



Occupational Health and Safety in the Construction Sector and the Legalization Process in Turkey

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*To cite this article, Collaborate, Current Science, Volume 5, No. 3-5, 2023, p. 205 – 237. -
0099-0001-2303-0504.*

*Our studies are in a format accredited, approved, and supported by EAALS - European
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("CURRENT SCIENCE") ("Scientific Studies - Current Science Georgia")*

ISSN: 2667-9515

Barcode: 977266795001

Editors Group:

Concessionaire: Tsisana Kharabadze

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CURRENT SCIENCE

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Abstract

In today's modern society, people from all occupations and holding a variety of jobs or titles have a reasonable chance of being involved in a workplace accident or danger at least once throughout the course of their professional careers. It is vital to educate working persons, to increase awareness of such situations, and to take appropriate safeguards to avoid or limit this accident and danger. Training working individuals is also necessary. As a result of this need, "Occupational Health and Safety" has made its way into our professional business life to ensure the occupational safety of the employees in the modern world. Many nations around the world have also created the necessary legal regulations to meet this need and have secured them with laws. This is to ensure that the modern workplace is a safe place for workers to perform



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their jobs. It is of the utmost importance to conduct all the Occupational Health and Safety procedures that have been established to reduce or even eliminate the possibility of occupational accidents occurring to workers and occupational illnesses developing during their working lives. Employers offer recommendations and proposals to take the appropriate safeguards by analyzing the risks in the workplaces where potential occupational accidents may occur and by forecasting the risks in the workplaces where possible occupational accidents may occur. They generate the requisite awareness by way of on-the-job training that they deliver. As a result, the number of work-related accidents and illnesses that may develop is reduced to a manageable level. Because of taking these measures and participating in these trainings, there will be fewer people injured or killed because of accidents that occur in work environments. Moreover, workers have rights that are legally protected to protect their health and safety. In our nation, as in the rest of the globe, the construction industry has a significant position in terms of both the economy and jobs, and the significance of the industry is only growing with each passing day. Accidents on the job are an unavoidable reality in any industry that employs a considerable number of people to conduct its day-to-day operations, and the construction industry is no exception. Only by fully implementing occupational health and safety precautions is it possible for the construction industry, which is widely regarded as one of the economic locomotives that drive the Turkish economy, to prevent occupational accidents. The construction sector encompasses a broad range of activities and, to conduct these activities, requires a large workforce comprised of individuals with a variety of expertise. The construction industry's Occupational Health and Safety system must be properly implemented to ensure worker safety due to the numerous various aspects involved. We can list many reasons, such as the laws and regulations enacted by the legislator, the control mechanisms of the authority, the obligations of Turkish companies against the laws of the host countries in international projects, and the cooperation of Turkish construction companies with foreign companies in multinational projects. These are just some of the reasons we can list. In addition to this, the laws and regulations that Turkey has established in order to become a member of the European Union. As a result of all these interrelated factors and dynamics, it is now essential to draft legal laws that are in line with international norms and regulations, just as is the case in industrialized nations. In this article, we will discuss the evolution of Occupational Health and Safety throughout the history of the Republic of Turkey, as well as the process by which it became



legalized, its current state in the construction industry, the legal regulations, laws, and regulations that are currently in effect, as well as the institutions and practices that are associated with the topic.

Keywords: Historical Development of Occupational Health and Safety, Construction Sector, Occupational Safety, Occupational Disease, Occupational Health, Construction Industry, Occupational Accident, Occupational Safety Legislation.

1. Introduction

In the Turkey of the present day, the human population is expanding at a high rate daily. Housing, places of employment, cities, the infrastructure of cities, and public buildings are being constructed, and development is continuing in a wide variety of diverse sectors so that the requirements of this naturally rising population may be met. The construction business requires a diverse pool of employees that come from a variety of backgrounds and possess a wide range of abilities, traits, levels of training, and work styles. As compared to rates of occupational accidents in other industries, construction's rates are much higher owing to variables like as working circumstances that deviate from the norm, distinct worker groups, and the ongoing nature of construction operations. The European Statistical Office (EUROSTAT) found that the construction sector was responsible for more than one-fifth of all fatal workplace accidents in Europe. (Eurostat, 2023) So why is it that this ratio seems to be so prevalent in the building industry? In their work titled "Construction accident causality: lessons from diverse nations and varied results," which was published in 2014, Alistair GBB and his colleagues explain the explanation for this as follows: "occupational accident." The challenging and hazardous working circumstances (Gipp, Lingard, Behm, & Cooke, 2014) in the construction industry are one of the primary contributing factors to the high number of accidents that occur on the job. In addition, the challenging working circumstances in this industry are a major contributor to the high prevalence of occupational disorders among employees. A large majority of firms, except for the construction sector, engage in their normal operations, are independent, and the job that each employee does is typically fixed, and they are aware of what they are supposed to accomplish. While working in the same setting, the odds of occupational accidents and the methods in which they might occur are comparable. Jobs at an automotive plant, for



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instance, often include the performer always doing the same kind of work and having the same set of responsibilities for their whole careers. Workers are made more aware of how to prevent potential workplace accidents by considering factors such as these. It is simpler for businesses to implement the essential safety measures, and it is less difficult for employees to get the training they need. Nonetheless, because of the one-of-a-kind working circumstances and inherent characteristics of the construction industry, it is distinct from other commercial sectors because were discussed before. Several factors, including working circumstances, the physical surroundings, natural conditions, varied worker groups, and changes in the execution of the project, might contribute to the unique dangers that are presented by each individual construction project. Because of the intricate nature of the building and manufacturing processes, as well as the components that are used, this sector is classified as a heavy industrial sector. Employees who are employed in the construction industry do not have access to a consistent working environment like those who are employed in other industrial enterprises since new projects need them to relocate often. The construction industry is fraught with danger and presents workers with a considerable number of challenges, both physically and mentally. In these difficult sectors of the workforce, there is a race against the clock. Both an elevated level of physical stamina and work experience are prerequisites for employment in these positions. It is necessary for many working groups to work in the same field at the same time. Working in conditions that are both physically demanding and fundamentally at odds with human nature always results in the creation of settings that provide an elevated risk for accidents on the job. The precariousness and perilousness of the working circumstances is further exacerbated by their complexity and difficulty. (Jaafar, et al., 2018) Because of all these factors, working in the construction industry is associated with a higher risk of injury than working in other fields, and it is much more difficult to protect the health and safety of construction workers. "The high accident rate in the construction sector remains a key issue for practitioners as well as researchers," despite ongoing attempts to enhance safety in the business, as stated in the previous sentence. (Umer, Li, Lu, Szeto, & Wong, 2018) In recent years, Turkish construction companies have begun to conduct construction activities in international areas. As a natural consequence of this development, the companies are now obligated to comply with and implement the laws and regulations pertaining to occupational health and safety that are in place in the countries in which they are located. In a similar vein, building businesses from



developed nations that collaborate with domestic construction companies to conduct their operations exert pressure on the domestic companies to apply occupational health and safety measures in the same manner as they do in their own countries. Yet not all our domestic construction enterprises are ready institutionally, which means that some of them are unable to react effectively to the demands and requests that are being made. On the other hand, they are putting up significant efforts to swiftly advance their standing in this arena. Turkey: Under the context of the process of harmonization with the European Union, it has implemented a great deal of new legal laws and altered existing ones. This procedure: It has helped to improving our standards to the level of those in developed countries, and it has had good impacts on the development of legislative rules relating to the area of occupational health and safety and the implementation of practices. With all these elements described above, to run the occupational health and safety system in Turkey, has recently adopted the appropriate legislative laws. This was done to meet the requirements of the European Union. In addition to this, it has set up authorized bodies, control mechanisms, and institutional structures. However, if Turkey truly desires to effectively protect and ensure the occupational safety and health of the people working in construction sites, it should not be content with the legal regulations it has created; rather, it should take measures to ensure that these laws are implemented in the field to achieve this goal.

2. Occupational Health and Safety in the Turkish Construction Industry

Building construction is the term used to describe a variety of diverse types of work that are conducted on the ground or below the surface, including but not limited to operations such as cutting, filling, excavation, tunneling, construction, and excavation. The term "structure" is defined in the following manner by the laws of the Republic of Turkey: "Structure; fixed and mobile facilities, including permanent or temporary, official and private subsurface and surface construction on land and water, and their addition, alteration, and repair." Buildings are defined as "structures that can be utilized on their own, are covered, and in which people can enter. Buildings may be used for sitting, working, having fun or relaxing, or worshiping, and buildings can also be used to safeguard animals and commodities." (3194 Sayılı İmar Kanunu, 1985) Throughout its history, humanity has formed a vast number of civilizations, continually developed modern technologies, and, of course, in the process of doing so, has produced new



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techniques and procedures in building. The construction of buildings that took an exceptionally long time to finish in earlier eras may now be done in a noticeably short amount of time. We can create enormous buildings because of the advances in science and technology that we have made in construction, particularly over the course of the last century. We can finish huge construction projects in a lot more efficient manner and in a shorter amount of time thanks to the construction equipment and construction materials that we manufacture. For instance, with the help of this technology, we can construct megastructures such as tunnels, motorways, dams, skyscrapers, and bridges, all of which had previously been unthinkable in our recent past. We can construct buildings that are unshakable in the face of natural disasters such as earthquakes, hurricanes, and high winds. The labor in several sub- and sub-sectors is beneficial to the construction industry, which is responsible for the building of all these structures. It obtains the building materials and other resources it requires from other commercial components surrounding the construction site. As a result of the value, it contributes to the economy, it has emerged as one of the most crucial factors in the continued economic growth of nations. Also, it creates job opportunities. Yet, in addition to these great elements that building brings to the economy, one of the bad aspects that may be encountered in construction regions is the increased risk of work-related accidents and occupational disorders. Accidents at work are a source of contention not just in Turkey but also in a substantial number of other nations throughout the globe. With a total of **2,296** accidents on the job, Turkey was ranked 12th by the International Labor Organization (ILOSTAT) in the category of non-fatal workplace mishaps in September of 2022. (ILOSTAT, 2023) According to the statistical information provided by the Social Security Institution, the mining and metal industries are the ones that suffer the highest number of occupational accidents in Turkey. In addition, there is no denying the alarmingly high number of accidents that take place on the job in the construction industry. In addition, when the fatality rates due to occupational accidents across all industries are compared, the construction industry, sadly, ranks at the very top of the list. According to the estimates provided by the Social Security Institution for the year 2021, the total number of workplaces in Turkey is **2 million 87 thousand 692**. The construction industry accounts for **197 075** of these workplaces, which represents **9.5%** of all these workplaces. These enterprises continue their operations in the sector of construction. Again, according to the statistics from 2021, our nation has a total of 16 million 169 thousand 679 workers registered in the SGK



system, and one million 630 thousand 678 of those people work in establishments that continue their operations in the construction industry. The number of people employed in construction accounts for **10.1% of** the total workforce in the industry. As a result of the facts presented here, the significance of the sector in question in relation to the operation of the economy and the provision of jobs in the nation may be deduced. But, in addition to these significant achievements, there are also some contributions in a bad light. Throughout our nation's history, unfortunately, one of the industries in which the highest number of deadly accidents have occurred is the building industry. In the year 2021, there were **a total of 511 thousand 84** accidents recorded on the job. The construction industry was responsible for 58,107 of these occupational accidents, which corresponds to a 11.4% share of all accidents during that year. The construction industry was the location of 386 of the fatal workplace accidents that were recorded the same year, bringing the overall number of fatal workplace accidents reported to **1,382**. These fatal workplace accidents happened in construction. It is responsible for **28%** of all fatal incidents that occur in the workplace. The construction industry is at the top of the list for the deadliest occupational accidents and accounts for nearly one third of all fatalities that occur in the sector as a whole, making it one of the industries with the greatest number of fatal accidents overall. (SGK İstatistik, 2023) The training of employees and employers has been sped up because of the legislative changes that were conducted in preparation for Turkey's membership to the European Union. This has allowed for the prevention of occupational accidents and the reduction of the number of lives lost. The occupational health and safety law that was part of the European *acquis* was adapted to the realities of Turkey and put into operation in the sphere of work in the years 2003 and 2004. This adaptation was based on Article 78 of Labor Law No. 4857. The piece of law was modernized in 2012, and the extent of its application was expanded with the passage of Occupational Health and Safety Law No. 6331. In addition, the issues that the construction industry in Turkey is required to comply with and do in relation to construction works are specified in the "Occupational Health and Safety Regulation in Construction Works," which was prepared and put into practice with reference to the Council Directive 92/57/EEC of the European Union. This regulation was prepared and put into practice with reference to the European Union. It is indicated here what steps the construction industry must do to improve worker health and safety in the workplace. As a result of these transactions, the industry gained exposure to a novel concept: the definition of project



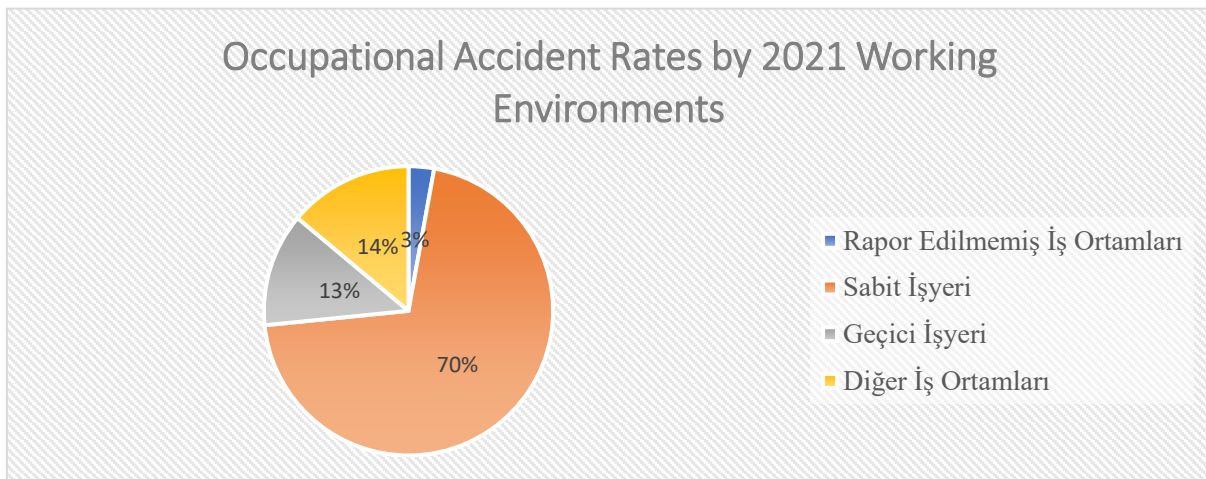
manager or supervisor. In addition, prior to beginning any construction activity, it was necessary to provide notification to the appropriate governmental institutions as required. A health and safety file that is unique to each building project will be prepared, health and safety plans will be made, and a health and safety specialist-coordinator will need to be appointed in the design, preparation, and implementation processes of these projects. In other words, the nature of the construction projects, the working conditions, and the techniques that will be applied will all play a role in the preparation of the health and safety file.

3. Accidents at work

The International Labor Organization (ILO) provides the following definition for the term "work accident": "Occupational injury is defined as any personal injury, sickness or death that is the consequence of an occupational accident." Hence, an occupational injury is not the same as an occupational illness, which is defined as "a disease that develops as a consequence of exposure over a period of time to risk factors that are the outcome of job activity." (Occupational Safety and Health Statistics, from the OHS Database, 2023) Accidents are characterized as unanticipated occurrences that result in personal harm, loss of life, a reduction in output, or damage to property. Numerous researchers have, over the course of time, proposed models of accident causation and conducted analyses of the factors that contribute to occupational accidents and occupational diseases in the construction industry. Their goals have been to gain a better understanding of occupational accidents and diseases in this industry. (Zhang, Shi, & Yang, 2020) An occupational accident is defined as "an event that occurs in the workplace or due to the conduct of the business, causing death or rendering bodily integrity mentally or physically disabled" (6331 Sayılı İş Sağlığı ve Güvenliği Kanunu, 2012). This definition is stated by the Turkish legislator in the Occupational Health and Safety Law No. 6331. Again, the legislator stated the following in the Social Insurance and General Health Insurance Law No. 5510: "While the insured is at work, if the insured works independently on his own behalf and account due to the work carried out by the employer, due to the work he is carrying out, During the times spent without doing his main job due to the fact that the insured working under an employer is sent to another place outside the workplace as an employee, It is an event that occurs during the time that the insured is at work. During the he went on to describe. According to law number 5510, in order for an event to be considered a work accident,

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" the person must be insured, there must be a physical or mental damage due to the work accident, and there must be an appropriate causal link between the accident and the damage caused to the person" (the person must be insured, there must be a physical or mental damage due to the work accident, and there must be an appropriate causal link between the accident and the damage caused to the person). All these conditions must be met. (5510 Sayılı Sosyal Sigortalar ve Genel Sağlık Sigortası Kanunu, 2006) In the year 2021, the labor force in Turkey reached 32 million 716 thousand persons, with an additional 1 million 981 thousand workers working in commercial activities compared to the year before. (SGK İstatistik, 2023) (TÜİK, 2023) According to the figures that were compiled and made public by the Social Security Institution (SGK) in line with Presidential Decree No. 4 and Law No. 5502, in 2021 there were a total of 511 thousand 639 persons who were injured on the job. There are 94 0030 women working in this total number of positions. Once again, according to the figures from the year 2021, 1,209 individuals were diagnosed with occupational disorders. The majority of the 49,296 accidents that happened on the job took place between 11:00 and 11:59 in the morning. The most occupational accidents occurred in businesses that had between 250 and 499 people employed. Also in that year, 360 thousand 580 of the total occupational accidents experienced occupational accidents in the stationary workplaces where they were continually employed. These individuals had been working there for an extended period. (SGK, 2023) In the year 2021, the rates of occupational accidents are broken out in Graph-1 according to the working conditions.



Graphic-1, 2021 Occupational Accident Rates by Working Environment in 2021



When someone works in the same place and under the same conditions over an extended period, the likelihood of experiencing an accident decreases. When the statistics from SGK for the year 2021 are analyzed, it is found that there were 57 thousand 695 males, 466 women, and 58 thousand 161 persons in total who were injured on the job while working in the construction business. It is common knowledge that the rate of workplace accidents in the construction industry is far higher than that of any other industry. This is the case when compared to other industries. In addition, a total of 32 thousand 146 workers, 225 of whom were women, were injured on the job while working on the construction of buildings, which is one of the sub-branches of the construction industry; 18 thousand 323 workers, 168 of whom were women, were injured while working on the construction of external structures; and 7 thousand 692 workers, 73 of whom were women, were injured while working in the field of private construction activities.

3.1. Fatal Occupational Accidents in the Construction Industry in Turkey

10% of fatal accidents are brought on by hazardous working conditions in work areas, 88% are brought on by hazardous movements during work, and 2% are brought on by other factors. According to the findings of research that was conducted on fatal occupational accidents that took place in workplaces that participated in the construction industry as well as the statistics compiled by SGK, it is understood that most occupational accidents that result in death are typically caused by falling from heights at rates ranging between 35 and 45 percent. Accidents involving any type of construction equipment, including trucks, excavators, mobile cranes, and so on, that collide with other vehicles operating in the field or with workers, who are at risk of falling from a height while working at construction sites, are categorized as falling from a height accidents. According to the studies that were done on the accidents that were brought on by falls on construction sites, the following is a list of the various kinds of accidents and the reasons behind them:

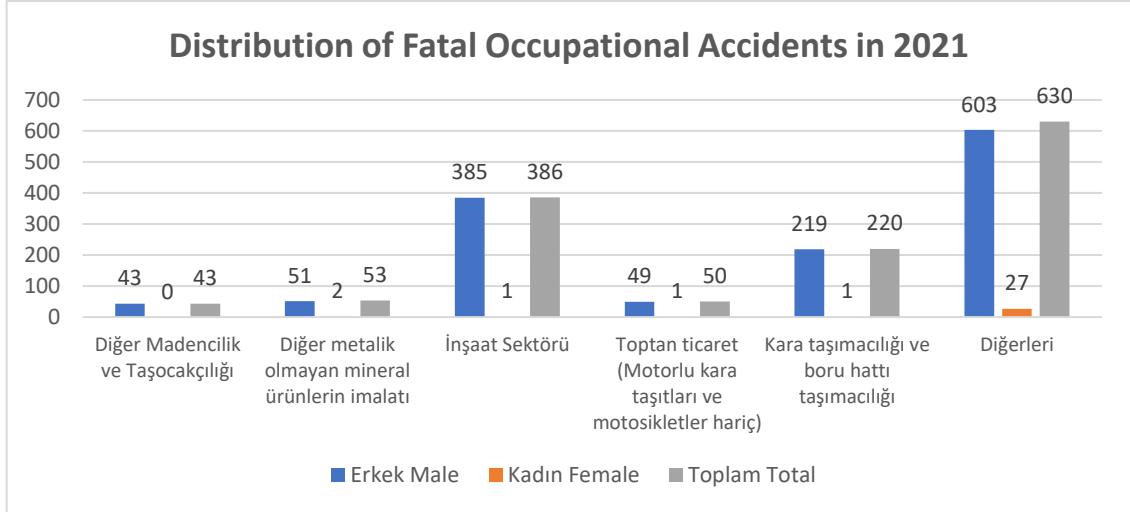
- Falling from scaffolding: scaffolds are not set up as they should be, they are not properly connected to the ground and the surface of the elevation, the scaffold has no protective equipment, the workers do not use safety cords while working on the scaffold.



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- Falling from the roof, incorrect body movements of the worker, being pushed or pulled down due to the crane, the object in the environment or the tool that the worker is in contact with at that moment.
- Falling from open ground or void; absence of warning and warning signs, not securing the undeveloped area, leaving the ground open and gaps unprotected or taking precautions with inappropriate protective equipment.
- Falling from the roof surface ; employees do not secure themselves with a safety cord, use of scaffolding that is not suitable for the working environment and its purpose, or it lack.
- Falling from the ladder; It is due to the use of unsafe materials that are ergonomically suitable for the working environment and do not have the strength to carry the working person.(Chia, Changa, & Tingb, 2005)

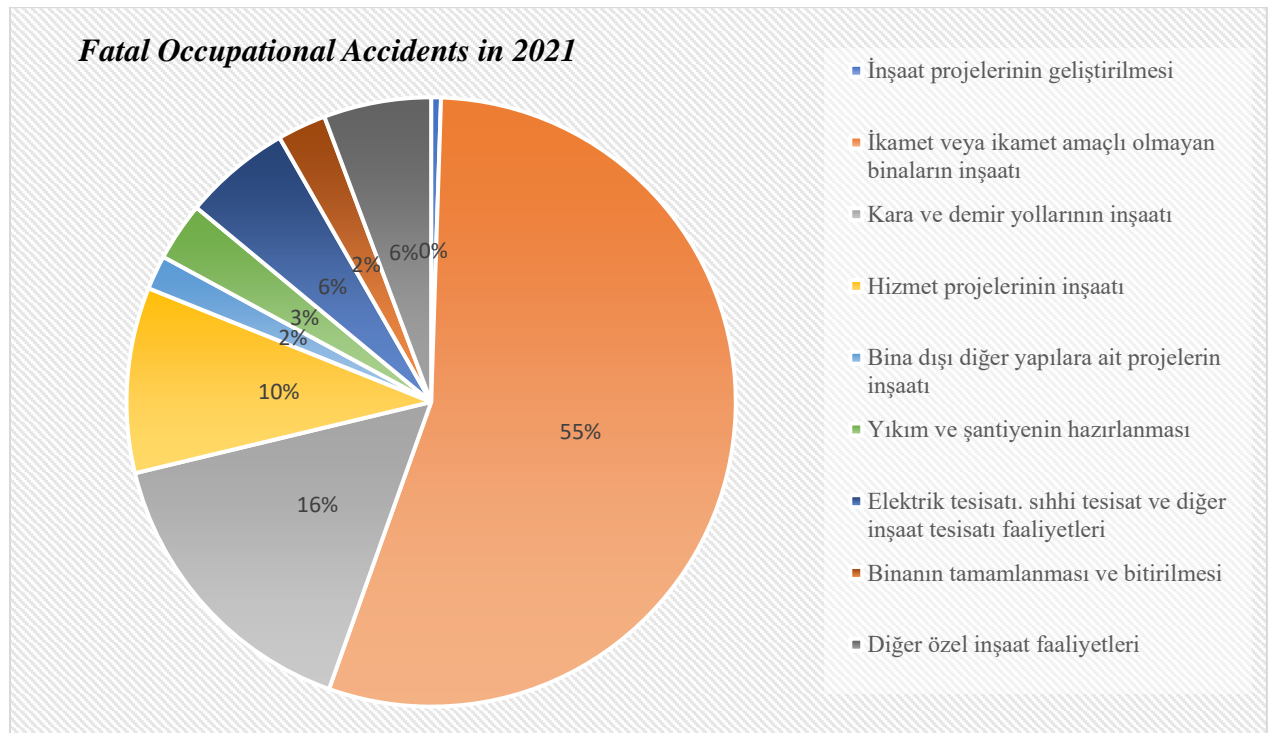
Occupational accidents at construction sites caused by things falling, being thrown, or colliding are the second most prevalent kind of accident that may occur there. Most of these mishaps are the result of improper installation or usage of mobile cranes, which are often used on construction sites, on land that is not suited for their operation. These cranes, when operated improperly, result in significant accidents for which compensation cannot be provided. These mishaps are capable of potentially causing fatalities. Cranes that have been improperly erected on inappropriate grounds and are being operated in an unsafe manner are the leading source of deadly workplace accidents that are caused by things falling from a height, being hurled, or colliding with one another, according to statistical data. Accidents that are caused by things being hurled, such as hand tools, nails, or stones, or by workers leaping from one platform to another, or jumping on the floor, or moving in an uncontrolled manner are in the second position. (2009) (Bahrapour, A.; Nodoushan, R. J.; Shoa, J. V.) The construction industry was responsible for 386 of the 1,382 fatal workplace accidents that took place in 2021. This accounts for 28% of the total.



Graphic-2, Distribution of Fatal Occupational Accidents in 2021.

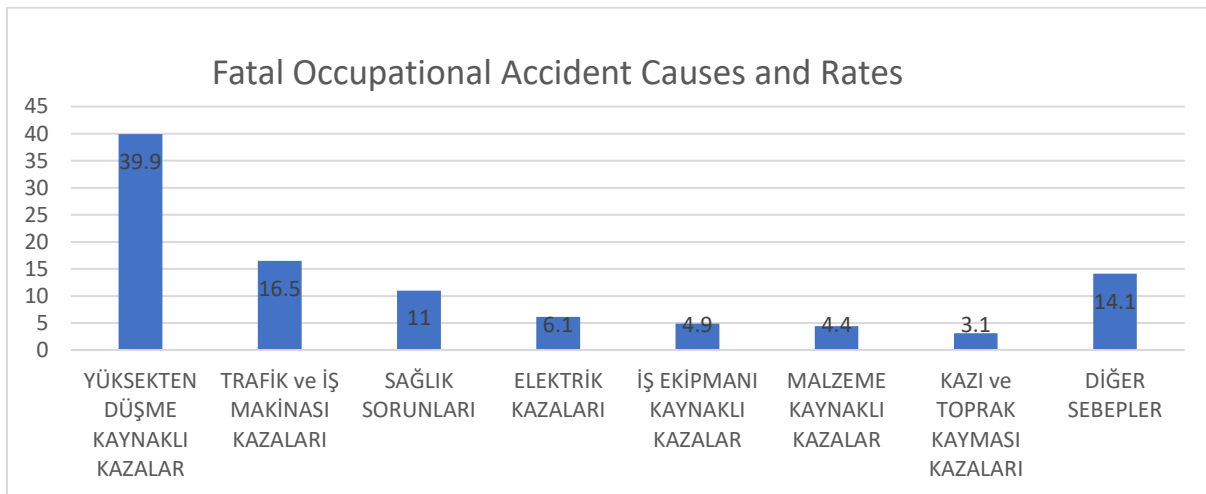
When it comes to deadly workplace accidents in Turkey, Graph-2 reveals that land transportation and pipeline transportation are tied for second position.

Accidents on the job that result in death; the ratio is as shown in Chart-3 when we compare the construction industry within its own sub-branches.



Graphic-3, Fatal Occupational Accidents

According to the statistics provided by the Social Security Institution, the number of fatal workplace accidents that will occur in the construction industry between the years 2013 and 2020 is 3,884. 3.1% of these incidents take place on construction sites either during excavation work or landslides; 4.4% are associated with the construction materials that are employed; 4.9% are the result of work equipment; 6.1% are electrical-related work accidents; and 11% are accidents that involve personnel. health issues, 14.1% unclear or unreported reasons, 16% owing to traffic accidents involving heavy equipment and motor vehicles used for construction purposes, and 39.9% due to falling from a height are the leading causes of death in the construction industry. Graph-4 details the factors that contribute to fatal workplace accidents as well as the rates at which they occur.



Graphic-4. Fatal accident causes and percentage rates. (TUİK, 2023)

386 people lost their lives because of work-related accidents in Turkey in the year 2021, according to the data collected from insured workers who were employed in all sub-branches of the construction industry. Of these fatalities, 214 workers participated in building construction, 66 were involved in private construction activities, and 106 were involved in non-building construction. (SGK İstatistik, 2023)



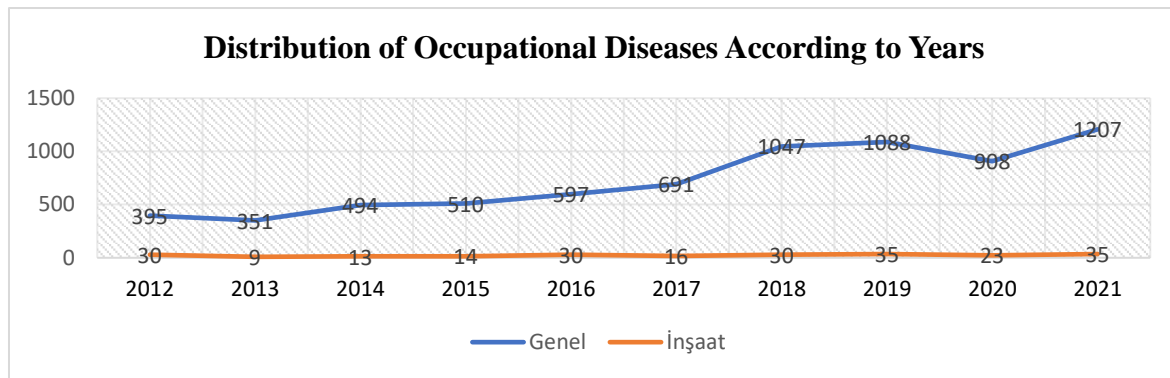
4. Occupational Diseases in the Construction Industry

In Turkey, the Legislator has provided the following definition of occupational disease: "Occupational disease is a temporary or permanent illness, physical or mental disability, which the insured suffers due to a recurring reason due to the nature of the work he/she works or performs, or due to the operating conditions of the business." Occupational disease can be a physical or mental disability as well. (5510 Sayılı Sosyal Sigortalar ve Genel Sağlık Sigortası Kanunu, 2006) "

For an event to be considered an occupational disease; that the insured has an occupational disease due to his job; It is obligatory to be determined by the Institution Health Board because of the examination of the health board report and the supporting medical documents duly issued by the health service providers authorized by the Institution. "In order for an event to be considered an occupational disease; that the insured has an occupational disease due to his job; " (SGK, 2023) In the construction industry, like in any other industry, some forms of occupational illnesses are induced by variables specific to that industry.

These illnesses are brought on not only by the difficult working circumstances of the construction industry but also by other variables, including those that are physical, biological, and chemical. Occupational diseases can develop in workers because they are subjected to conditions such as extreme heat or cold for extended periods of time, vibration, cement, which is one of the primary materials used in the construction process, and chemical components in its content, standing for long periods of time, being in extremely dusty environments due to the nature of construction sites, carrying heavy construction materials, and other similar working conditions.

In Turkey in 2021, there were a total of 1,207 persons, 943 male employees and 274 female workers, who were affected with occupational illnesses, as shown by the data from the SSI. These workers came from a variety of occupational groupings. 35 of them are employed in some aspect of the building industry. According to the data presented in Graph-5, it is believed that there was an increase in the total number of people suffering from occupational diseases between the years 2012 and 2021, whereas the number of people suffering from occupational diseases in the construction industry remained the same during this time.



Graphic-5, Distribution of Occupational Diseases According to Years. (SGK İstatistik, 2023)

Because each construction activity has its own environment and construction materials used in construction, it is necessary to identify the factors that can cause disease in each construction work area to prevent occupational diseases in the construction industry. This is necessary because each construction activity has its own construction materials used in construction. Workers should be provided with personal protective equipment (PPE) such as safety glasses, gloves, masks, and hard hats, depending on the nature of the work they perform and the materials they use. Additionally, workers should receive training on how to protect themselves against the disease and how to take precautions. In addition, there should be warning signs as well as instructional signs posted in working settings in relation to the preventative actions that may be performed against occupational illnesses. Regular inspections of the workers are required, and all hygiene regulations must be always adhered to. Hearing loss, carpal tunnel syndrome, white finger disease, illnesses caused by dust, diseases caused by chemical agents, tetanus, cancer, asthma, chronic low back and back pain, skin problems, and asbestos are the most frequent occupational ailments in this industry.

4.1. Hearing Loss Due to Noise

The eardrum may be damaged with prolonged or excessive exposure to loud noises at work; the extent of this damage is proportional to the sound's volume and duration. The human ear, when subjected to sound for an extended period and in a continuous manner, first loses its ability to hear at high frequencies. If the human ear is subjected to this loud sound for an extended period, the ability to hear low frequencies will be lost in the later stages. On



construction sites, there are many kinds of loud noises coming from various sources, which may lead to hearing loss. On the origin of this noise: various work equipment, including drills, crushers, compressors, and other instruments. A temporary exposure to the noises that we refer to as noise in working settings creates transitional or less severe hearing problems. Nevertheless, if the exposure is extended and persists in the subsequent working processes, permanent hearing loss may result. In addition, the volume of the noise that an individual is subjected to may have a role in the development of health issues such as difficulty concentrating, restlessness, earache and ringing, anxiousness, and hypertension. To protect the employees from this issue, the dangerous group is identified via the tests that are conducted during the process of recruiting, and it is possible to guarantee that the risky group works in an atmosphere that is free from noise pollution. The propagation of noise should be stopped at its source by taking precautions such as installing sound insulation and giving preference to machinery with a low level of background noise. Noise levels in the workplace must be measured on a regular basis, and efforts must be taken to avoid prolonged exposure to environments with excessively high noise levels. It is imperative that employers mandate that their employees always wear hearing protection. People need to have their hearing checked at least once a year using an audiometer. The legal noise limit value that workers would be exposed to during an eight-hour working period is 87 dB(A), as stated by the rule that is now in effect in Turkey to protect employees from noise and dangers. In these circumstances, the noise level may reach a maximum of 85 dB(A), and it can drop to a minimum of 80 dB(A). (Çalışanların Gurultu İle İlgili Risklerden Korunmalarına Dair Yonetmelik, 2013)

4.2. carpal tunnel syndrome

It is the general diagnosis given to syndromes such as lack of function, deterioration, and pain in muscles, joints, tendons, and soft tissues due to movements that cause trauma in the limbs. It is the result of construction workers performing movements that require continuous and repetition during their work, which pushes the biomechanical limit of the body. The condition manifests itself first because of compressed nerves in the carpal tunnel of the wrist. Each one of these factors—strength, exposure to cold, posture, vibration, and repetition—can increase your likelihood of developing the condition. Carpal tunnel syndrome may be brought on by any combination of these risk factors, including prolonged and strenuous hand and wrist



postures, vibration, intense gripping of the hand for extended periods of time, pressure and strain in the palm, and working in chilly environments. The hands and arms are often the first places affected; however, the neck and shoulder regions are also potential trouble spots. In its latter phases, it can cause harm to the bones, and in rare instances it even affects the spine.

4.3. Vibration-induced white finger disease

Construction workers are often subjected to vibration either because of the environment in which they operate or the tools and equipment that they use in their jobs. The vibration exposure measure is defined as the average of the vibration to which they are subjected throughout the course of an average of eight hours of operation. This is done over the course of one day. According to the percentage of the worker's body that was in touch with the vibration source, it is broken down into two different sections. The first one is the vibration of the whole body. When a person is operating a machine at work that generates continuous vibration, or is in a machine that generates continuous vibration, or is working on a floor that vibrates, the worker is subjecting his whole body to vibration. The other one is the vibration of the hand and arm. In this case, however, the only part of the worker that is exposed to the vibration source is the leg that he touched. Raynaud's illness is a condition that affects construction workers and is often brought on by prolonged exposure to vibration. Workers who use spinning hand tools and tools, crushers, and machines that create vibrations such as grinding and sanding without using protective equipment are more likely to get discomforts such as muscle tears and muscle cramps during their careers. After this, patients will suffer a loss of feeling in the limbs that were exposed to the vibration as well as atrophy in the neurological system. Because to the constriction of the blood vessels, the blood is unable to supply the skin, which results in the skin taking on a white and blue look. With higher levels of exposure, there is a greater risk of skin wounds, which are followed by the death of tissue. To safeguard employees who are exposed to vibration from becoming unwell, the length of exposure to vibration should be decreased as much as possible by cutting down on the number of hours workers are required to put in each day. Alternating between tasks and taking sufficient pauses is recommended for operators of vehicles with strong vibration impacts. Anti-vibration devices need to be put on the steering wheels and foot pedals of the vehicles to provide protection against vibration for the people who operate the machines. It is essential that the cabins, in which the driver or



operators are housed, be equipped with suspension systems. Work machines that produce less vibration during operation should be favored wherever feasible, and regular maintenance of the equipment should be performed to eliminate the possibility of vibration. A division of labor should be set up so that employees are not required to spend extended periods of time working with machines that generate vibration. Moreover, workers should be equipped with the essential protective clothes and equipment to guard them against the effects of vibration.

4.4. Problems Due to Dust Exposure

In several sub-sectors of the building and construction industry, activities such as crushing, sanding, dismantling, digging, plastering, and excavation are among the many that contribute to the generation of dust. Other such activities include demolition and excavation transport. This dusty atmosphere presents a risk to the workers' health if they continue to operate in it without adopting any preventative steps. It is important to use a mask that can protect against inhaling the disease-causing dust. Dust should be measured in working environments, dust extraction systems that prevent or decrease the creation of dust should be installed, and the ventilation system of the environment should be run properly. Dust should also be measured in working settings. The following is a list of the most common types of occupational disorders that construction workers suffer from due to dust in the workplace:

- **Asthma:** These are usually symptoms of shortness of breath, wheezing, chest swelling and coughing.
- **Chronic obstructive pulmonary disease (COPD):** It is a disease that occurs mainly due to narrowing of the airway . Initial symptoms of the disease; shortness of breath, cough, difficulty in breathing, sputum production. In the advanced stages, loss of appetite, weight loss and swelling of the feet occur.
- **Lung infection (Pulmonary infection :** Many kinds of bacteria and viruses suspended in the air by adhering to the dust in the working environments in constructions reach the lungs of the workers through respiration and cause infection in the lungs. In the first stages, it creates phlegm and inflammation, making breathing difficult. To protect workers from disease, special filter masks that provide protection against dust must be



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provided and the working environments must be ventilated in accordance with the legislation.

- **Asbestosis** : Generally, people who work in construction for 5-10 years and have asbestosis for a long time. may occur because of exposure. Symptoms of the disease; Dangerous consequences such as hypertension, respiratory failure, lung cancer, heart failure may occur.
- **Silicosis** : Cement is one of the most used building materials in the construction industry and to which workers are most exposed. It contains abundant silicosis substance in its cement structure . Therefore, it is inevitable for workers to be exposed to silicosis during construction activities . If necessary protective measures are not taken; At first, general lung disorders begin to emerge in workers. In the later stages, it can cause weight loss, edema, hypertension and skin disorders. Depending on the particle size, the density of the dust and the inhalation time, the effects and progression of the disease may differ. This disease, which has fatal consequences in the last stages of the disease, cannot be cured.

4.5. Work Position Related Problems

Back and muscular discomfort are caused by working in tricky situations, such as on construction sites, as well as by carrying heavy goods, standing for extended periods of time, being in the same posture, or repeating identical actions. Working in this manner for extended periods of time may result in problems of the skeletal system. If the weight is raised repeatedly, there is a risk of the waist being flattened, sustaining an injury, or developing a problem that causes slippage. One of these conditions is called a lumbar hernia, and it may be brought on by engaging in strenuous physical labor. If the discomfort has worsened because of repeated exposure, the patient may have pain in the lumbar area that negatively impacts their quality of life. Moreover, the patient may experience an increase in the amount of pain they feel whenever they sneeze or cough. In the latter stages of the illness, you may notice a decrease in reflex activity in the limbs, as well as waist abnormalities and muscular spasms. Damage to the tendons, which are what link the muscles and bones in a human body, is another source of pain that may be attributed to improper postures and stances used while at work. The most typical



symptoms in this region are sensitivity to touch, tingling in the tendons, discomfort, burning, and swelling in the affected area. The inability to move freely restricts employees' range of motion. While working out, it is important to take care not to overstretch your tendons since this may lead to soreness. The capacity to move is afforded to the human body by the presence of joints. Sliding fluid sacs may be found in joints throughout the body, including the shoulders, hips, elbows, and knees. These vesicles protect the joints from the abrasions and wear that are caused by the friction that occurs when the joints move. The condition known as bursitis develops when a worker injures the slippery fluid that is found in his joints because of poor posture and severe strain over a prolonged period. One of the signs of bursitis is swelling in the regions that are painfully affected by the condition. Certain parts of your body are noticeably hotter than the rest of your body. Workers should be trained and warned to prevent them from lifting heavy materials by forcing their bodies into the incorrect position or by lifting heavy materials in an awkward position. The location and environment of the machines should be arranged in a way that workers can work comfortably. Ergonomic machines with adjustable height or low according to the body of the worker should be preferred. Workers should be able to work comfortably.

4.6. Chemical Induced Problems

Workers in the construction sector may be put in situations where they are exposed to hazardous substances such acid, thinner, paint, lead, varnish, beryllium, tar, and solvents. It is possible for the quantity of chemical exposure as well as the kind of chemical to change based on the job, the length of time spent working, and the ambient circumstances. It is possible for the painter to be exposed to poisonous metal and solvent fumes, for the roofer to be exposed to tar in the roof insulation material he uses, and for the asphalt road construction worker to be exposed to petroleum. Symptoms such as discomfort, swelling, crusting, flaking, burning, and itching may appear on the skin if the body is subjected to an environment that is hazardous to it. Rashes, crusted wounds, and itchy rashes are among symptoms that may be seen in the latter stages of the illness. are symptoms of the skin conditions dermatitis and eczema. As a preventative strategy against these health issues, the warnings that are included in the **Material Safety Data Sheets** of the chemicals that are used should be taken into consideration, and the appropriate protective measures should be implemented in accordance with these warnings. The



selection of building materials that provide the least potential risk to human health in terms of chemical exposure should be prioritized. The worker who is going to be exposed to toxic substances must have protective gear made available to them. In addition, the appropriate ventilation systems should be installed to protect workers from being exposed to chemicals.

4.7. Temperature Related Problems

As a result of prolonged exposure to elevated levels of heat, workers at high altitudes and in wintry weather conditions may experience discomforts such as impaired concentration, heat cramps, heat strokes, heat exhaustion, and sensitivity. These symptoms are caused by the loss of minerals and water that occurs because of working in hot conditions for an extended period without taking in the required quantity of fluids. As a result of the fact that construction workers are often required to do their jobs outside, they are exposed to the potentially harmful effects of the sun and heat. It is important to monitor the health of workers on a regular basis to head off any potential problems that may arise because of the contact between them. It is important to monitor the employees' oxygen consumption rates and determine if there is any variation in these rates. As a preventative measure against heat strokes, appropriate pauses in air-conditioned areas should be taken, and enough amounts of fluids should be consumed. The length of time spent exposed to hazardous substances and the degree of danger posed by those substances both have a role in determining how likely it is that an individual may develop an occupational illness. Hence, to safeguard workers from occupational illnesses; and to decrease the amount of time employees are exposed to a hazardous environment, frequent breaks should be provided to employees. It is essential to adhere to this practice to safeguard the employees' health. The legislation requires that a worker put in a minimum of 45 hours of labor every week, which breaks down to 11 hours of work per day. For safety reasons, women who work night shifts, pregnant women, and nursing moms should not exceed the maximum workday length of 7.5 hours. In addition, the lawmaker has made it illegal for workers aged 16 to 18 to put in extra hours that amount to more than eight hours per day and forty hours per week. This article also applies to those who work at night, including pregnant women and moms who nurse their children. Regular checkups are very necessary if one want to lessen or eliminate the risk of developing occupational disorders via timely diagnosis.



5. Legalization Process of Occupational Health and Safety in the Construction Sector in Turkey

The administration of the Ereğli coal basin was handed up to the Ministry of Navy in the year 1865, when the Ottoman Empire was still in existence. Because of this, **Dilaver Pasha** was selected to serve as the responsible party for the mining region on behalf of the Navy Ministry. We can say that the first written Occupational Health and Safety regulation in the history of Turkey was created after Dilaver Pasha took office. On May 8, 1967, he declared the Dilaver Pasha Regulation, which bears his name and which he prepared because of the research he conducted over the course of the two years. This regulation was the result of his efforts. Between the years 1867 and 1922, this restriction was enforced in the Ottoman Empire about the laborers who were employed in the Ereğli Coal Basin. Nevertheless, Abdulaziz, who reigned during that time, did not give his blessing to the plan. There are a total of one hundred articles and seven chapters included in the rule. In conclusion, the kind of management that will be implemented at the mines has been chosen, the operating rights have been revised once again, and the commercial acquisition and selling of the coal that has been produced has been governed by rules.

The 21st item of the rule states that all healthy males between the ages of 13 and 50 who reside in one of the 14 villages that are located in the area where the mines are situated are required to work in the mines for a total of six months every year. Article 29 mandated a reduction in the number of hours that mine employees were required to put in each day, from 12 to 10, and Article 30 addressed the health issues that miners face as a direct result of their working circumstances, as well as potential remedies. With the passage of the 56th article, Christian miners were granted time off for Easter, while Muslim mining workers were granted time off for religious holidays. The provision of employees' sustenance and other necessities linked to their labor by the mining operation was made illegal by the 82nd article of the 68th article. Also, the 68th article barred workers from engaging in employment that was unrelated to their work in the mine. Provisions were established, such as breaks for employees, the payment of wages and salaries in advance, and the payment of earnings to workers who were kept on standby but did not work in the quarries at that period. It was made certain that the employees who were suffering from illnesses that were not life-threatening would get free medical attention from the



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physicians working for the mining companies, while those who were sick would be sent home to rest instead of being required to do their jobs. Under **the Dilaver Pasha Regulation**, the idea of sickness was considered as the grounds for the termination of the contract of the mine employees. The regulation did not include work accidents as they are understood today, nor did it identify the actions that were to be performed in relation to this problem. In 1869, the Maadin Regulation came into effect, and as a result, several restrictions that were beneficial to employees and were analogous to those that govern occupational health and safety today were put into place. According to this regulation, the provision of compensation to the employee and their relatives for the compensation of the damage caused by the work accident and a fine if the owner of the workplace was at fault in the accident was valid. In addition, the provision of compensation to the employee and their relatives for the compensation of the damage caused by the work accident was valid. This rule officially granted miners with the right to have physicians and open pharmacies inside the mines, engineers to take the required precautions to avoid or reduce accidents, and the right to demand materials from management to implement these measures. It is required that a report be filed with the management on any accidents that may have occurred. In addition to this, there is no longer any need for employees to be employed in mines to do menial tasks.

According to the circumstances that exist today, key laws concerning occupational health and safety have been developed because of this regulation. This is something that may be comprehended. Mecelle was the first legal rule in our history to be referred to as "civil law," and it went into effect in the year 1876. Legal provisions were regulated with the Mecelle in regard to the employer's compensation for the damage suffered by the worker due to the worker's fault, the prohibition of paying the worker's wages in kind, the employer's ability to extend the worker's working time only from sunrise to sunset, and the payment of the wages of the worker kept ready for the job as if he had worked. All these issues were addressed in the Mecelle. (ergometri e-kutuphane, 2023) Throughout the history of the Republic of Turkey, which was created after the Ottoman Empire, this rule was one of the main ones that was enacted in 1921 about the rights of employees, working conditions, worker health and safety. The process of the Ottoman Empire's dissolution and the ensuing wars of independence relied on the coal that was collected from the coal mines. This coal was the most essential source of energy that was utilized throughout these battles. It was vitally essential to ensure that the



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production of this priceless source of energy would continue uninterrupted. This kind of consistency is only attainable with a substantial number of employees.

At the Zonguldak and Ereğli Coal Enterprises, significant legal arrangements were established to enhance the working environment and personal rights of people who were working in very harsh and challenging circumstances, and two laws were adopted one after the other. (Çatma, 2006) Children who had not yet attained the age of 18 were not permitted to be engaged as laborers by the terms of Law No. 151 on Ereğli Havza-i Fahmiyesi Mining Law, which went into effect on September 10, 1921. This was done to safeguard the welfare of the youngsters. There was a cap on the number of hours that could be worked in a single day, and that cap was set at eight. If the number of hours worked per day went above eight, workers would be compensated at a rate that was double the standard rate for each additional hour worked, and the parties involved would have to agree to the overtime. Workers who get ill at work or are injured on the job will not be required to pay for their medical care since their company will maintain a pharmacy, hospital, and doctor on-site or near the mine. Mining permits and privileges will be taken away from firms that do not offer adequate health and safety measures in the workplace. If an employer is found to be at blame for a fatal workplace accident, the surviving family members of the deceased worker have the legal right to seek compensation as well as criminal prosecution. (Ozeken, 1944) When the First Turkish Grand National Assembly (Ereğli Havzai Fahmiyesi Maden Amelesinin Hukukuna Muteallik Kanun, 1337) was convened in Izmir on March 4, 1923, the First Economics Conference was held there. The worker delegates came up with a list of 30 different suggestions to discuss at the congress, which resulted in a number of significant decisions being made addressing the protection of the personal rights of employees. The problem of working six days a week and taking the day off on Friday was legally secured with the passage of Law No. 394 on Weekend Vacations on January 2, 1924. The law did not go into effect until January 21, 1934. The law was approved on January 2, 1924. (394 Sayılı Hafta Tatili Hakkında Kanun, 1924) The weekend holidays were rescheduled because of the passage of Law No. 2739 on National Holidays and General Holidays on May 29, 1935, which was ratified on the following day and went into effect on June 1, 1935. Sunday was the day off during the weekend vacation. It is stipulated that it will begin at 13:00 on Saturday of every week, if it is not less than 35 hours long. There are now brand-new laws in place regulating the separation of public holidays and religious holidays.



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(2739 Sayılı Ulusal Bayram ve Genel Tatiller Hakkında Kanun, 1935) Article 332 of the Code of Obligations, dated 24 April 1926 and numbered 818, orders as follows: " The employer is required to take the necessary measures against the dangers he is exposed to due to working at the level that can be requested from him in terms of the special circumstances of the contract and the nature of the work, together with the appropriate and sanitary workplaces, together with the worker..... If he is a resident, he is responsible for providing a clean and comfortable place to sleep. (818 Sayılı Borclar Kanunu, 1926) According to this law, it is also stipulated that the employer should take measures against the work accidents that the worker may suffer; otherwise, the employer will be responsible for covering the damage suffered by the worker because of the damage caused by the worker due to the experience of a work accident.

The Public Health Law No. 1593 was approved on April 24, 1930, and it went into effect on May 6, 1930. As part of this law, certain provisions were put into place to safeguard female employees and children who were employed in the workforce. According to these laws, it was required to have a doctor present at businesses that employed fifty or more people, and it was required to build an infirmary or hospital in companies that employed a worker capacity that was defined in the law. Again, according to the provisions of the law between articles 173 and 180, in terms of occupational health and safety, it is illegal to employ child workers who are younger than 12 years old in any kind of workplace or mine, including factories and workshops. This prohibition applies to all types of work environments. It is against the law for employees between the ages of 12 and 16 (male and female), regardless of gender, to be on the job after 8 o'clock in the evening. Workers aged 12 to 16 years old, regardless of gender, would not be required to put in more than eight hours of labor every day. It was against the law to hire anybody younger than 18 years old to work in the entertainment industry or in other comparable establishments, such as bars, dance halls, and coffee shops. Female employees who are pregnant will not be required to perform labor that is heavy for the final three months before they give birth. Additionally, they will be permitted to take a break consisting of two stages totaling a half an hour to breastfeed their babies for the first six months after they have finished their rest and have returned to work. The total amount of time that employees in underground operations at night are required to put in within a 24-hour period is limited to no more than eight hours. (1593 Sayılı Umumi Hifzıssıhha Kanunu, 1930). According to Article 54 - 62 of Labor Law No. 3008, which was published in the Official Gazette on June 15, 1936, which states the



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provisions on occupational safety and health, the measures to be taken by the employers regarding the occupational safety and health of the workers they employ, and the penal and administrative sanctions they will face if they do not take these measures, the provisions on occupational safety and health state that the measures to be taken by the employers regarding the occupational safety and health of the workers they employ. specified. In addition, rules have been developed governing the duty of workers to comply with the measures taken by their employer. This obligation has been made a regulatory requirement. "Labor law is essentially a branch of the law that regulates the relations between the workers who work on the basis of the employment contract and the employers who employ them, and the first detailed and comprehensive step specific to this field in our country was taken with the Labor Law dated 1936 and numbered 3008," (Ataturk Ansiklopidisi, 2023)

With the passing of Law No. 4763 on June 22, 1945, the Ministry of Labor came into being. In accordance with the first article of the Ministry of Labor Law No. 4841 dated 28 January 1946, social security was included as one of the responsibilities of the ministry. Additionally, the social security legislation pertaining to working life was discussed for the very first time in conjunction with this law. As a result, just one authority will be responsible for enforcing legislation and conducting research concerning occupational health and safety. Throughout the subsequent years, the General Directorate of Occupational Health was founded inside the ministry, and responsibility was subsequently passed to this directorate. After that, on December 13, 1950, Law No. 5690 came into effect, and Article 9 of the International Labor Organization (ILO) Labor Inspection Convention No. 81 stated, "To ensure the implementation of the legal provisions regarding the protection of each member's health and safety while they are busy with their work and to ensure that the procedures used, " The necessary steps will be taken to ensure that appropriately qualified experts and technicians, including specialists in the fields of medicine, machinery, electricity, and chemistry, participate in inspection activities in the most appropriate manner according to national conditions. This will allow for the examination of the effects that materials and working methods have on the health and safety of workers. To accomplish this, the necessary measures will be taken. " (ILO, 81 No'lu İş Teftişi Sözleşmesi, 1947) authorized . It is necessary to assign specialist personnel such as doctors, engineers, and chemists to inspect workplaces to ensure worker health and safety, to make improvements and organize the working life of workers, and to give advice on the subject, as



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required by law number 5690 and the ILO agreement that Turkey signed. The pertinent amendment to Law No. 147 was made official. On the same day that the legislation was passed, January 12, 1963, the Occupational Safety Inspectors Group President was founded in the cities of Ankara, Zonguldak, and Izmir, with its headquarters initially located in Istanbul. In the years that followed, inspections concerning the health and safety of people on the job were conducted with the assistance of Directorates that were created in cities like as Bursa, Adana, and Erzurum, amongst other locations. The Labor Law No. 931 was passed in 1967 to better meet the needs of the changing working life that was caused by the growing industry and technology and to make the required arrangements. This law was adopted to better meet the requirements of the changing working life. Yet, the Constitutional Court decided that this legislation should not be in place and thus struck it down. In the years that followed, in 1971, the Labor Law No. 1475 was published and eventually came into force. The Labor Law No. 4857 was approved on the 22nd of May in 2003, and it was published in the Official Gazette on the 10th of June in the same year. Since then, it has been in effect. A necessity of the harmonization process conducted by the European Union was one of the motivations for the creation of this regulation. Regulations were enacted in accordance with the terms "Occupational Health and Safety Board," "Occupational Physician," and "Occupational Safety Engineers or Technical Staff" in Articles 80, 81, and 82 of the Law, respectively. In accordance with these rules and regulations.

- They will form an Occupational Health and Safety Board for businesses that have an industrial qualification, have at least fifty employees on a permanent basis, and conduct work for more than six months. The employer will implement and fulfill the decisions to be made by the board in accordance with the legislation.
- Businesses with at least fifty employees on a permanent basis will have a workplace physician to take occupational health and safety measures related to the health status of the employees, and to perform first aid and emergency response services, excluding the treatment services provided by the Social Insurance Institution. Depending on the degree of danger of the work and the number of employees in the workplace, one or more doctors will be available. To fulfill this service, a workplace health unit will be established.



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- Enterprises that have an industrial nature, have at least 50 employees continuously and work for more than six months will assign engineers or technical personnel to determine, monitor and implement the measures to be taken in order to prevent work accidents and protect employees against occupational diseases. Engineers or technical personnel will be increased according to the degree of danger, the number of workers and their characteristics.(4857 Sayılı İş Kanunu, 2003)

After being adopted on June 26, 2012, and published in the Official Gazette on June 30, 2012, Occupational Health and Safety Law No. 6331 became operational and began to be enforced on July 1, 2012. Because of this, the appropriate preparations were made to improve the work that was conducted in this sector based on the legislation, and the required emphasis was given to the subject of occupational health and safety.

6. Conclusion

It was on May 8, 1967, that the Dilaver Pasha Regulation became the first written Occupational Health and Safety regulation in the history of Turkey. Since then, Turkey has been the source of numerous legislative laws that have been effective in the sphere of occupational health and safety. The positive advancements in occupational health and safety (OHS) gained impetus because of our membership in many international organizations and the signing of various international agreements. One of the factors that has contributed to the realization of these developments is the developing and growing Turkey, the positive developments in education and training, and the social awareness created by the constant communication that people have with one another through social media and other similar means of communication. It is impossible to stop the flow of information between the cultures of today, which are in continuous connection with one another thanks to the many technologies available for social communication. The Turkish people, who have become more aware in a century in which there has been so much opportunity for communication, have a natural desire to observe the legal norms that are enforced in industrialized nations and the steps that are done in Turkey. In addition, the requirements that Turkey must meet to become a member of the European Union have also been a crucial factor in the development of occupational health and safety procedures. Several Turkish construction enterprises collaborate on building projects with their counterparts in other countries or with global construction firms. During the development of these projects, international firms urge Turkish enterprises to satisfy



environmental, quality, and safety standards. Occupational safety is also included among these demands since it is an important concern for foreign corporations. Gains may be made through transmitting beneficial experience, information, and technological procedures that are connected to occupational health and safety while simultaneously satisfying these commitments. As a result of the problems and regulatory requirements that are discussed in the article, occupational safety has developed into an essential sector of the Turkish economy. In addition, it is a goal to establish Occupational Health and Safety departments at educational institutions such as universities and to train qualified professionals to educate the required specialized labor force. All these efforts are being made with the intention of preventing accidents on the job and protecting workers from getting illnesses related to their jobs. Yet, compliance with legal requirements is not sufficient on its own to ensure success in this industry. The culture of occupational health and safety should be adopted by both employers and workers, and both parties should adhere to the standards and take the necessary precautions to protect themselves. After the earthquake that occurred in the Kahramanmaraş region of Turkey on February 6, 2023, the construction industry will have a significant amount of work to complete, and thousands of workers will be required to clear the rubble that was left behind by the buildings that collapsed and to rapidly rebuild the structures in the regions that were damaged. Occupational health and safety should be implemented carefully throughout this process to ensure the well-being of workers, and the state's regulatory mechanisms should be put into action.

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