COMPARISON OF SOCIAL SECURITY INSTITUTIONS INDICATORS OF OCCUPATINAL ACCIDENTS: BETWEEN 2012-2020

SOSYAL GÜVENLİK KURUMU İŞ KAZALARI GÖSTERGELERİNİN KARŞILAŞTIRILMASI: 2012-2020 YILLARI ARASI

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ABSTRACT

The growth in the industries of developed nations is directly proportional to the progress they have made in occupational health and safety. The biggest indicator of these advances is the minimization of the number of occupational accidents. In this context, it is of great importance to examine and interpret the occupational accidents in our country. Within the scope of this study, statistical data, periods of incapacity and number of fatal cases related to occupational accidents between the years 2012-2020 were obtained from the Social Security Institution (SSI). By analyzing the data, occupational accident severity rates and occupational accident frequency rates for years were determined and compared without making any sectoral discrimination. In particular, the curfew in the conditions of the Covid-19 pandemic, working from home, stopping certain sector works, etc. The rate of active workers in business life, which occurred after the implementation of the measures, decreased rapidly. In order to protect the worker, a dismissal ban was introduced, resulting in unrealistic results in the occupational accident severity rate calculations due to the fact that the worker did not go to the workplace or worked from home despite being actively registered as an active worker in the SSI system. It can be suggested that the state should not leave occupational health and safety only as a documentation on the law, and that it can prevent occupational accidents by creating an occupational health and safety culture in Turkey by cooperating with employers and workers.

Keywords: Occupational health and safety, occupational accident, frequency rate, severity rate.

ÖZET

Gelişmiş milletlerin sanayilerinde meydana gelen büyümeler iş sağlığı ve güvenliği konusunda ortaya koydukları ilerlemeler ile doğru orantılıdır. Bu ilerlemelerin en büyük göstergesi ise iş kazası sayısının en aza indirgenmesidir. Bu kapsamda ülkemizde yaşanan iş kazalarının incelenerek yorumlanması büyük önem arz etmektedir. Bu çalışma kapsamındaki 2012-2020 yılları arasında yaşanan iş kazalarına ait istatistiksel veriler, iş görmezlik süreleri ve ölümlü

vaka sayıları Sosyal Güvenlik Kurumu (SGK)'ndan elde edilmiştir. Veriler analiz edilerek sektör ayrımı yapılmadan yıllara ait iş kazası ağırlık oranları ve iş kazası sıklık hızları belirlenmiş ve kıyaslanmıştır. Özellikle Covid-19 pandemi şartlarındaki sokağa çıkma yasağı, evden çalışma, belirli sektör çalışmalarının durdurulması vb. önlemlerin uygulanması sonrasında meydana gelen iş hayatındaki faal çalışanlarının oranını hızla azalmıştır. İşçiyi korumak amacıyla işten çıkartma yasağı getirilerek işçinin faal olarak SGK sisteminde aktif çalışan olarak kayıtlı olmasına rağmen iş yerine gitmemesinden ya da evden çalışmasından dolayı iş kazası ağırlık oranı hesaplamalarında gerçeği yansıtmayan sonuçlar çıkmasına sebep olmuştur. Devletin sadece kanunlar üzerinde dokümantasyon olarak iş sağlığı ve güvenliğini bırakmaması, işveren ve işçiler ile de iş birliği yaparak Türkiye'de iş sağlığı ve güvenliği kültürü oluşturarak iş kazalarını önleyebileceği önerisi verilebilir.

Anahtar Sözcükler: İş sağlığı ve güvenliği, iş kazası, ağırlık oranı, sıklık hızı

1. INTRODUCTION

The health problems related to the use of minerals/mines in nature to meet their needs such as protection and shelter, as well as the extraction of minerals and their subsequent use by processing, were the source of the first studies carried out within the scope of occupational health and safety. Especially with the Industrial Revolution, occupational accidents and occupational diseases experienced due to the mechanization of production, the rapid growth of technology, the increase in the speed of social transformation, the fact that existing formations and values gradually lose their importance or disappear completely, as a result of people working for long periods in factories where safety and health measures are not taken. After a while, it turned into a problem for the people and countries in all around the world

The development of occupational health and safety in our country has shown parallelism with the historical developments in business life as in the rest of the world. The Industrialization Movement, which gained momentum in the first years of the republic in Turkey, brought with it some safety and health problems. Many legal regulations (laws, regulations, by-laws, etc.) have been made to solve and solve these problems, and standards related to occupational health and safety have begun to be established (Koçali,2018).

Especially after the start of the European Union candidacy process, many regulations have been published within the scope of occupational health and safety since 2003. Many of these regulations are the Turkish versions of the regulations accepted by the European Union without

any changes. It is obvious that any kind of work done will make many contributions to our country. However, the most important point here is to ensure that all the regulations required for implementation are adopted by the state-employer-employee, rather than remaining on paper. Therefore, our legal regulations on occupational health and safety give important responsibilities and duties to both the employer and the employee. (Koçali, 2021)

Occupational health and safety has made it worker-friendly by enriching the working style and environment with the series of rules and measures, as well as the legal regulations it has added to business life. On 30 June 2012, the Occupational Health and Safety Law No. 6331 entered into force within the scope of regulations related to occupational health and safety. Previously, the regulations made with the Labor Law No. 4857 were gathered under one roof with this law. The most important point of the law is that it aims to prevent occupational accidents and occupational diseases before they occur. These duties and responsibilities are listed with the Occupational Health and Safety Law and many regulations enacted within the scope of these articles. Considering the occupational accidents experienced in the past years, it has been observed that each occupational group has its own risks.

In this study, the comparison of occupational accidents in Turkey between the years 2012-2020 with the accident frequency rate and severity rates was made. All business lines were examined without making any sectoral discrimination in order to obtain meaningful, objective and efficient results with the occupational accidents, fatal cases, periods of incapacity and number of employees obtained from the Ministry of Labor and Social Services. Occupational accident severity rates and occupational accident frequency rates by years were calculated. The results were interpreted within the scope of occupational health and safety and solution suggestions were presented.

2. MATERIAL AND METHOD

The number of occupational accidents, fatal occupational accidents, permanent incapacity and temporary incapacity for work by years were obtained from the Ministry of Labor and Social Services and the Social Security Institution (SSI) affiliated to the ministry. Data between 2012 and 2020 were used in the study which used the number of occupational accidents, incapacity periods, number of employees and number of fatal cases between 2012-2020, the Occupational Accident Frequency Rate and Occupational Accident Severity Rate for the years were calculated separately.

2.1. Calculation of Occupational Accident Frequency Rate

Occupational accident frequency rate refers to the number of occupational accidents that occur in a given working period. It is the ratio of the value found after dividing the sum of occupational injuries and deaths experienced during a calendar year by the total number of working hours of employees per 1 million working hours. In short, it is a coefficient used to reveal how many occupational accidents occur in 1,000,000 work hours in a work year.

The most important point when calculating the occupational accident frequency rate is to know how many hours of work were done in total and how many occupational accidents occurred. Total hours worked can be calculated by calculating how long all employees worked during that period. (if working 8 hours a day, the total working time is 100 people x 30 days x 8 hours = 24000) In order to be able to make an accurate calculation, weekend holidays, public holidays, the periods of leave and sick leave of the workers should be subtracted from the working time.

$$Total\ Work\ Days = Number\ of\ Days\ in\ the\ Period\ x\ Number\ of\ Employees \quad [1]$$

$$Accident\ Frequency\ Rate = \frac{The\ Total\ Number\ of\ Work\ Accidents}{(Total\ Working\ Days - Non\ Working\ Days)\ x\ Daily\ Working\ Time}\ x\ 1.000.000$$

2.2. Calculation of Occupational Accident Severity Rate

Occupational accident severity rate expresses the total number of lost days due to occupational accidents caused by occupational injuries and deaths in a given working period. It is the ratio found by dividing the number of lost days by the total working hours of the employees in the same calendar year and in the same occupational group, and multiplying the value by 1000. Thus, it is used as a general method of comparison with the number of lost days per 1000 working days. In this calculation, unlike the accident frequency rate, the number of days, not hours, is used.

$$Accident\ Severity\ Rate = \frac{Total\ Number\ of\ Lost\ Days}{(Total\ Working\ Days - Non\ Working\ Days)}\ x\ 1.000 \quad [2]$$

These formulas are used by the European Union Statistical Office (Eurostat) to indicate the accident rate per 1000 people in the literature.

- WA = Number of occupational accidents
- TPAD = Total number of premium accrued days,
- TPAD is multiplied by 8 full hours of work per day to find the total working hours of all insured persons in a year.

- 1,000,000 = It is used to find the number of occupational accidents per million working hours worked.
- 225,000 = In the II method, it is a value found as a result of the calculation made by assuming that 100 full-time insured employees work 45 hours a week and 50 weeks a year.

3. RESULTS & DISCUSSION

In our study, the number of occupational accidents and deaths that occurred due to these reasons was taken from the 2012-2020 on SSI statistical yearbook and standardized according to the number of 4/a compulsory insured workers and given in tables. According to the data obtained from the Social Security Institution affiliated to the Ministry of Labor and Social Security, an increase is observed in the number of workers in Turkey between 2012 and 2020. The number of people covered by social security increased from 18,352,859 in 2012 to 23,344,547 in 2020. In this context, the number of workers is given in Table 1.

Table 1. Number of active insured between 2012-2020

Years	Active Insured
2012	18.352.859
2013	18.886.989
2014	19.821.822
2015	20.773.227
2016	21.131.838
2017	22.280.463
2018	22.072.840
2019	22.000.964
2020	23.344.547

When the number of occupational accidents is examined, it is seen that there is a change over the years and the accidents increase. This situation can be interpreted as the fact that the registration of occupational accidents has become a necessity as per the law, or it can be interpreted as the increase in carelessness or unsafe working environments due to the increase in work capacity. It is also a case that this situation should be clearly examined and revealed.

In the occupational accident severity rate and occupational accident frequency rate calculations, in the light of the data shown in the formulas [1] and [2], the number of occupational accidents, the total number of days for which premiums are accrued, the temporary incapacity period, the

permanent incapacity period and the number of death cases should also be known. this scope, the synthesized version of the data received from the Ministry of Labor and Social Security is shown in Table 2.

Table 2. Occupational accident statistics between 2012-2020

Years	Number of Occupational accidents	Total Number of Premium Accrued Days	Temporary Incapacity for Work (days)	Permanent Incapacity for Work (days)	Number of Death Cases
2012	74.871	3.855.795.100	1.647.127	66.039	744
2013	191.389	4.069.831.784	2.357.505	52.825	1.360
2014	221.366	4.248.428.182	2.065.962	42.857	1.626
2015	241.547	4.462.091.444	2.992.070	103.833	1.252
2016	286.068	4.524.501.578	3.453.702	134.403	1.405
2017	359.653	4.524.383.875	3.996.873	252.916	1.633
2018	430.985	5.006.245.563	2.488.001	484.791	1.541
2019	422.463	4.907.005.930	3.627.934	123.623	1.147
2020	384.262	4.426.007.941	3.492.824	98.620	1.231

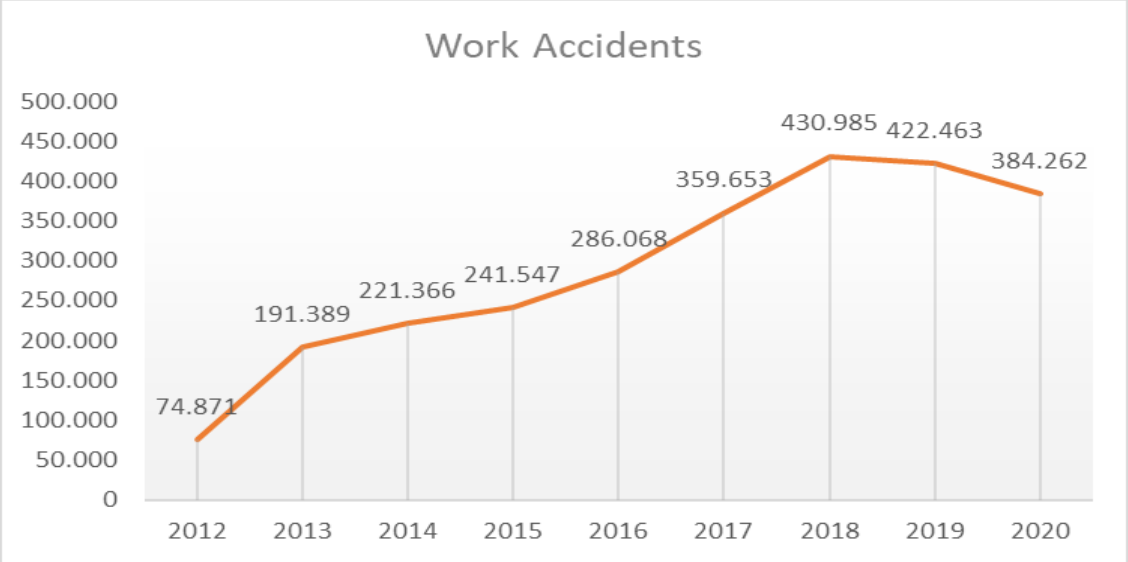

Figure 1. Graph of change in the number of occupational accidents

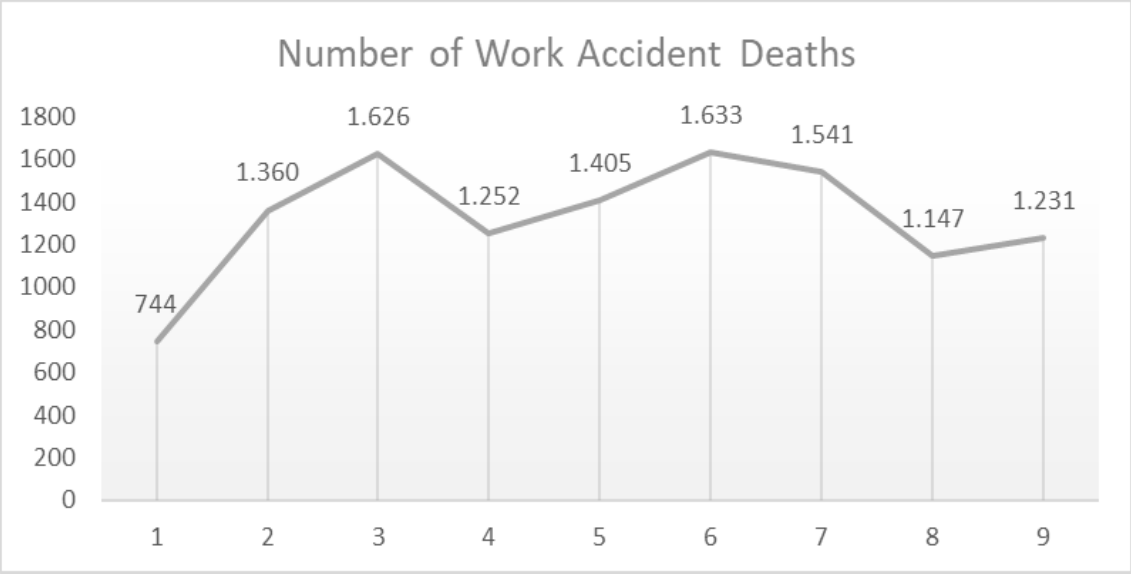

Figure 2. Graph of change in the number of fatal occupational accidents

In 2012, 74,871 occupational accidents occurred in Turkey and 744 of these cases were fatal. The total period of temporary incapacity for work is 1,647,127 and the period of permanent incapacity is 66,039. 191,389 occupational accidents occurred in 2013 and 1,360 of these cases were fatal. The total period of temporary incapacity for work is 2,357,505 and the period of permanent incapacity is 52,825. In 2014, there were 221,366 occupational accidents and 1,626 of these cases were fatal. The total period of temporary incapacity for work is 2.065.962 and the period of permanent incapacity is 42,857. In 2015, there were 487,626 occupational accidents and 1,252 of these cases were fatal. The total period of temporary incapacity for work is 2,992,070 and the period of permanent incapacity is 103,833. In 2016, 286,068 occupational accidents occurred, of which 1.405 were fatal. The total period of temporary incapacity for work is 3,453,702 and the duration of permanent incapacity is 134.403. In 2017, there were 359,653 occupational accidents and 1,633 of these cases were fatal. The total period of temporary incapacity for work is 3,996,873 and the duration of permanent incapacity is 252,916. In 2018, 430,985 occupational accidents occurred, of which 1,541 were fatal. The total period of temporary incapacity for work is 2,488,001 and the period of permanent incapacity is 484,791. In 2019, 422,463 occupational accidents occurred, of which 1,147 were fatal. The total period of temporary incapacity for work is 3,627,934 and the period of permanent incapacity is 123,623. In 2020, 384,262 occupational accidents occurred and 1,231 of these cases were fatal. The total period of temporary incapacity for work is 3,492,824 and the period of permanent incapacity is 98,620. The graph of the change in occupational accidents over the years is given in Figure 1, and the numbers of fatal occupational accidents are given in Figure 2.

Table 3. Occupational accident frequency rate

Years	Occupational Accident Frequency Rate 1.000.000 work hours	in 100 people
2012	2,427	0,546
2013	5,878	1,323
2014	6,513	1,465
2015	6,767	1,522
2016	7,900	1,780
2017	9,937	2,236
2018	10,761	2,421
2019	10,762	2,421
2020	10,852	2,442

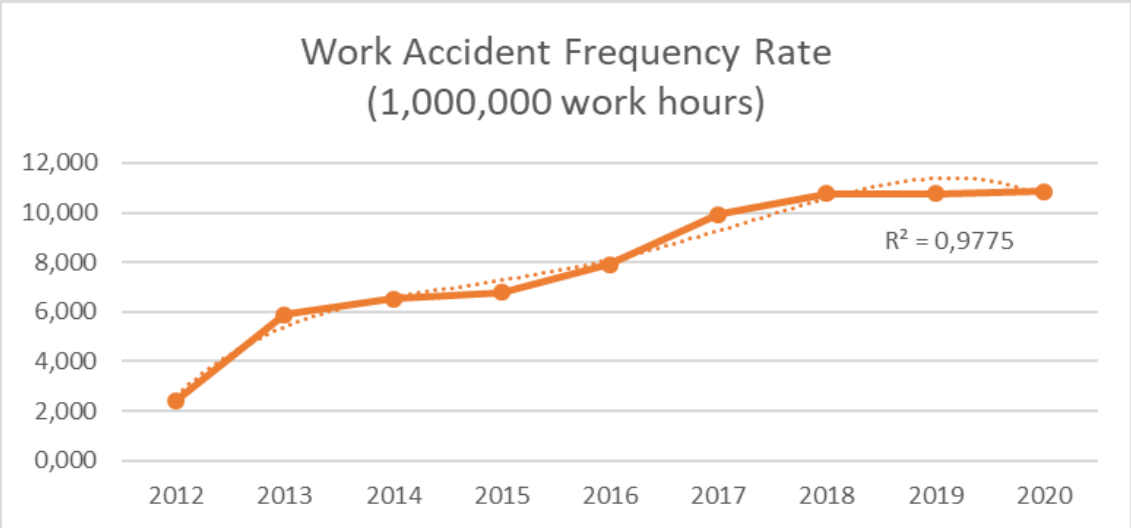

Figure 3. Occupational accident frequency rate (1,000,000 work hours)

Occupational accident frequency rate in 2012 was 2,427 compared to one million working hours, and its rate per hundred people was 0.546. From 2012 to 2020, the frequency of occupational accidents has increased compared to one million working hours. This is because the variables in the values calculated with the formulas given above are used. In 2020, the frequency rate of occupational accidents is 10,852 compared to one million working hours, and its rate per hundred people is 2,442. The change graph of the frequency rate of occupational accidents over the years is given in Figure 3, and the frequency of occupational accidents has increased by 347.25% from 2012 to 2020 compared to one million work hours. This rate is the same as the frequency rate of occupational accidents in 100 people. Because the number of workers is taken instead of working hours in the calculation. The confidence interval of the results obtained as a result of the statistical analysis of the graph obtained in the light of the data is 0.9775. If the r value is greater than 0.8, it shows that there is a good relationship between

the two variables, and it has been revealed that the change in the occupational accident frequency rates over the years is significant and related.

Table 4. Occupational accident severity rate

Years	Occupational Accident Severity Rate	
	Days	Hours
2012	395	0,32
2013	507	0,41
2014	514	0,41
2015	565	0,45
2016	665	0,53
2017	973	0,78
2018	1259	1,01
2019	548	0,44
2020	568	0,45

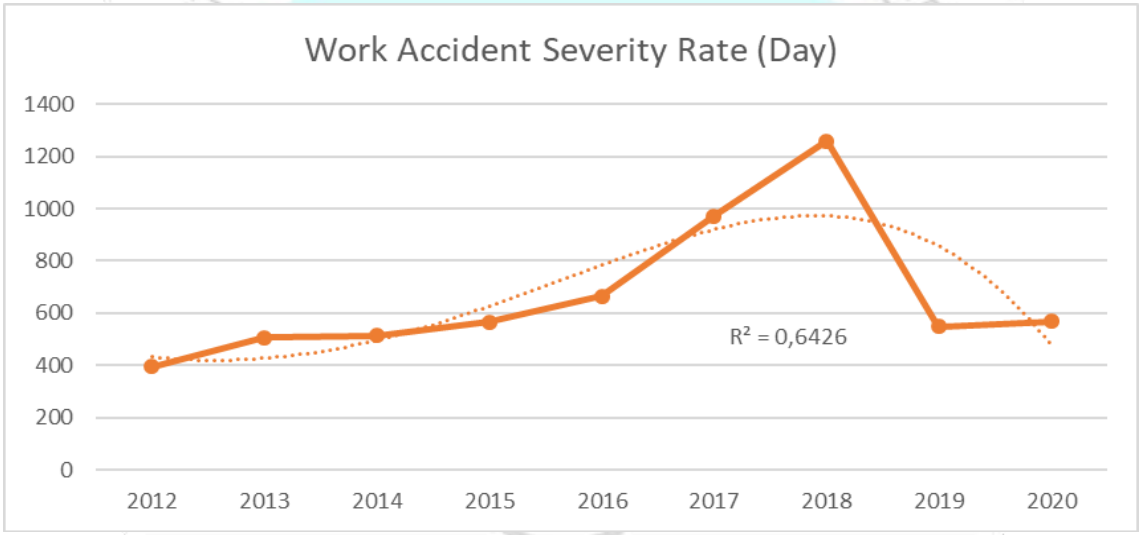

Figure 4. Occupational accident severity rate (days)

In 2012, the occupational accident severity rate was 395 on a day basis and 0.32 on an hourly basis. From 2012 to 2020, the rate of occupational accident severity has been increasing. This is because the variables in the values calculated with the formulas given above are used. In 2020, the occupational accident severity rate is 568 on a day basis and 0.45 on an hourly basis. The graph of the change in the severity rate of occupational accidents over the years is given in Figure 4, and the occupational accident severity rate increased by 43.79% on a daily basis from 2012 to 2020. This rate is the same in the hour calculation of the occupational accident severity rate. Because the number of workers is taken instead of working hours in the calculation. The confidence interval of the results obtained as a result of the statistical analysis of the graph obtained in the light of the given light is 0.6426. If the r value is greater than 0.8, it indicates

that there is a good relationship between the two variables, and it has been revealed that the change in the occupational accident severity rate over the years is insignificant and unrelated. The reason for this is the break in the chart, which occurred suddenly, especially as of 2019. In particular, the curfew in the conditions of the Covid-19 pandemic, working from home, stopping the work of certain occupational groups, decreasing social activity, etc. It is the rapid decrease in the ratio of active employees in business life that occurs after the implementation of such measures. The prohibition of dismissal in order to protect the worker has led to inaccurate results in the calculations of the occupational accident severity rate due to the fact that the worker does not go to the workplace or works from home even though he is actively registered as an active worker in the SSI system. Although the worker worked in the heavy industry sector with a high rate of occupational accidents, although he could not go to work within the scope of the Covid-19 pandemic measures, there was a rapid decrease in the rates as he appeared to be an active worker in the SSI system.

4. CONCLUSION

The growth in the industries of developed nations is directly proportional to the progress they have made in occupational health and safety. The biggest indicator of these advances is the minimization of the number of occupational accidents. In this context, it is of great importance to examine and interpret the occupational accidents in our country. Within the scope of this study, statistical data, periods of incapacity and number of fatal cases related to occupational accidents between the years 2012-2020 were obtained from the Social Security Institution. By analyzing the data, occupational accident severity rates and occupational accident frequency rates for years were determined and compared without making any sectoral discrimination. Occupational accident frequency rate in 2012 was 2,427 compared to one million working hours, and its rate per hundred people was 0.546. In 2020, the frequency rate of occupational accidents is 10,852 compared to one million working hours, and its rate per hundred people is 2,442. Between 2012 and 2020, the frequency of occupational accidents increased by 447.25%. In 2012, the occupational accident severity rate was 395 on a day basis and 0.32 on an hourly basis. In 2020, the occupational accident severity rate is 568 on a day basis and 0.45 on an hourly basis. Between 2012 and 2020, the occupational accident severity rate increased by 43.79% on a daily basis.

In particular, the curfew in the conditions of the Covid-19 pandemic, working from home, stopping certain sector works, etc. The rate of active workers in business life, which occurred

after the implementation of the measures, decreased rapidly. In order to protect the worker, a dismissal ban was introduced, resulting in unrealistic results in the occupational accident severity rate calculations due to the fact that the worker did not go to the workplace or worked from home despite being actively registered as an active worker in the SSI system. It can be suggested that the state should not leave occupational health and safety only as a documentation on the law, and that it can prevent occupational accidents by creating an occupational health and safety culture in Turkey by cooperating with employers and workers.

REFERENCES

[1] Eurostat (2016). *Accidents at work statistics*. 01 Ekim 2021, https://ec.europa.eu/eurostat/statisticsexplained/index.php/Accidents_at_work_statistics .

[2] Issever, H., Ezirmik, E., Oztan, G., Issever, T., (2020). *Standardization of occupational accidents and occupational diseases indicators of social security institution between 2008-2017 years*. J Ist Faculty Med 2020, 83(4), 434-45. doi: 10.26650/IUITFD.2020.0018

[3] Koçali, K. (2018). Açık Ocak Maden İşletmelerinde İşçi Anketleri İle İş Sağlığı ve Güvenliği Kültürü ve Uygulamasının Araştırılması. *Bilimsel Madencilik Dergisi*. 57(1), 15-24.

[4] Koçali, K. & Erçetin, R. (2021). Legal Regulations Regarding Liabilities of Workers and Employers Related To Occupational Health and Safety In Mining. *3. Başkent Ulusal Disiplinler Arası Bilimsel Çalışmalar Kongresi* (ss.357-358). Ankara.

[5] Koçali, K. (2021). *Maden Kazalarında Sorumluluklar ve Kusur Oranları*. Nobel Yayın Kitapevi.

[6] Nenonen, N., Saarela, K., (2014). *Global Estimates of Occupational accidents And Fatal Work-Related Diseases in 2014*. Tampere University of Technology Department of Industrial Management, Finland. https://www.wsh-institute.sg/-/media/wshi/past-publications/2014/global-estimates-of-occupational-accidents-and-work-related-illness 2014.pdf?la=en&hash=CC0F4E20BDDEB6189A8B1BB4786D7973

[7] Nicholl, J., Jacques, R.M.i Campbell, M.J., (2013). *Direct Risk Standardisation: A New Method For Comparing Casemix Adjusted Event Rates Using Complex Models*. BMC Med Res Methodol, 13, 133. https://doi.org/10.1186/1471-2288-13-133

[8] Sosyal Güvenlik Kurumu (SGK). (2021) *SGK 2012-2021 İstatistik Yıllıkları*. 01 Ekim 2021, http://www.sgk.gov.tr/wps/portal/sgk/tr/kurumsal/istatistik/sgk_istatistik_yilliklari.

[9] Yılmaz, F., (2010). Avrupa Birliği Ülkeleri ve Türkiye'de Iş Sağlığı ve Güvenliği Kurulları: Türkiye'de Kurulların Etkinliği Konusunda Bir Araştırma. *Uluslararası İnsan Bilimleri Dergisi*, 7(1), 149-92.