



Situation Analysis of Occupational Accidents in Passenger and Freight Transportation Activities at Airports in Turkey

Türkiye'deki Havalimanlarında Yolcu ve Yük Taşımacılığı Faaliyetlerinde Yaşanan İş Kazalarının Durum Analizi

Kaan Koçali¹ , Seçil Ulufer Kansoy²

öz

Havayolu taşımacılığı günümüzde hem yolcu hem de yük taşımacılığı konusunda büyük bir öneme sahiptir. Her geçen gün büyüyen ve gelişen havacılık sektörü özellikle emniyet ve güvenlik, iş sağlığı ve güvenliği açısından büyük bir paya sahiptir. Hataya ihtimal vermemek adına titizlikle yürütülen süreçlerde hem sektör hem de sektörün çalışanları için iş kazaları ve iş güvenliği konularının analizi için bu çalışma hazırlanmıştır. Türkiye'deki havalimanlarında "51 – Havayolu Taşımacılığı" kodu ile yapılan çalışmalar Sosyal Güvenlik Kurumu (SGK) sisteminde "51/1 – Havayolu ile Yolcu Taşımacılığı" ve "51/2 – Havayolu ile Yük Taşımacılığı" şeklinde iki temel ekonomik faaliyet sınıflaması altında toplanmaktadır. Çalışmada, Türkiye'deki havalimanlarındaki bu taşımacılık faaliyetlerinde yaşanan iş kazalarının durumu analiz edilerek karşılaştırma yapılmıştır. Sektörün 2013-2021 yılları arasındaki iş kazaları verilerinin analizi ile; işyeri sayısı, sigortalı sayısı, iş kazası geçiren sigortalı sayısı, iş kazası sonrası geçici iş görmezlik süresi, iş kazası sonrası ölüm sayısı, işyeri başına düşen çalışan sayısı, sigortalı başına iş kazası sayısı, iş kazası başına geçici iş görmezlik süresi ve iş kazası sonrasında meydana gelen kayıp çalışma süreleri hesaplanmıştır. Elde edilen veriler ile sektörde yaşanan iş kazalarının durum incelemesi yapılmıştır. Belli süreler içerisindeki verilerin analizine göre Türkiye'deki havalimanlarındaki yolcu ve yük taşımacılığı faaliyetleri iş sağlığı ve güvenliği açısından değerlendirilmiştir.

Anahtar Kelimeler: İş Kazası, İş Güvenliği, Havalimanı, Havayolu Taşımacılığı, Havayolu Çalışanları

ABSTRACT

Air transport is of great importance in terms of both passenger and freight transport today. The aviation sector, which is growing and developing day by day, has a large share especially in terms of safety and security, occupational health and safety. This study has been prepared for the analysis of occupational accidents and occupational safety issues for both the sector and the employees, in the processes that are carried out meticulously in order to avoid any possibility of mistakes. Studies carried out at airports in Turkey with the code "51 – Air Freight" are grouped under two basic economic activity classifications in the Social Security Institution (SSI) system as "51/1 – Passenger Transportation by Air" and "51/2 – Freight Transportation by Air". In the study, the situation of work accidents in these transportation activities at the airports in Turkey was analyzed and compared. With the analysis of the sector's occupational accidents data between the years 2013-2021; the number of workplaces, the number of insured personnel, the number of insured people who had a work accident, the period of temporary disability after work accident, the number of deaths after work accident, the number of employees per workplace, the number of work accidents per insured, the temporary incapacity period per work accident and the after-work accident are calculated. Lost working time was calculated. With the obtained data, the situation of occupational accidents in the sector was examined. According to the analysis of the data within certain periods, the passenger and freight transportation activities at the airports in Turkey were evaluated in terms of occupational health and safety.

Keywords: Occupational Accident, Occupational Safety, Airport, Air Transportation, Air Transport Employees

¹ Corresponding Author: Istanbul Gelisim University, Istanbul Gelisim Vocational School, kkocali@gelisim.edu.tr, 0000-0002-1329-6176

² Kırklareli University, Lüleburgaz Faculty of Aeronautics and Astronautics, seciluluferkansoy@klu.edu.tr, 0000-0002-5522-324X



INTRODUCTION:

The aviation is a sector that constantly renews itself with its dynamic structure that changes depending on technological developments. This structure of the sector stands out as the biggest feature that distinguishes it from other sectors in today's working life. The aviation sector, which consists of many sub-sectors with its impact, input and capacity, is constantly growing and developing due to its nature (Küçükönel & Korul, 2002). As a result of the sectoral growth experienced, the aviation sector was divided into three main groups as commercial, military, and general aviation. These sub-three main groups intersect among themselves with large organizational structures in some sub-sectors. Air transportation is at the top of these sub-sectors (Kanat, 2017; Şen & Erdağ, 2021).

The developments at the micro and macro levels in air transportation increase the safety of goods and lives in the sector and make it faster, more flexible, reliable, and safe every day. Today, 70-80% of the occupational accidents in the air transportation sector occur due to human errors, negligence, or violations. This ratio also shows us that the human factor is the biggest source of risk in the sector (Erdem et al., 2015; Taşkın & Durmaz, 2021).

Since occupational accidents that occur in business life have negative effects on employees, the importance of occupational health and safety (OHS) should be emphasized. Despite many national and international legal regulations put into practice to reduce occupational accidents, the World Health Organization (WHO) describes occupational accidents as epidemics (Hedeyat and Shahniani, 2017). According to the World Health Organization (WHO), occupational accident; is "a condition that causes individual injuries that were not planned beforehand, causing disruption in the production of the enterprise and material damage". According to the International Labor Organization (ILO), occupational accidents; are "events that were not previously expected, planned and could not be controlled and could harm the environment". The European Union Statistical Office (EUROSTAT) defined an occupational accident as "a sudden incident that causes mental and physical harm during the occupation" (Öçal & Çiçek, 2021; Koçali, 2021a).

When the international definitions are taken into consideration, occupational health and safety (OHS) can be defined as all technical and administrative regulations that cover the labor sectors as a whole and where many various disciplines such as law, health, economy, environment and engineering work multidisciplinary, aiming to create a safe working environment in order to protect the employees physically, socially and spiritually by preventing all possible occupational accidents in the workplaces. In this context, it is of great importance to analyze the occupational accidents that occur in Turkey in the air transportation sector and to examine the situation in the sector. Because there is no scientific study in the literature examining especially air transportation occupation accidents. With this study, it is aimed to fill the gap in the literature and to create sectoral awareness by drawing the general framework of occupational health and safety for all stakeholders in the sector.

1. Air Transportation Overview

Air transportation; is the business of transporting passengers, cargo, and mail by air vehicles with or without a scheduled basis, aimed at a commercial purpose. Air transportation companies have a wide range from airlines that make hundreds of planes and thousands of flights a day, to airline companies that make several flights a year with a small plane. The air transportation sector connects continents, countries, and cities due to its extensive flight network (Wensveen, 2011). Air transportation is one of the most important of the transportation sectors and civil aviation activities. The aviation sector, which is the easiest alternative to transportation, is a pioneer in transportation. The air transportation sector operates in two areas as air and ground services. The cabin and cockpit crews involved in the air services and the teams that manage the operations by providing all kinds of services to the passengers

arriving at or from the airport who are in charge of ground handling services and who are in charge of the transportation of passengers and cargo (mail, baggage and cargo) constitute the air transportation sector in Turkey (Şen & Erdağ, 2021).

Air transportation is defined as the relocation of the passenger or cargo between two points within the scope of air transportation (Yaşar & Gerede, 2018). Air transportation provides economic and social benefits that cannot be underestimated in daily life. Air transportation offers us the most necessary and important transportation network for global and tourism. Air transportation is a sector in which people, technology, products, and services provide an extremely significant boost to economic development. Air transportation provides a great deal of employment and prosperity to the country where they are located. Air transportation should not be considered only as passenger transportation. It plays a very important role in world trade. It has facilitated world trade by shortening distances. Thanks to airlines, it has become easier for businesses to want to export due to growth demand. Although air transportation is an extremely important trade, it is also a great trade in itself (Çelik, 2017).

The main reason why air transportation is one of the most popular transportation today is that it is more comfortable and faster than other transportation methods. People's active business life, and the effort to catch up from one place to another creates anxiety for people, especially in big cities. However, air transportation has made this situation practical for individuals. Moreover, the convergence of prices by land also prepares a great ground for this situation to happen. Civil aviation has become a very important sector from a social and economic point of view. Speed, comfort, and safety distinguish aviation from other transportation factors. Especially the comfort it provides makes air transportation more attractive. Thus, air transportation is a dynamic sector that develops day by day (Yılmaz, 2020).

The fact that air transportation is a global sector brings with it sensitivity to external factors. For example, the forecasts and statistics made by many international organizations operating in the field of aviation before 2020 for air transportation are very promising; however, the Covid-19 outbreak, which was never foreseen in the first quarter of 2020, brought the sector to a near standstill. For this reason, all expectations for air transportation may change before and after 2020. When we look at the last decade of air transportation before the pandemic, it is seen that the toll passenger mileage figure increased by 51% between 2010-2019. In addition, it is estimated that the sector will grow by an average of 4.6% annually over the next ten years. (AIRBUS, 2020). According to Boeing's pre-pandemic forecasts; emerging markets, rapid urbanization and a growing urban population are likely to support airline demand by 2030 and the sector will continue to grow (Boeing, 2020). In addition, 176 new airports were put into service between 2012 and 2018, mostly in the Asia-Pacific region (IATA, 2021).

In the sector, where an optimistic picture was drawn before the Covid-19 outbreak, the outbreak reversed all expectations in a few months. Globally, airline operators incur losses of approximately \$118 billion in 2020, with an additional \$38 billion expected in 2021. In addition, the number of passengers decreased from 4.5 billion in 2019 to 1.8 billion in 2020 (IATA, 2021). The devastation wrought by the Covid-19 pandemic has been far greater than the September 11 attacks and the 2008 economic crisis of previous years. According to the figures of the Cirium data company, the sector; Due to travel restrictions in 2020, the number of passengers decreased by 67% compared to 2019 figures and decreased to 1999 levels twenty-one years ago. In addition, the number of flights decreased from 33.2 million in 2019 to 16.8 million in 2020 with a decrease of 49% and 77% of these flights are domestic flights (Cirium, 2021).

Although the European region is an economically stable region, it is going through a difficult period due to the political turmoil and trade uncertainties brought about by the Brexit Agreement. The Covid-19 pandemic added to these uncertainties in 2020. According to CAPA (Centre for Aviation), airline seating capacity in Europe fell by 57.7% in 2020. This rate was recorded as the largest decrease figure compared to all regions. In addition, the European region has fallen from second to third place in terms of total seat capacity (CAPA, 2021). In the European region, fleet growth in 2019 was 2.9%. In terms of fleet, it is estimated that approximately 9,000 new aircraft, 80% of which are single-aisle, will enter the European market in the next 20 years. In addition, the European market's air traffic growth in 2019 was 3.6% (Airbus, 2020).

In the North American region, where economically stable growth is expected in the next 20 years, the fleet increase in 2019 was 1.9%. The traffic increase in 2019 was 3.2%. According to IATA, passenger traffic of North American airlines fell by 75.4% compared to 2019, making it the third largest region after Asia-Pacific and Europe in terms of passenger traffic. With passenger traffic starting to recover in 2021, the commercial aviation sector in North America is expected to revive in the coming years. The Asia-Pacific region, which has achieved high growth figures in recent years, is projected to grow an average annual GDP of 4.1% until 2038. Annual fleet growth rates are 4.6% on average. The Asia Pacific region recorded a 76.4% decline in passenger volume in 2020. The number of single-aisle aircraft in this market is expected to double by 2038. The Middle East market experienced a 73% decrease in passenger demand and a 53% capacity contraction compared to 2019. IATA announced that Middle Eastern airlines will close 2020 with a loss of 7.1 billion. In terms of fleet growth data, it achieved an average annual growth of 5.1%. The number of narrow-body and wide-body aircraft is very close to each other. IATA's 2021 forecast for the Middle East market is that the number of passengers may increase by 43% and capacity by 23.6%. Airline operations belonging to this region are expected to announce a loss of \$ 3.3 billion in 2021. Positive developments in the field of trade and tourism positively affect traffic growth in the Latin American region. Fleet growth increased by 3.9% in 2019. The Latin American region experienced a 49% decline in terms of paid passenger km in 2020 and announced a loss of \$ 18 billion. Boeing predicts that 2,640 new narrow-body aircraft will join the Latin American market by 2038 (Boeing, 2020; IATA, 2021).

The total number of passengers using the airline in our country in 2019 is two hundred and nine million. In 2019, there was an 11% increase in international flights, while domestic passenger traffic decreased by 11.5%. The Covid-19 pandemic has deeply affected Turkey's civil aviation activities as well as all over the world. Air traffic decreased by approximately 50% in 2020, and the number of passengers decreased from 209 million to 81.5 million. With the recovery, the State Airports Authority predicts that the number of passengers will reach 123 million in 2021, 178 million in 2022 and 203 million in 2023 (DHMi, 2021). Figure 1 below shows the figures of the last ten years in passenger transportation in our country.

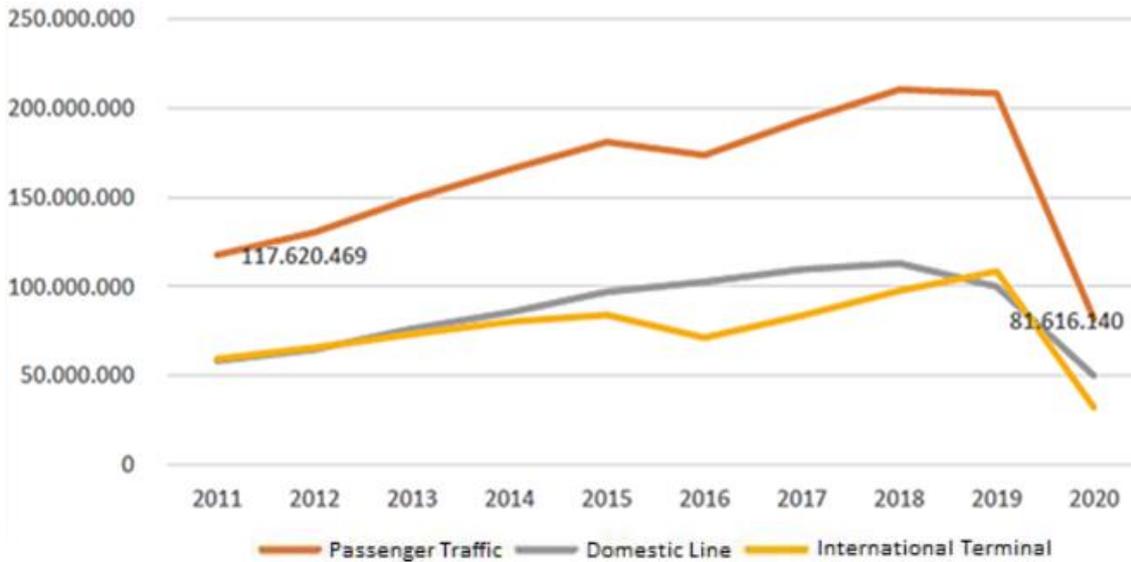


Figure 1: Passenger numbers in Turkey in 2011-2020 (DHMI, 2021).

It can be said that the decline in cargo transportation in our country is at very low rates compared to passenger transportation. The biggest reason for this situation is that although the country's borders are closed to air passenger transportation, air cargo traffic continues in order to continue production in critical areas. According to DHMI data, the amount of cargo decreased from 1.52 million tons in 2019 to 1.36 million tons in 2020. Turkey's development in the field of cargo transportation in the last decade is shown in Figure 2 below.

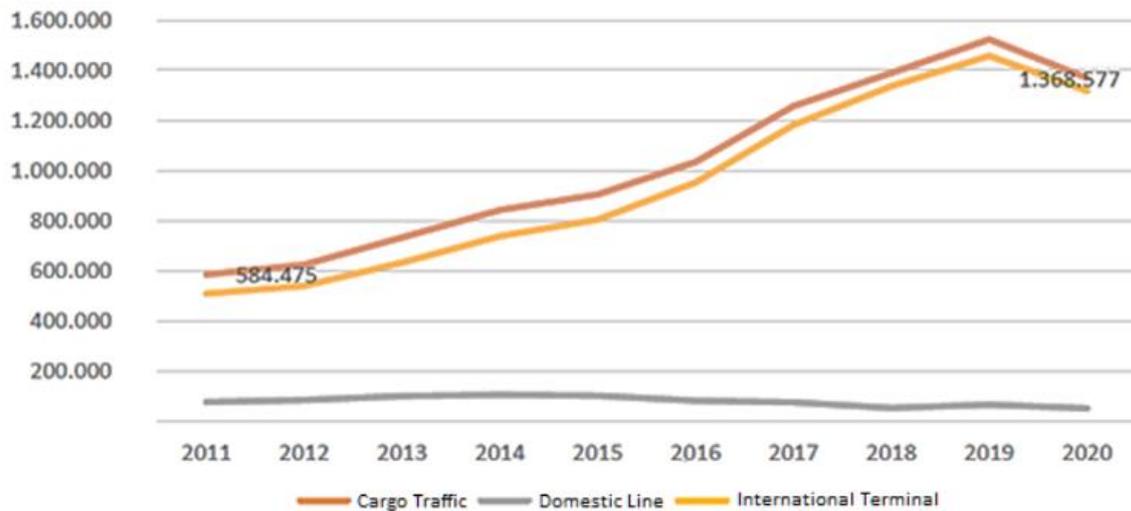


Figure 2: Turkey-wide 2011-2020 cargo transportation figures (DHMI, 2021).

2. Materials and Methods

In this study, where the analysis of the occupational accidents that occurred between 2013-2021 in the air transportation sector at the airports in Turkey and the situation in the sector were examined, the occupational accident data of the insured reported to the Social Security Institution (SSI) were used (SGK, 2022). The reason for choosing 2013 as the starting year of the study is that although the Occupational Health and Safety Law was enacted in 2012, it entered into force in 01/01/2013 (Koçali, 2021b). Although there were many laws, regulations, etc. about occupational health and safety in the

air transportation sector before this date, it is important to choose the Occupational Health and Safety Law, which is the most basic legal basis valid today, within the scope of the study.

Transportation activities at airports in Turkey is grouped under two basic economic activity classifications "51/1 – Passenger Transportation by Air" and "51/2 – Freight Transportation by Air" in the Social Security Institution (SSI) system (SGK, 2022). Sector codes are those specified by the European Statistical Office (EUROSTAT) and set out a certain standard for classification and statistical studies (EUROSTAT, 2022).

In the study, data from 4(a) employees registered with Social Security Institution (SSI) were used. It has been observed that the number of 4(b) employers and 4(c) civil servants in the air transportation sector is very small in the sector and although these people appear to be sector employees, they do not spend time in transportation activities and are not included in the occupational accident statistics because they only have management, auditing, accounting etc. duties.

By analyzing the data of the Social Security Institution (SSI) between 2013-2021; The number of workplaces, the number of insured, the number of insured persons who have undergone occupational accidents, the temporary period of incapacity after occupational accidents, the number of deaths after occupational accidents, the number of employees per workplace, the number of occupational accidents per insured, the temporary incapacity period per occupational accident and the lost working time after the occupational accident are calculated.

3. Results

As can be seen in Table 1, the number of enterprises operating in passenger and freight systems at airports in Turkey increased from 237 in 2013 to 631 in 2021. As a result of the 2.66-fold increase in the number of workplaces, the number of insured persons increased by 2.86 times in parallel with this rate, reaching 28,791 in 2021 from 10,068 in 2013. The most important point in the table is that while there was an average of 294 workplaces between 2013 and 2020, this number increased by 2.14 times to 631 in 2021. However, in 2021, there was no increase in the number of insured persons employed in the sector at the same rate.

Table 1: Number of workplaces and insured persons between 2013-2021

Years	Number of Workplace Numbers	Number of Insured
2013	237	10.068
2014	300	22.602
2015	302	25.391
2016	288	25.943
2017	286	25.244
2018	292	27.542
2019	314	29.687
2020	333	28.975
2021	631	28.791

Table 2 contains occupational accident data for "51/1 – Passenger Transportation by Air" and "51/2 – Freight Transportation by Air" at the airports in Turkey between 2013 and 2021. The data of "51/1 – Passenger Transportation by Air" are given in prose and the data for "51/2 – Freight Transportation by Air" are given in horizontal (italic) form. Thus, the basic two sub-sectors of the air transportation sector can be easily compared by seeing them in a single table. In addition, the data in the table were divided

into female and male and the relationship between occupational accidents and gender factors was revealed.

Table 2: Occupational accident data for the years 2013-2021

Years	51/1 – Passenger Transportation 51/2 - Freight Transportation					
	Number of Insured Having Occupational Accidents		Temporary Incapacity for Work (Days)		Number of Deaths after Occupational Accidents	
	Male	Female	Male	Female	Male	Female
2013	321	606	1.634	2.440	-	2
	1	-	-	-	-	-
2014	389	1.008	1.300	2.274	1	-
	-	-	-	-	-	-
2015	572	1.133	2.644	5.087	2	-
	-	-	-	-	-	-
2016	529	995	3.687	4.158	1	1
	2	-	70	-	-	-
2017	571	847	2.947	4.010	3	-
	2	-	-	-	-	-
2018	577	984	1.637	1.933	-	4
	3	-	-	-	-	-
2019	464	1.070	2.993	6.517	-	-
	2	-	27	-	-	-
2020	102	278	1.124	1.685	2	-
	4	-	37	-	-	-
2021	181	523	1.045	3.705	-	-
	5	-	46	-	-	-
TOTAL	3.725	7.444	19.191	31.809	9	7

In "51/1 – Passenger Transportation by Air", it was seen that the number of female insured persons who had an occupational accident was higher than the number of male insured. The main reason for the decrease in the number of occupational accidents in 2020 is that air transportation has completely stopped for a long time during the Covid-19 pandemic. During this period, the employment contract of the employees in the Social Security Institution (SSI) was not terminated and the occupation models of working at home or working remotely were started. In other words, although the insured appear at work in the system, they have actually minimized the number of occupational accidents by working remotely or away from home and away from the risks of occupational accidents in the workplace. When the temporary incapacity periods of the insured who are injured after the occupational accidents are examined, it is seen that it is proportional to the number of occupational accidents experienced. However, in the occupational accidents that occurred in 2019, it was calculated that both male and female insured persons had more periods of incapacity compared to other years. The reason for this is that with the greater severity of occupational accidents that occurred in 2019, the number of injuries or injuries of the insured by having more severe occupational accidents increased. Since there is no detailed data entry for the occupational accidents experienced in the Social Security Institution (SSI) system, it is not known as a result of which kind of occupational accidents occurred especially the 2.57-fold temporary incapacity period increase in 2019. As a result of occupational accidents, only 16 deaths occurred between 2013 and 2021, including 9 male and 7 female insured employees. Considering the high number of insured, the low number of deaths after occupational accidents was seen as a

remarkable and remarkable data as a result of the analysis of the data in terms of "51/1 – Passenger Transportation by Air".

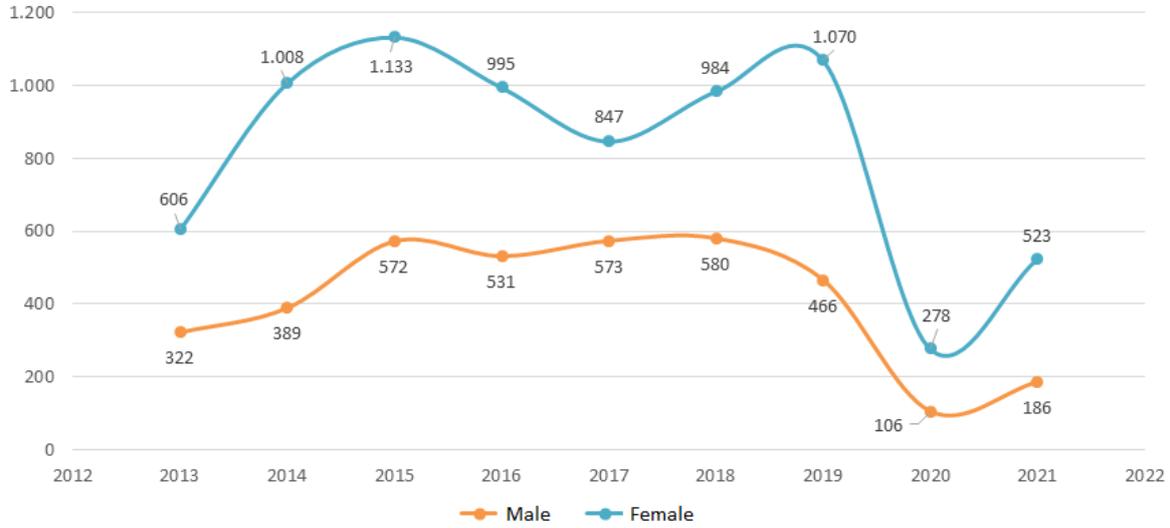


Figure 3: Number of insured persons who had an occupational accident in the air transportation sector between 2013-2021

In "51/2 – Freight Transportation by Air", it was seen that the number of male insured persons who had an occupational accident was higher than the number of females insured. It has been calculated that the total number of male insured persons who have suffered an occupational accident between 2013 and 2021 in this sector is 19 and that no female insured employee has ever suffered an occupational accident. In 2014 and 2015, there were no occupational accidents in the sector. When the temporary incapacity periods of the male insured persons injured as a result of the occupational accidents were examined, it was found that there was a period of incapacity of 9.47 days per 1 occupational accident. The fact that occupational accidents result only in injury and no deaths is also remarkable for the "51/2 – Freight Transportation by Air" sector.

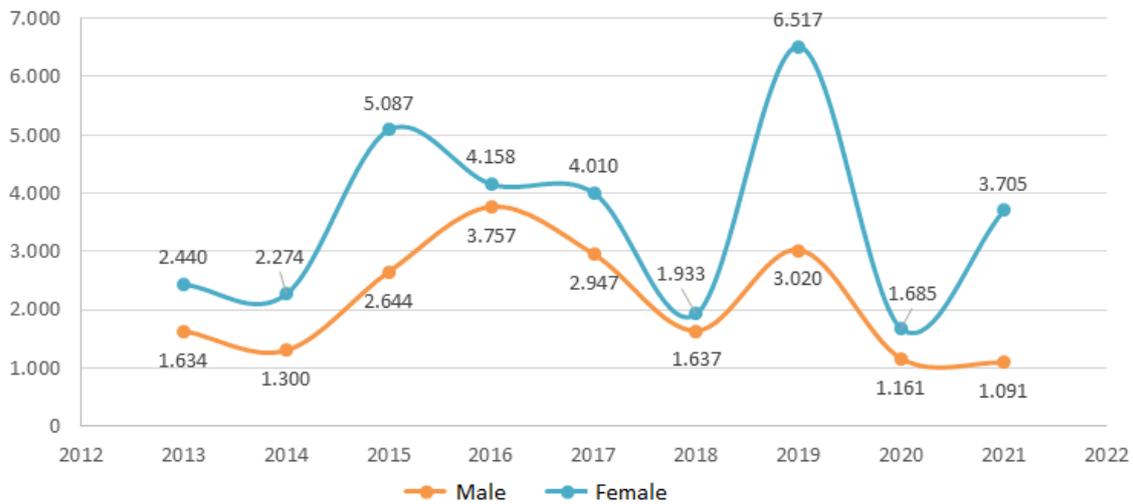


Figure 4: Temporary period of incapacity (days) of insured persons who have suffered an occupational accident between 2013 and 2021 in the air transportation sector

In the data of airports in Turkey for the years 2013-2021 belonging to the "51 – Air Transportation" sector, there are 224,243 insured employees in a total of 2,983 workplaces; 3,725 male and 7,444 female insured employees had suffered occupational accidents; those male insured persons had

19,191 days and female insured persons had 31,809 days of temporary incapacity; It was calculated that 9 male and 7 female insured persons died after the occupational accidents.

Table 3: Occupational accident sector status between 2013-2021

Years	Number of Employees per Workplace	Total Insured Suffering from Occupational Accident	Number of Work Accidents Per Insured	Sum of Temporary Incapacity for Work	Temporary Incapacity for Work Per Occupational Accident	Loss of Time After Occupational Accident
2013	42,48	927	0,09	4.074	4,39	17,19
2014	75,34	1.397	0,06	3.574	2,56	11,91
2015	84,08	1.705	0,07	7.731	4,53	25,60
2016	90,08	1.524	0,06	7.915	5,19	27,48
2017	88,27	1.418	0,06	6.957	4,91	24,33
2018	94,32	1.561	0,06	3.570	2,29	12,23
2019	94,54	1.534	0,05	9.537	6,22	30,37
2020	87,01	380	0,01	2.846	7,49	8,55
2021	45,63	704	0,02	4.796	6,81	7,60

As can be seen in Table 3, it was determined that the number per workplace increased due to the increasing number of insured persons after 2013, but decreased to the level of 2013 with the increase in the number of workplaces in 2021. When the number of occupational accidents per insured is examined, there is a continuous decline in the sector from 2013 to 2021. However, this situation is not reflected in the sum of the temporary incapacity period. The reason for this is that the temporary incapacity periods per occupational accident have increased depending on the number of occupational accidents and the severity of the accident. When the number of lost days after an occupational accident in the "51 – Air Transportation" sector is examined, it is seen that there has been a decrease of approximately 3.6 times as of 2016. The reason for the sudden increase in time loss in 2019 is that the severity of the occupational accidents that occurred in 2019 is higher and the number of injuries or injuries of the insured by having more severe occupational accidents increases. It is noteworthy that temporary periods of incapacity tend to decrease continuously depending on the number of injuries and deaths that occur after occupational accidents in the sector. These data, which are of great importance in terms of occupational health and safety, clearly reveal that the awareness of occupational health and safety in the sector has increased.



Figure 5: Situation analysis of the air transportation sector after occupational accidents between 2013-2021

4. Conclusion and Discussion

The importance of air transportation is increasing rapidly today due to the contribution, convenience, and opportunities it provides. It has become an indispensable choice for global tourism and logistics, becoming the fastest and most uninterrupted transportation network in the world. When the developments in both the world and Turkey are examined, the importance of the air transportation sector is clearly revealed. Considering the number of passengers and cargo transportation, fleet and infrastructure investments and other technological sanctions and development potentials of the sector, it can be easily seen that the air transportation sector is growing day by day.

Due to the high risks encountered in parallel with the technological developments and advances in the sector, the creation of suitable working environments in terms of occupational health and safety has become a condition of business life. It is aimed to prevent occupational accidents by creating an occupational health and safety culture and increasing the level of awareness among employees. In line with this purpose, with the Occupational Health and Safety Law No. 6331, which entered into force in 2013, risk assessment studies were made mandatory in all workplaces operating in the air transportation sector and it was aimed to determine the hazards and risks in advance and to establish a preventive safety policy in the workplaces.

In the study, the situation of work accidents in these transportation activities at airports in Turkey was analyzed and compared. With the analysis of the sector's occupational accidents data of the Social Security Institution (SSI) between 2013-2021, it was seen that the "51 – Air Transportation" sector was grouped under two basic economic activity classifications as "51/1 – Passenger Transportation by Air" and "51/2 – Freight Transportation by Air". It has been determined that the number of workplaces operating in the sector is constantly increasing, but the number of insured persons employed has become almost stable since 2015. It has been calculated that the number of female insured persons who have suffered an occupational accident in both "51/1 – Passenger Transportation by Air" and "51/2 – Freight Transportation by Air" is higher than the number of male insured. However, when the deaths after occupational accidents were examined, it was seen that between 2013 and 2021, there were 16 deaths only in "51/1 – Passenger Transportation by Air" and no deaths in "51/2 - Freight Transportation by Air". It has been determined that the temporary period of incapacity of women insured persons is also higher due to the high number of occupational accidents. When the data of the "51 – Air Transportation" sector for the years 2013-2021 are examined as a whole, there are 224,243 insured employees in a total of 2,983 workplaces; 3,725 male and 7,444 female insured employees had suffered occupational accidents; that male insured persons had 19,191 days and female insured persons had 31,809 days of temporary incapacity; It was calculated that 9 male and 7 female insured persons died after an occupational accident.

The data obtained show that Occupational Health and Safety (OHS) management is very important in the air transportation sector as in every sector. As a result, it is possible to take the necessary precautions before the occurrence of occupational accidents, to use protective equipment and equipment, and to act according to regulations and rules with an effective OHS management. There will also be a decrease in productivity as the separation of employees from their workplaces after any occupational accident will lead to man/hour registration specified as temporary incapacity period for the enterprise.

As a result, considering the difficulties that will be faced in the air transportation sector, it is possible to continue the growth of the sector day by day with preventable occupational accidents. For this reason, in order to create OHS awareness in enterprises, it is necessary to take both national and international measures and provide the necessary trainings to the employees. Using the equipment

recommended by WHO and IATA, it should be aimed to protect the motivation of employees and thus increase occupational safety. It is of great importance to create a vision of zero occupational accidents in air transportation by creating a common perspective with airports, aircraft manufacturers, fuel, catering and passenger services, national and international suppliers, trade unions, associations and the government operating in the sector.

There is no academic study in which the data of occupational accidents in air transportation at airports in Turkey. The data obtained from this study can easily use in the comparison of the situation with sectoral occupational accidents experienced in other foreign countries. In the academic studies to be carried out later, it is recommended to investigate the impact of occupational accidents in air transportation on economic growth and sectoral development by making cost analyzes.

Compliance with Ethical Standard

Conflict of Interests: There is no conflict of interest between the authors or any third-party individuals or institutions.

Ethics Committee Approval: Ethics committee approval is not required for this study.

Funding Disclosure: No financial support was required in this study.

REFERENCES:

- Airbus, (2020). *Global Market Forecast 2019-2038; Cities, Airport and Aircraft*, Airbus. <https://www.airbus.com/aircraft/market/global-market-forecast.html>
- Boeing, (2020). *Commercial Market Outlook 2019–2038*, Boeing. <https://www.boeing.com/commercial/market/commercial-market-outlook/>
- CAPA, (2021). *Europe Aviation: 2020 Hindsight and 2021 Vision*, Centre for Aviation. <https://centreforaviation.com/analysis/reports/europe-aviation-2020-hindsight-and-2021-vision-548049>
- Çelik, D.S. (2017). The airline transport industry and its economic impacts, *The Journal of International Scientific Researches*, 2(8), 82-89. <https://doi.org/10.23834/isrjournal.350019>
- Cirium, (2021). *Data and Analytics For Aviation and Travel*. Cirium. <https://resources.cirium.com/2021-on-time-performance-review/>
- DHMI, (2021). *2020 Faaliyet Raporu*, Devlet Hava Meydanları İşletmesi Genel Müdürlüğü. [https://www.dhmi.gov.tr/Lists/FaaliyetRaporlari/Attachments/22/Faaliyet%20Raporu-31.05.2021web%20\(3\).pdf](https://www.dhmi.gov.tr/Lists/FaaliyetRaporlari/Attachments/22/Faaliyet%20Raporu-31.05.2021web%20(3).pdf)
- Erdem, M.S. et al. (2015). A study in human factors engineering in terms of pilotage errors and/or aircraft design problems (the importance of human error), *Suleyman Demirel University Journal of Engineering Sciences and Design*, 3(3), SI:Ergonomi2015, 493-500.
- EUROSTAT, (2022). *Non-fatal accidents at work by NACE Rev. 2 activity and sex*, EUROSTAT. https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=hsw_n2_01&lang=en
- Hedayat, A. & Shahniani, M., (2017). Investigating the safety culture and costs arising from safety non-compliance on building sites, *Journal of History Culture and Art Research*, 6(1), 315-325. <https://doi.org/10.7596/taksad.v6i1.744>

- IATA, (2021). *International Air Transportation Association*, IATA. <https://www.iata.org/en/about/history/>
- Kanat, Ö. Ö. (2017) *Hava Aracı Bakım Yönetimi*. Atatürk University Press.
- Koçali, K. (2021a) *Calculation of occupational accident indicators of Türkiye*. In M. Dalkılıç & B.S. Yılmaz (Eds.), *INSAC Social and Education Sciences*, (pp.224-250). Duvar Yayınevi.
- Koçali, K. (2021b). Sosyal Güvenlik Kurumu'nun 2012-2020 yılları arası iş kazaları göstergelerinin standardizasyonu, *Akademik Yaklaşımlar Dergisi*, 12(2), 302-327. <https://doi.org/10.54688/ayd.1012081>
- Küçükönal, H. & Korul, V. (2002). Havayolu işletmelerinde insan kaynakları yönetimi, *AKU Sosyal Bilimler Dergisi*, 2(5), 67-90.
- Öçal, M. & Çiçek Ö. (2021). Türkiye ve Avrupa Birliği'nde iş kazası verilerinin karşılaştırmalı analizi. *Hak-İş Uluslararası Emek ve Toplum Dergisi*, 6(16), 616- 637.
- Şen, Y. & Erdağ, T. (2021). Evaluation of air transport sector development stages with pest analysis: An investigation in the scope of 5 periods+Covid-19 pandemic process period, *TroyAcademy*, 6(2), 422-461.
- Sosyal Güvenlik Kurumu (SGK). (2022). *SSI 2013-2021 Statistical Yearbooks*. http://www.sgk.gov.tr/wps/portal/sgk/tr/kurumsal/istatistik/sgk_istatistik_yilliklari
- Taşkın, E. & Durmaz, Y. (2012). *Lojistik Faaliyetler*, Detay Press.
- Wensveen, J.G., (2011) *Air Transportation A Management Perspective*, 7th Ed., TJ International Press. Cornwall, United Kingdom.
- Yaşar, M. & Gerede, E. (2018). Türkiye havayolu iç hat şehir çiftlerindeki pazar yapılarının piyasa yoğunlaşması ölçütleri ile belirlenmesi, *Yönetim ve Ekonomi Dergisi*, 25(1), 72-197.
- Yılmaz, F. (2020). Evaluation of industry and historical development between 2003-2018 years of civil aviation sector in Turkey, *Eurasian Journal of Researches in Social and Economics*, 7(1), 113-129.