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Research Article

Intrinsic and Extrinsic Factors Affecting Occupational Accidents: The Case of Türkiye[1]

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Abstract
The present study has been conducted for the purpose of presenting solutions to the problems in this field. To this end, an analysis has been made of the occupational accident data occurring between 2008 and 2021 in Türkiye. The data obtained from the Social Security Institution were used to calculate occupational accident frequency rates, occupational accident severity rates, mortality and fatality rates, and rates of change. These rates were then compared by year. The analysis yielded two salient effects believed to significantly influence the number of occupational accidents: the "Occupational Health and Safety Law No. 6331," enacted in 2012, and the pandemic process that affected the country in 2020. Through rigorous evaluation, it was determined that these effects significantly influence both the frequency of occupational accidents and the number of fatalities. Consequently, a series of actionable recommendations have been formulated to address and eliminate or minimize these hazards.

Keywords: Occupational accident, occupational safety, occupational accident frequency rate, occupational accident weight rate
JEL Classification Codes: J21, J28

İş Kazalarını Etkileyen İçsel ve Dışsal Faktörler: Türkiye Örneği

Öz
Bu çalışmada Türkiye genelinde 2008-2021 yılları arasında meydana gelen iş kazası verileri analiz edilerek bu alandaki sorunlara yönelik çözüm önerilerinin sunulması amaçlanmaktadır. Bu nedenle Sosyal Güvenlik Kurumu'ndan elde edilen veriler ile iş kazası sıklık hızları, iş kazası ağırlık hızları, mortalite ve fatalite hızları ile değişim oranları hesaplanarak elde edilen bulguların yıllara göre kıyaslaması yapılmıştır. Belirlenen dönem için gerçekleştirilen analizler sonucunda iş kazası sayılarında büyük bir değişime sebep olduğu düşünülen iki farklı içsel ve dışsal etki dikkat çekmektedir. İçsel etki olarak 2012 yılında çıkarılan 6331 sayılı İş Sağlığı ve Güvenliği Kanunu, dışsal etki olarak 2020 yılında ülkemizi etkisi alan pandemi süreci tespit edilmiştir. Bu etkilerin iş kazaları ve meydana gelen ölüm sayıları üzerindeki rolü değerlendirilerek, iş kazalarını ortadan kaldırmak veya en aza indirmek amacıyla çözüm öneriler geliştirilmiştir.

Anahtar kelimeler: İş kazası, iş güvenliği, iş kazası sıklık hızı, iş kazası ağırlık hızı
JEL Sınıflandırma Kodları: J21, J28

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1. Introduction

The term accident is defined in the Turkish Language Association (TDK) dictionary as "damage to a person, an object, or a vehicle due to involuntary or negligent, imprudence and carelessness".

In legal terms, the concept of accident is defined in two ways, narrowly and broadly. In the narrow sense, the concept of an accident is stated only as the deterioration of body integrity or death, while in the broad sense, it is expressed as all of the causes that cause undesired, sudden damage. The definition that gains importance in terms of occupational accidents has a narrow meaning, and situations that cause property damages are not considered as occupational accidents (Basa & Uçakhan Güleç, 2020; Güzel et al., 2021).

Despite the plethora of definitions for the concept of occupational accident, it is employed in divergent contexts within the Code of Obligations, Labour Law, Occupational Health and Safety Law, and Social Insurance and General Health Insurance Law. While Law No. 6331 on Occupational Health and Safety and the Turkish Code of Obligations No. 6098 contain definitions of occupational accidents, the Law No. 5510 on Social Insurance and General Health Insurance (SSGSSK) states which situations should be considered as occupational accidents rather than definitions.

In accordance with the provisions stipulated within Law No. 5510 on Social Insurance and General Health Insurance, the definition of "an occupational accident is as follows:

a) An incident that occurs while the insured individual is present at the designated workplace.

b) An incident that occurs due to the execution of work activities by the employer, provided that the insured individual is engaged in independent work activities on their own behalf and account.

c) The time spent by the insured, who works for an employer, without performing their main job due to being sent to another place apart from the workplace on duty,

d) The breastfeeding female is insured within the scope of subparagraph (a) of the first paragraph of Article 4 of this Law, during the time allocated for breastfeeding her child in accordance with the labour legislation,

e) An event that occurs during the travelling of the insured to and from the place of work by a vehicle provided by the employer, which immediately or subsequently renders the insured physically or mentally disabled" (SSGSSK No. 5510, Art. 13/1).

In Law No. 6331, the title “Occupational Health and Safety” in the fifth section of the Labour Law No. 4857 was repealed, and the term “occupational accident” was defined as “an event that occurs in the workplace or due to the execution of work, causing death or disabling the body integrity, mentally or physically”.

The 2002 Protocol to Convention No. 155 on Occupational Health and Safety and the Working Environment, adopted by the International Labour Organization (ILO) in 1981, defines the term as “an event resulting in fatal or non-fatal injury arising out of or in the course of work”. The World Health Organization (WHO), in contrast, defines the term as “an unplanned event that often leads to injuries, damage to machinery, tools and equipment, or interruption of production for a period of time”.

In the context of occupational safety and health, the term “occupational accident” is defined as “an accident suffered by the employee as a result of an external cause and an event that occurs suddenly and as a result of the work he performs for the employer or due to the work” while he is under the control of the employer (Eren, 2023).

As a consequence of economic development and industrialization, occupational accidents have become a significant issue for both employers and employees. Occupational accidents not only lead to economic losses but also pose serious threats to employees' lives. According to the WHO, millions of workers lose their lives or suffer injuries each year due to occupational accidents or diseases (ILO, 2021). The ILO reported that more than 395 million occupational accidents occurred globally in 2019. Additionally, approximately 2.93 million workers lost their lives as a result of these accidents (Takala et al., 2024).

This situation has highlighted the importance of occupational health and safety in the working environment. To address these challenges and establish healthy and safe workplaces, countries have implemented numerous legal regulations. In Türkiye, the “Occupational Health and Safety Law No. 6331” was enacted in 2012 with this objective in mind. This law mandates significant measures, including the employment of occupational safety experts, the conduction of risk assessments, employee training, and sanctions for non-compliance (Bilir, 2016; Eravcı, 2019). However, preventing occupational accidents is not solely a matter of legal obligations; it also necessitates the development of a culture of occupational health and safety. Taking health and safety measures in the workplace and raising awareness among employees play a crucial role in reducing occupational accidents (Olcay, 2021). Despite the implementation of laws and regulations, sufficient progress has not been achieved in Türkiye. Notably, sectors classified as highly hazardous, such as manufacturing, construction, and mining, continue to record high numbers of occupational accidents (Irmak, 2024).

Therefore, this study aims to propose solutions to mitigate or eliminate occupational accidents by identifying and controlling the internal and external factors that influence these incidents.

2. Literature

Occupational accidents result in significant economic losses at both societal and individual levels due to their consequences. These outcomes lead to substantial direct and indirect costs, including expenses such as production interruptions, workforce losses, and medical expenses. According to a report by the ILO, the global economic cost of occupational accidents and work-related diseases is approximately 4% of the world's Gross Domestic Product (GDP). This figure corresponds to nearly $2.8 trillion (ILO, 2021).

Research conducted by the Occupational Safety and Health Administration (OSHA) reveals that the annual cost of occupational accidents and work-related diseases in European Union (EU) countries is €476 billion. This amount represents approximately 3.3% of the total GDP of EU member states (OSHA, 2017). These findings underscore that the costs associated with occupational accidents and work-related diseases have significant global implications rather than being confined to individual impacts.

Poor and unfavourable conditions in working environments are known to manifest as occupational accidents, which are typically the result of a combination of one or more working environment conditions, negligence in personal factors, inadequate maintenance and repair work, managerial errors, insufficient training and lack of supervision (Ceylan et al., 2022).In general, the primary causes of occupational accidents can be analysed under four headings. These factors can be categorised as follows: human, machine, environment-environment, and management (Ceylan et al., 2022). The term 'human' refers to personal factors, 'machine' refers to equipment factors, 'environment-environment' refers to working factors, and 'management' refers to managerial factors. The following diagram illustrates the interplay of these factors and the formation of occupational accidents.

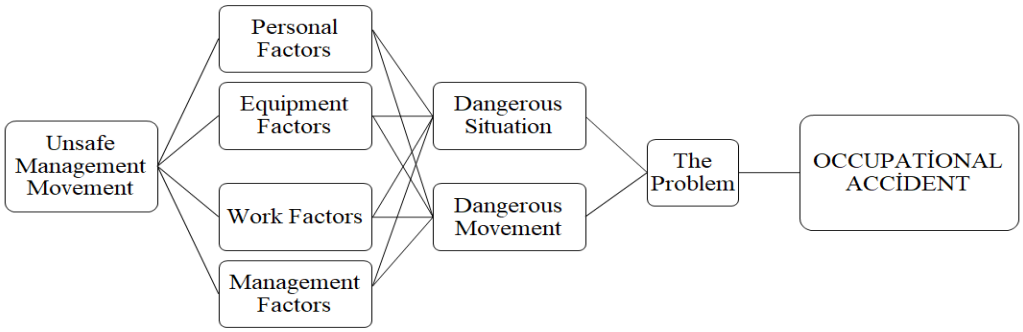

Figure 1: Occupational Accident Formation Scheme

Given these critical consequences, a proactive approach was adopted to reduce the number of occupational accidents in Türkiye through the enactment of the "Occupational Health and Safety Law No. 6331" in 2012. Studies conducted to examine the occupational accidents that occurred before and after the implementation of this law are outlined below.

Erginel and Toptancı (2017) analyzed occupational accidents that occurred in the construction sector in the Central Anatolia Region between 2005 and 2017. Their study highlighted that the number of occupational accidents and the loss of workdays were unacceptable, although the total number of lost workdays had decreased in the last two years of the study period. Similarly, Güllüoğlu and Güllüoğlu (2019) examined occupational accidents in Türkiye's construction sector and across the country for the period 2008–2017. They noted that, despite little change in the number of workers after 2012, the number of occupational accidents increased approximately threefold.

In his 2018 study, Özer analyzed the impact of the Occupational Health and Safety Law No. 6331 on Social Security Institution (SGK) statistics. He emphasized that the number of occupational accidents in Türkiye has increased annually. Özer also noted that, following the enactment of the law, sanctions led to increases in occupational accident rates, severity rates, and frequency rates. Similarly, Koçali (2021) examined occupational accidents in Türkiye between 2012 and 2020. He found that the number of occupational accidents increased as the workforce expanded. After standardizing the number of occupational accidents, he concluded that the frequency of accidents showed a rising trend.

İşsever et al. (2020) conducted a comparative study of fatal occupational accidents in Türkiye and European Union (EU) countries for the period 2008–2017. They identified Türkiye as the country with the highest fatality rate. Likewise, Ceylan (2021), in his study on occupational accidents in Türkiye in 2019, emphasized that the frequency of fatal occupational accidents in Türkiye was significantly higher than in European countries. Ceylan also evaluated the role of the Occupational Health and Safety Law No. 6331 in preventing occupational accidents, noting that the desired outcomes had not been achieved.

Studies examining occupational accidents by sector are as follows:

Arıtan and Ataman (2017) investigated occupational accidents that occurred at the Kırka Bor Open Pit Mine between 2008 and 2014. Their findings indicated a significant increase in both the number and frequency rates of occupational accidents after 2010. Akyüz et al. (2016) examined occupational accidents in the forestry sector in Türkiye between 2011 and 2014, comparing them with other sectors. They noted a continuous increase in the number of occupational accidents over the years analyzed. Their findings revealed that the forestry sector and the manufacturing sector exhibited similar figures in terms of accident rates.

Oral and Ünal (2020) analyzed occupational accidents in the travel sector in Türkiye during the period 2016–2018. Their study concluded that the number of occupational accidents increased each year. Demir and Özay (2022) focused on occupational accidents in the healthcare sector in Türkiye between 2013 and 2019. They observed that, despite fluctuations, the number of fatalities resulting from occupational accidents in the healthcare sector and across the country exhibited a continuous upward trend.

Irmak (2024) examined changes in occupational accidents in Türkiye from 2015 to 2021, as well as certain sector-specific accidents in European Union (EU) countries. The study emphasized the need to enhance inspections and existing preventive measures in the manufacturing, transportation, construction, and storage sectors to reduce the incidence of occupational accidents.

3. Methodology

In this study, occupational accidents that occurred in Türkiye between 2008 and 2021 were analyzed. Data on occupational accidents were obtained from the Social Security Institution (SGK) statistics, and the necessary standardization procedures were performed. The calculations required for standardization were carried out using the equations provided below:

Occupational Accident Frequency Rate;

$$\text{Occupational Accident Frequency Rate} = \frac{\text{IAC}}{(\text{TCCDSx8})} \text{x1.000.000} \qquad (1)$$

Equation (1) calculates the number of insured employees who experienced an occupational accident per 1,000,000 working hours within a calendar year. In the equation, IAC refers to the "Number of Insured Employees Involved in Occupational Accidents," and TCCDS denotes the "Total Contribution-Covered Day Sum." TCCDS is obtained by multiplying the total number of contribution-covered days for all insured employees by 8 hours per day, representing the total working hours in a year.

$$\text{Occupational Accident Frequency Rate} = \frac{\text{IAC}}{(\text{TCCDSx8})} \text{x225.000} \qquad (2)$$

Equation (2) determines how many insured employees among 100 full-time workers experienced an occupational accident. The value 225,000 used in this equation is derived from the assumption that 100 full-time employees work 45 hours per week for 50 weeks annually.

Occupational Accident Severity Rate;

$$\text{Occupational Accident Severity Rate} = \frac{\text{TDL}}{(\text{TCCDSx8})} \text{x1.000.000} \quad (3)$$

Equation (3) calculates the number of lost workdays due to occupational accidents per 1,000,000 hours worked in a calendar year. In this equation, TDL refers to the "Total Days Lost" due to occupational accidents.

$$\text{Occupational Accident Severity Rate} = \frac{\text{TDLx8}}{(\text{TCCDSx8})} \text{x100} \quad (4)$$

Equation (4) determines how many hours are lost per 100 hours worked. The total days lost, used in both equations, is obtained using the equation provided in Equation (5):

TDL=(Temporary Incapacity Duration)+(Permanent Incapacity Cases×75)+(Fatal Cases×7,500) (5)

Mortality Rate;

$$\text{Mortality Rate} = \frac{\text{Number of Fatal Accidents}}{\text{Number of Employees}} \quad (6)$$

Fatality Rate;

$$\text{Fatality Rate} = \frac{\text{Number of Fatal Accidents}}{\text{Number of Occupational Accidents}} \quad (7)$$

4. Findings and Discussion

Data such as fatalities resulting from occupational accidents, accident frequency rates, and accident severity rates are utilized to assess the adequacy of occupational health and safety measures in the workplace and to improve health and safety conditions (Özdemir & Topçuoğlu, 2009). For this reason, Social Security Institution (SGK) annual statistical reports were used to analyze occupational accidents, and the relevant data are presented in Table 1.

Table 1: Occupational Accident Statistics (2008–2021) (SGK)

Year	Number of Active Insured Employees	Number of Insured Employees Involved in Occupational Accidents	Total Contribution-Covered Day Sum	Temporary Incapacity Duration (Days)	Total Permanent Incapacity Degree	Number of Fatal Accidents
2008	15.041.268	72.963	2.945.664.020	1.795.046	52.685	866
2009	15.096.728	64.316	2.915.404.372	1.572.106	61.300	1.171

Table 1 Continued: Occupational Accident Statistics (2008–2021) (SGK)

Year	Number of Active Insured Employees	Number of Insured Employees Involved in Occupational Accidents	Total Contribution-Covered Day Sum	Temporary Incapacity Duration (Days)	Total Permanent Incapacity Degree	Number of Fatal Accidents
2010	16.196.304	62.903	3.190.289.762	1.502.871	75.833	1.444
2011	17.374.631	69.227	3.532.389.503	1.757.422	78.054	1.700
2012	18.352.859	74.871	3.855.795.100	1.647.127	66.039	744
2013	18.886.989	191.389	4.069.831.784	2.357.505	52.825	1.360
2014	19.821.822	221.366	4.248.428.182	2.065.962	42.857	1.626
2015	20.773.227	241.547	4.462.091.444	2.992.070	103.833	1.252
2016	21.131.838	286.068	4.524.501.578	3.453.702	134.403	1.405
2017	22.280.463	359.653	4.524.383.875	3.996.873	252.916	1.633
2018	22.072.840	430.985	5.006.245.563	2.488.001	484.791	1.541
2019	22.000.964	422.463	4.907.005.930	3.627.934	123.623	1.147
2020	23.344.547	384.262	4.426.007.941	3.492.824	98.620	1.231
2021	24.745.149	511.084	5.205.921.298	4.650.312	95.360	1.382

Table 1 presents the data on occupational accidents occurring in Türkiye between 2008 and 2021, including the number of deaths, temporary incapacity periods, permanent incapacity periods, number of days accrued as premium, and the number of active insured, for the purpose of comparison. Based on these data, Figure 2 presents the graph of the number of insured individuals with occupational accidents.

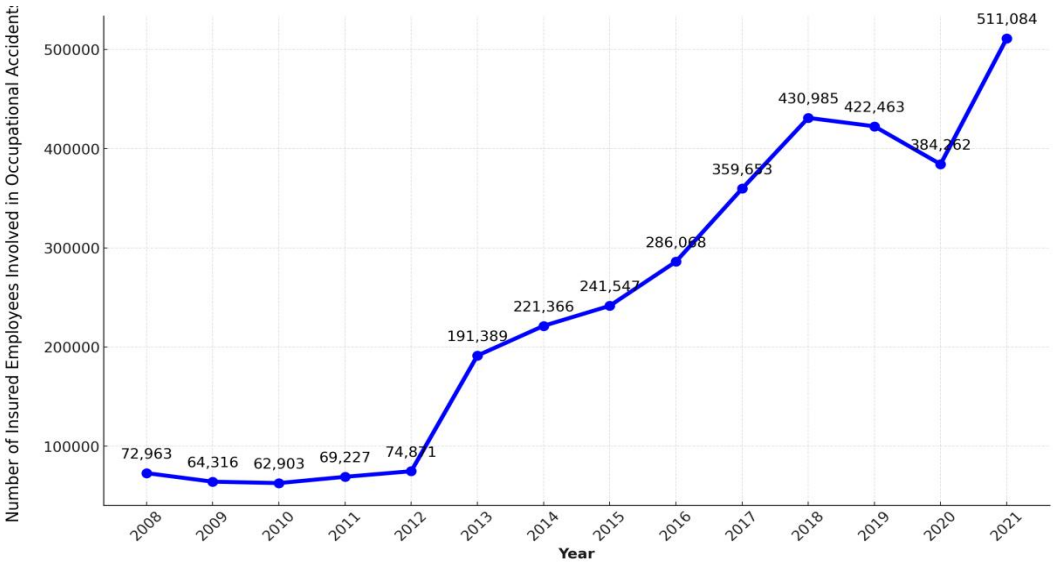

Figure 2: Number of Insured Employees Involved in Occupational Accidents (2008-2021)

Figure 2 presents the number of occupational accidents in Türkiye between 2008 and 2021. It is observed that the number of occupational accidents, which exhibited a horizontal course between 2008 and 2012, followed a continuously rising course from 2012 to 2018, showed a slight downward trend in 2018-2020, and exhibited a great increase again after 2020. The graph of the number of fatalities resulting from these occupational accidents is presented in Figure 3.

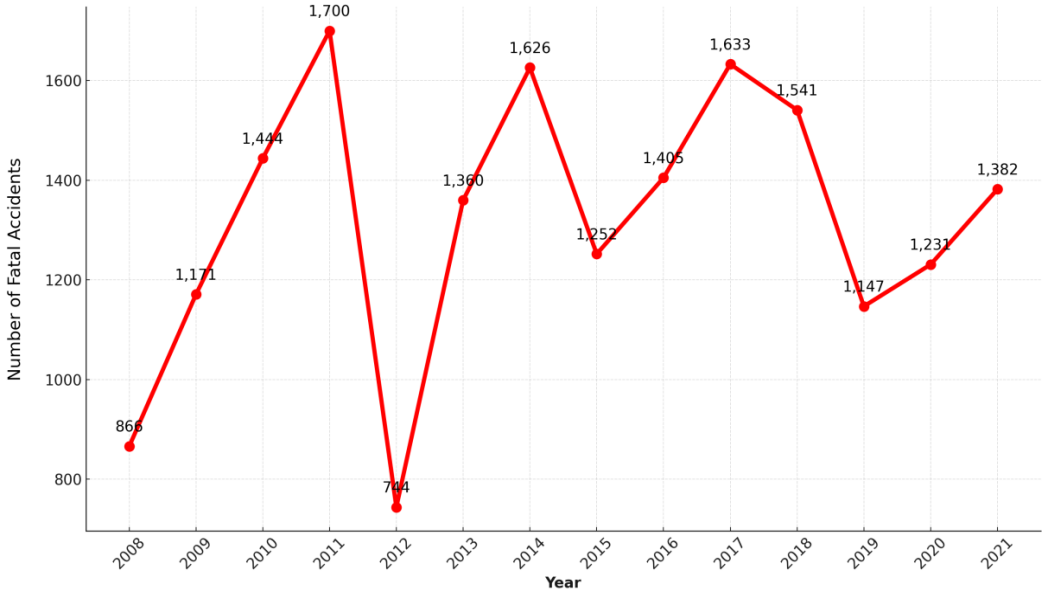

Figure 3: Number of Fatal Accidents (2008-2021)

Figure 3 presents the graph of the number of fatal cases occurring as a result of occupational accidents in Türkiye between 2008 and 2021. It is observed that the number of fatal cases, which followed a fluctuating course between the given years, doubled approximately after 2012 and increased from 744 cases to 1360. A particularly salient peak was observed in 2017, when the number of fatalities reached 1,633. Subsequent years, from 2018 to 2019, witnessed a substantial decline in the number of fatalities, suggesting a downward trend.

Figure 4 presents a comparative graph between the number of insured persons with occupational accidents and the number of insured persons with active employment.

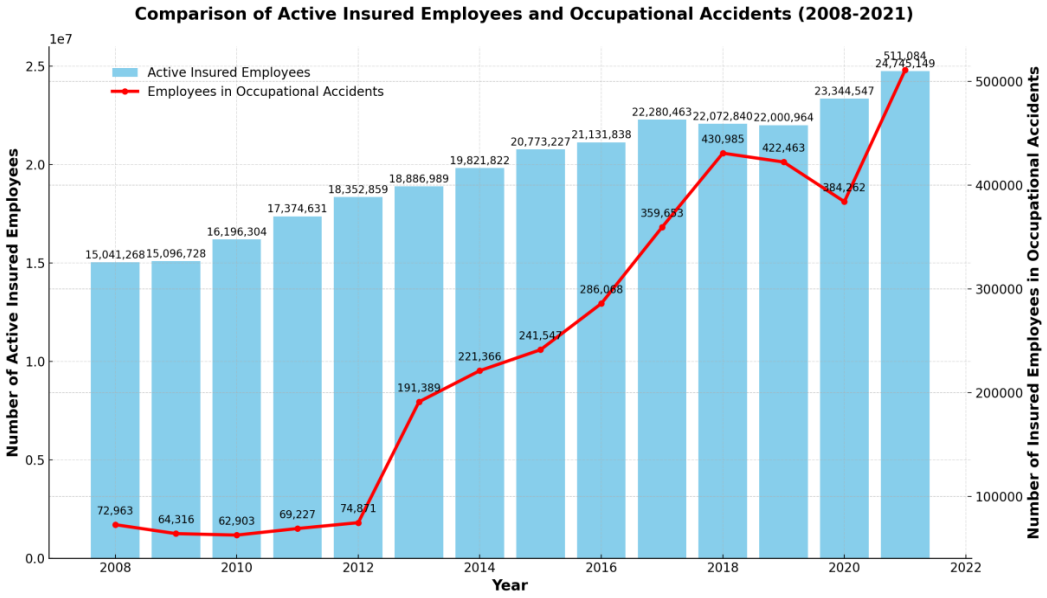

Figure 4: Number of Active Insured and Occupational Accident Insured (2008-2021)

Figure 4 illustrates the number of active insured persons and the number of insured persons with occupational accidents in 2008-2021. The annual fluctuations in the number of active insured and insured with occupational accidents are demonstrated in Table 2.

Table 2: Presents the Annual Change in the Number of Active Insured Persons and the Number of Insured Persons with Occupational Accidents from 2008 to 2021.

Year	Number of Active Insured Employees	Number of Active Insured Employees Annual Change (%)	Number of Insured Employees Involved in Occupational Accidents	Number of Insured Employees Involved in Occupational Accidents Annual Change (%)
2008	15.041.268	-	72.963	-
2009	15.096.728	0.37	64.316	11.85
2010	16.196.304	7.28	62.903	-2.20
2011	17.374.631	7.28	69.227	10.05
2012	18.352.859	5.63	74.871	8.15
2013	18.886.989	2.91	191.389	155.63
2014	19.821.822	4.95	221.366	15.66
2015	20.773.227	4.80	241.547	9.12
2016	21.131.838	1.73	286.068	18.43
2017	22.280.463	5.44	359.653	25.72
2018	22.072.840	- 0.93	430.985	19.83

Table 2 Continued: Presents the Annual Change in the Number of Active Insured Persons and the Number of Insured Persons with Occupational Accidents from 2008 to 2021.

Year	Number of Active Insured Employees	Number of Active Insured Employees Annual Change (%)	Number of Insured Employees Involved in Occupational Accidents	Number of Insured Employees Involved in Occupational Accidents Annual Change (%)
2019	22.000.964	-0.33	422.463	-1.98
2020	23.344.547	6.11	384.262	-9.04
2021	24.745.149	6.00	511.084	33.00

The data reveal a gradual increase in the number of active insured persons from 2008 to 2018, followed by a decline in 2018-2019. However, as of 2020, there was a resurgence in the number of active insured persons. In 2010, while the number of active insured increased, the number of insured individuals who experienced occupational accidents decreased. In 2013, while the number of active insured increased by 5.63%, the number of insured individuals who had occupational accidents increased by a significantly higher rate of 155.63%. A subsequent decline in the number of insured persons who had occupational accidents was observed in 2019-2020, followed by a 33% increase in 2021.The frequency and annual increase rates of occupational accidents for 1,000,000 work hours and 100 persons have been calculated using equations (1) and (2) and are presented in Table 3.

Table 3: Occupational Accident Frequency Rate and Annual Increase Rate (2008-2021)

Year	Occupational Accident Frequency Rate			
	1.000.000 work hours	Annual Change (%)	100 persons	Annual Change (%)
2008	3,096	-	0,697	-
2009	2,758	-10.92	0,620	-11.05
2010	2,465	-10.62	0,555	-10.48
2011	2,450	-0.61	0,551	-0.72
2012	2,427	-0.94	0,546	-0.91
2013	5,878	142.19	1,323	142.31
2014	6,513	10.80	1,465	10.73
2015	6,767	3.90	1,522	3.89
2016	7,903	16.79	1,778	16.82
2017	9,937	25.74	2,236	25.76
2018	10,761	8.29	2,421	8.27
2019	10,762	0.01	2,421	0.00
2020	10,852	0.84	2,442	0.87
2021	12,272	13.09	2,761	13.06

According to the results given in Table 3, there is a downward trend in both occupational accident frequency rates between 2008 and 2012. However, in 2013, the frequency rate of occupational accidents calculated over 1,000,000 working hours increased by 142.19%, and the frequency rate calculated over 100 people increased by 142.31%. This increase continued until 2019. It is observed that this increase, which stagnated in 2019-2020, entered an increasing trend again in 2021 (see Figure 5).

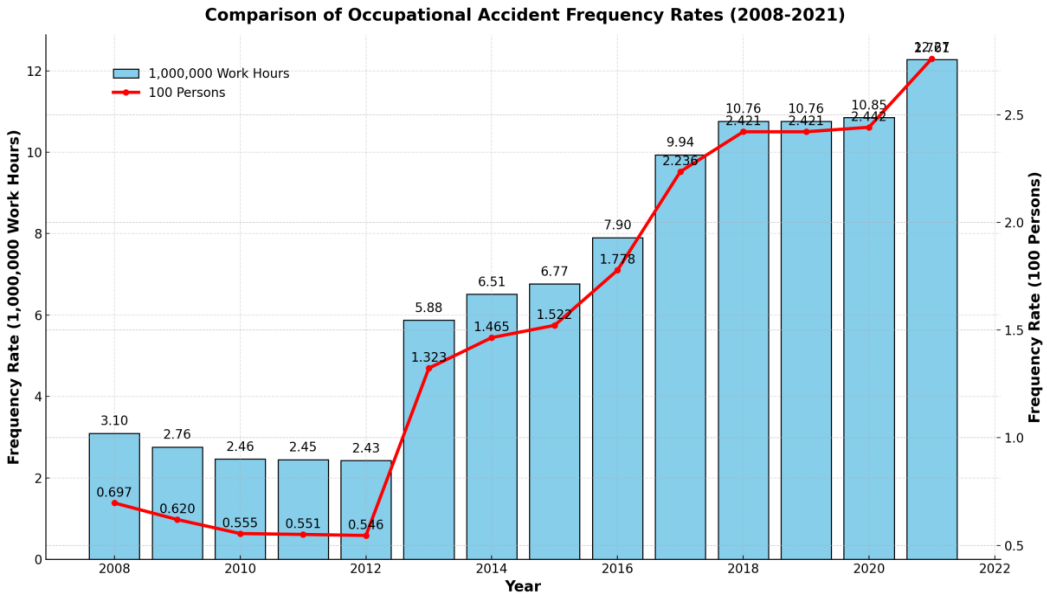

Figure 5: Change in Occupational Accident Frequency Rate (1.000.000 Work Hours / 100 People) by Years (2008-2021)

Figure 5 presents the data obtained for both occupational accident frequency rates in graphical form. It is evident from the graph that both occupational accident frequency rates exhibited a downward trend between 2008 and 2012, followed by an upward trend between 2012 and 2021.To analyse the occupational accidents, the weighted rates and annual increase rates of occupational accidents based on days and hours were presented in Table 4, utilising equations (3) and (4). Equation (5) was utilised to derive the TGK value employed in equations (3) and (4).

Table 4: Occupational Accident Severity Rate and Annual Increase Rate (2008-2021)

Year	Occupational Accident Severity Rate			
	Day	Annual Change (%)	Hour	Annual Change (%)
2008	519,468	-	0,416	-
2009	641,082	23.41	0,513	21.43
2010	706,000	10.13	0,565	11.76

Table 4 Continued: Occupational Accident Severity Rate and Annual Increase Rate (2008-2021)

Year	Occupational Accident Severity Rate			
	Day	Annual Change (%)	Hour	Annual Change (%)
2011	720,528	2.06	0,576	1.75
2012	394,862	-45.20	0,316	-44.83
2013	507,373	28.49	0,406	28.12
2014	514,168	1.34	0,411	0.00
2015	565,025	9.89	0,452	9.76
2016	665,030	17.70	0,532	17.78
2017	972,869	46.29	0,778	47.17
2018	1258,549	29.36	1,007	29.49
2019	547,742	-56.48	0,438	-56.44
2020	568,285	3.75	0,455	4.55
2021	532,262	-6.34	0,426	-6.52

The findings presented in Table 4 indicate an upward trend in both occupational accident severity rates between 2008 and 2011. However, in 2012, a significant decline was observed, with the occupational accident severity rate on a day basis decreasing by 45.20% and the occupational accident severity rate on an hourly basis decreasing by 44.83%. Both accident severity rates exhibited a substantial increase in 2013, a trend that persisted until 2019, before a notable decrease was recorded in 2019. The temporal progression of these data is illustrated in Figure 6.

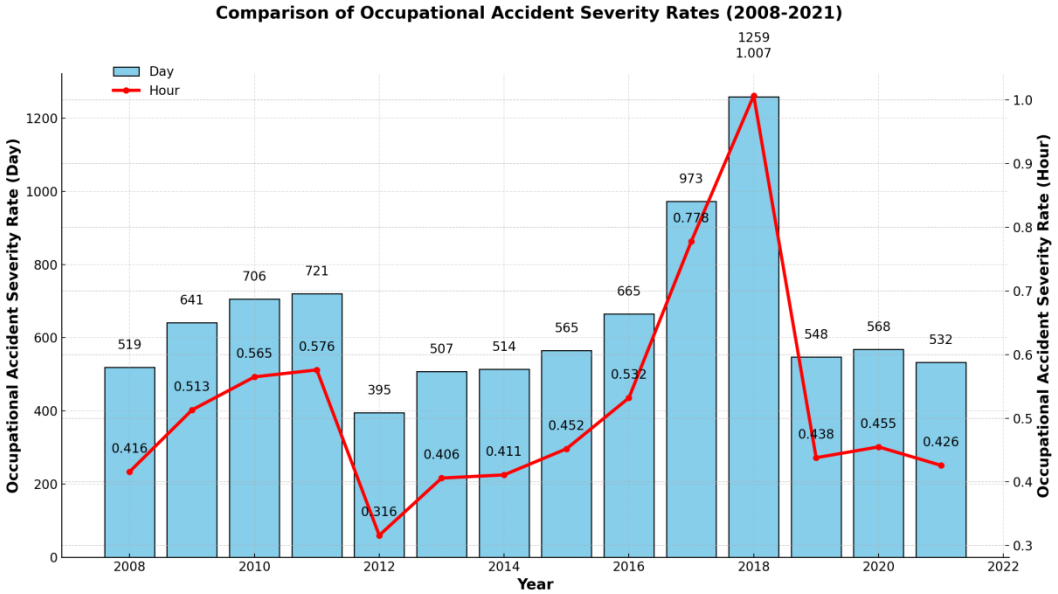

Figure 6: Changes in Occupational Accident Severity Rate (Days/Hour) by Years (2008-2021)

Figure 6 presents the data obtained for both occupational accident severity rates. It is evident from the graph that both occupational accident weight rates exhibited an upward trend between 2008 and 2012, followed by a significant decline in 2012. Thereafter, both rates demonstrated a sustained upward trajectory until 2018, after which they underwent a downward trend.

The mortality and fatality rates resulting from occupational accidents and subsequent deaths were calculated using the established equations (6) and (7), and the results are presented in Table 5.

Table 5: Mortality Rate and Fatalities Rate (2008-2021)

Year	Mortality Rate (per hundred thousand)	Fatalities Rate (per thousand)
2008	5,757	11,869
2009	7,757	18,207
2010	8,916	22,956
2011	9,784	24,557
2012	4,054	9,937
2013	7,201	7,106
2014	8,203	7,345
2015	6,027	5,183
2016	6,649	4,911
2017	7,329	4,540
2018	6,981	3,576
2019	5,213	2,715
2020	5,273	3,204
2021	5,585	2,704

As demonstrated in Table 5, the mortality and fatality rates resulting from occupational accidents and fatal occupational accidents in Türkiye between 2008 and 2021 are presented. The mortality and fatality rates exhibited a persistent upward trend between 2008 and 2011, subsequently experiencing a substantial decrease as of 2012, followed by an increase as of 2013 and a subsequent oscillatory trajectory. The change graph of mortality and fatality rates between 2008-2021 is presented in Figure 7.

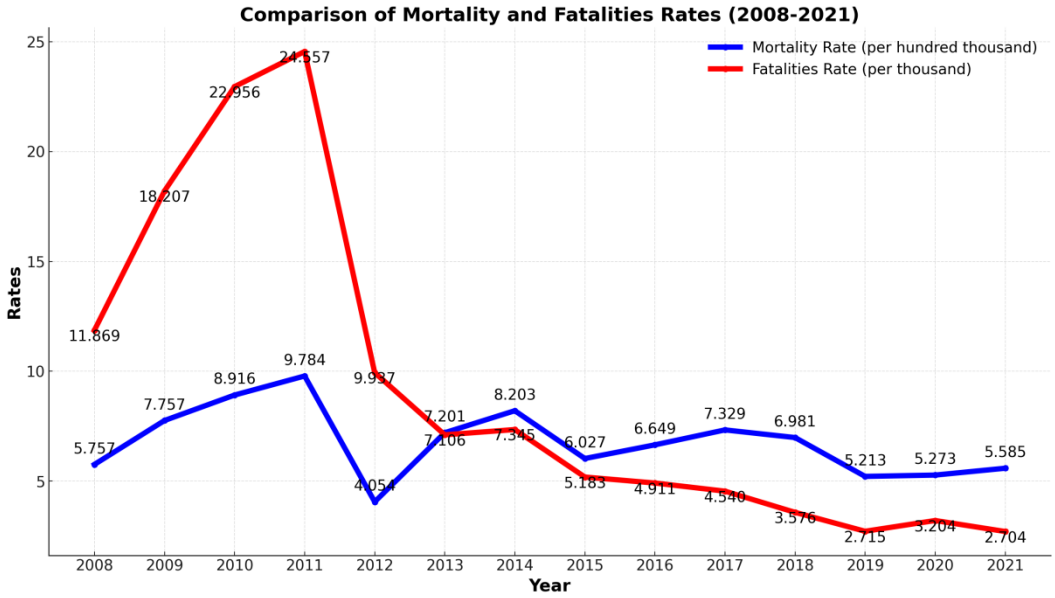

Figure 7: Mortality Rate and Fatality Rate (2008-2021)

Figure 7 shows the graph of the data obtained for mortality and fatalities. It is evident from the graph that both values exhibited an upward trend between 2008 and 2012, followed by a significant decline in 2012. Thereafter, there was a period of fluctuation until 2018. These results are in alignment with the findings derived from the literature review. The findings from the literature review, which are analogous to the results obtained in the present study, indicate that there are substantial discrepancies between the occupational accident data collected prior to 2012 and that collected subsequently. The decline in the number of occupational accidents observed in 2019 and subsequent years corresponds with the results obtained from both the literature review and the present study.

5. Conclusion

Upon thorough analysis of the findings, it is evident that two distinct periods emerge when considering the evolution of occupational accidents in Türkiye between 2008 and 2021. These periods can be delineated as the enactment of the Occupational Health and Safety Law No. 6331 in 2012 and the subsequent pandemic that impacted the nation in 2020. The results obtained demonstrate that the occupational accidents that occurred between 2008 and 2021 were influenced by both internal developments in occupational health and safety policies and external events, including the pandemic.

The legislative act of 2012, along with the approximately sixty subsidiary regulations that were promulgated in accordance with it, has precipitated a plethora of innovations in numerous domains, including but not limited to training, risk evaluation, expertise, the governance of working environments, sanctions for

transgressions, and accident notifications. Nevertheless, the inadequacies in the implementation of these legal instruments, which were envisaged as a pivotal stride in the establishment of a salubrious and secure working environment, have not yet culminated in the anticipated outcome with respect to the mitigation of occupational accidents. An analysis of the results obtained from 2008 to 2012 reveals a decline in the frequency and severity of occupational accidents. However, a marked increase in accidents has been observed since 2013. Specifically, while the rate of increase in the number of workers compared to the previous year was 2.91% in 2013, the rate of change in the number of occupational accidents occurring was determined as 155.63%. While the frequency rates of occupational accidents demonstrated a continuous downward trend until 2012, the frequency rate of occupational accidents calculated over 1,000,000 working hours increased by 142.19%, and the frequency rate of occupational accidents calculated over 100 persons increased by 142.31% as of 2013. While the weighted rate of occupational accidents exhibited an upward trajectory until 2012, it underwent a 45.20% decrease on a daily basis and 44.83% on an hourly basis in 2012. However, from 2013 until 2018, it underwent a significant upward trend. Conversely, mortality and fatality rates exhibited a sustained increase between 2008 and 2011, followed by a substantial decrease in 2012 and subsequent fluctuations. This phenomenon can be attributed to the sanctions and compulsory measures introduced under the 'Occupational Health and Safety Law' No. 6331 and its associated regulations, which led to a notable surge in occupational accident notifications. Despite an increase in the number of occupational accidents compared to the previous period, there has been no significant rise in the number of fatalities. This is due to the fact that fatal occupational accidents are systematically followed up through judicial institutions. Following the enactment of the law in 2012, it was determined that the notification and statistics of occupational accidents occurring since 2013 are more rigorously monitored and recorded.

Notably, in 2018, the number of occupational accidents and the severity rates reached a peak. However, between 2019 and 2020, the number of occupational accidents decreased by 9.04%, largely attributable to the restrictions and measures implemented in the workplace following the pandemic. Subsequent to the waning impact of the pandemic and the subsequent normalisation of working life, there was a 33% surge in the number of occupational accidents in 2021. This situation clearly demonstrates the existence of the pandemic as an external effect in occupational accident statistics.

Accordingly, in order to minimise the number of occupational accidents and deaths, it is essential to take control of the internal and external factors that affect occupational accidents. The primary action to be taken is the dissemination of occupational health and safety culture through awareness training and programs. In addition, it is necessary to increase the inspections carried out by public institutions. The implementation of such measures is expected to enhance the oversight of the

working environment, thereby leading to a reduction in unregistered work and, consequently, a significant decrease in the number of occupational accidents. Furthermore, the integration of technological innovations within the working environment, coupled with the introduction of special regulations in high-risk sectors, is anticipated to contribute substantially to the reduction in occupational accidents.

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Ethics Statement: The authors declare that ethical rules have been followed in all the preparation processes for this study. In case of a contrary situation regarding scientific ethics issues, all responsibility belongs to the authors of the study and Çankırı Karatekin University Journal of Faculty of Economics and Administrative Sciences has no responsibility.