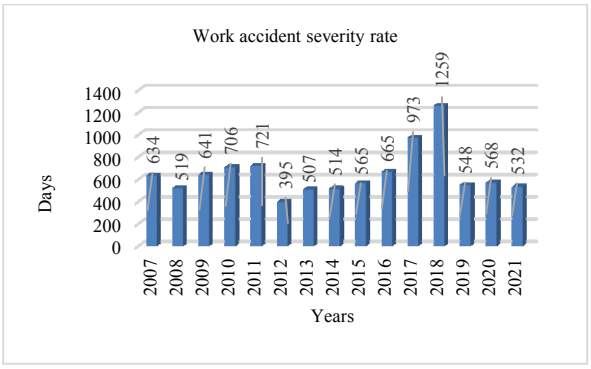

Fig. 2a Work accident severity rate (as lost days).

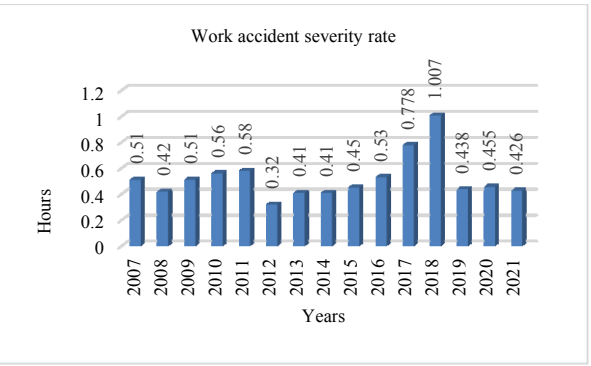

Fig. 2b Work accident weight rate (as lost working hours).

It is observed that the severity rates of occupational accidents (both as loss of days and hours of work) in the occupational accidents that occur, continue to have a stable course except for 2018. Despite the increase in work accident frequency rate after 2012, the fact that the severity rate remained stable shows that the loss of work days as a result of the accidents did not increase and that the work accidents were less.

The number of deaths due to occupational accidents in Turkey between the years 2007-2021 is given in Figure 3.

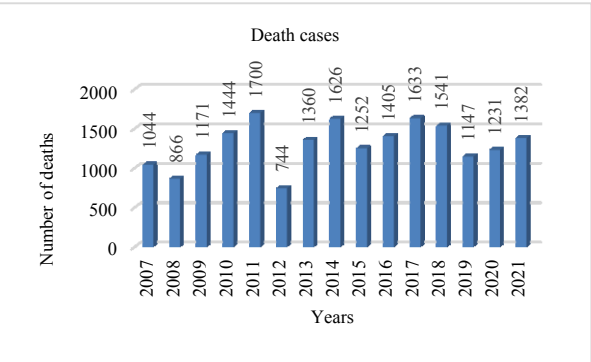

Fig. 3 Number of deaths as a result of work accidents.

Most of the loss of lives as a result of work-related accidents occur in non-qualified occupations, plant and machine operators and assemblers.

The distribution by occupational groups in 1382 fatal occupational accidents that occurred in 2021 is given in Table 4.

Table 4. Occupational groups of those who died as a result of work accidents in 2021

Occupational groups (ISCO 08)	Number of deaths
Occupations related to the armed forces	0
Managers	22
Professionals	23
Technicians and associate professionals	44
Staff working in office services	24
Service and sales people	114
Skilled agricultural, forestry and aquaculture workers	10
Craftsmen and related workers	130
Plant and machine operators and installers	367
Occupations without qualifications	648

While the largest part of the deaths after occupational accidents occurred in the unqualified occupational group (648 fatal cases), and 358 of these cases were exposed to those working in jobs that do not require qualifications in the mining, construction, manufacturing and transportation sectors. Remaining cases included 206 scavengers and other non-skilled workers, 35 cleaners and assistants, 25 non-qualified workers in agriculture, forestry and fisheries, 21 food preparation assistants, and 3 were street workers and related sales and service employees.

Results and Discussion

In Turkey, with the law no. 6331, short-term reflections appear as joint health and safety units providing occupational health and safety services, educational institutions, and workplaces that make contracts with occupational safety experts. In the medium and long term, it is aimed to decrease the work accidents and occupational diseases thanks to the sensitivity to be created by increasing the level of knowledge and education in the working environment. While the increase in occupational accident frequency rates which continued after 2012, when the law entered into force in Turkey, is explained due to postponements made in some articles of the law. It is also necessary to evaluate the expected effects of the law as improvements that will occur in the medium and long term.

The most important point here is that despite the increase in the occupational accident frequency rate, the stability of the work accident weight rate shows that it has started to show its effect in the legal regulations.

The Covid-19 pandemic, which started in 2019, had a positive impact on Turkey as working activities in some sectors were stopped completely or partially, and some employees were allowed to work remotely.

In addition to the development of a social occupational health and safety culture, the quality of the activities carried out in this field should be increased and standardized. It will be important to keep the statistics of occupational accidents and occupational diseases meticulously including all medical diagnoses, not only cases that have been decided, especially in occupational diseases. It is necessary to reduce the rates of work accidents, especially by intensifying the studies in the metal, mining and construction sectors.

All expenditures made within the scope of occupational health and safety should be considered as an investment rather than a cost expense. Thanks to the investments made for this purpose, the decrease in the accident frequency and severity rates will result in an improvement in the costs of occupational accidents.

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