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Health and Safety Perception of Workers in Turkey: A Survey of Construction Sites

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This study reports the general health and safety (HS) conditions in the Turkish construction industry from the perspective of construction labor. Toward this aim, a questionnaire survey was carried out with 800 workers employed in 32 construction projects in Turkey. Contractors were found to neglect their legal liabilities in paying workers' insurance premiums. Also, they overlooked safety training and were reluctant to hiring physicians at construction sites and investing in personal protective equipment (PPE). As the real constructors of projects, workers did not attach adequate importance to occupational training. In addition, they were not willing to use some PPE. Key participants of HS affairs such as workers, contractors, unions, and government should comprehend their drawbacks to overcome the current dangerous view of the industry. In this regard, related government bodies should compel contractors and workers to adapt to the relatively new regulations on occupational HS.

construction labor worker health occupational safety survey Turkey

1. INTRODUCTION

Workers involved in construction projects are potentially prone to many serious accidents, injuries, and diseases because of hard production processes and dangerous working conditions. Since prevention of these incidents is a principal objective of safety management, it is essential to identify the causes of the incidents and to develop corresponding preventive measures in the industry [1]. However, before making this effort, it is better to determine the current general health and safety (HS) environment in a country to observe the industrial view at the macro level. It will then be easier to focus on the causes of the incidents and to offer some specific solutions and recommendations to fix the problems. In this context, much country-specific research in the HS domain of construction has been executed to date such as for Australia [2], China [3], Finland [4], Hong Kong [5], Korea [6], Kuwait [7], The Netherlands [8], Saudi Arabia [9], the USA [10], the UK [11], Spain [12], and Taiwan [13]. However, these studies are far from presenting the general and practical HS conditions at construction sites. They each examined either numerical data available in statistical reports of the country in consideration or some specific safety issues such as tower crane

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safety, accident prevention in greenhouse construction, cause–effect relationships in occupational accidents, importance levels of a series of factors affecting safety, etc. Taking into account Turkey-specific research, just a few studies exist in the related literature, and the aforementioned drawback is valid for them as well. Colak, Etiler, Bicer introduced general statistical values concerning fatal occupational injuries in the construction sector in an administrative province of Turkey [14]. Mungen and Gurcanli investigated fatal traffic accidents in the Turkish construction industry [15]. Gurcanli studied third-party and child injuries at construction sites in Turkey [16]. And finally, Gurcanli and Mungen suggested an occupational safety risk analysis method [17].

Among contributors to production in construction projects, workers are the group with the greatest exposure to danger and to whom most accidents happen. This is also the group in which everybody should be most concerned about working safely [18]. Therefore, it is more important and more realistic to have workers' perspectives regarding the HS climate in the construction industry than to give perceptions of other groups such as owners, main contractors, subcontractors, construction managers, and field safety engineers. These groups' points of view are, of course, noteworthy, but a basic understanding of workers can better reflect real-world conditions. In the literature, there is some research that studied construction workers' thoughts on the HS issue [19, 20, 21, 22, 23, 24, 25, 26]. However, these papers identified several particular problems of construction safety such as safety signs, hearing protection devices, immigrant workers, respiratory protective equipment, and relation of safety attitude with age/national culture/organizational stressors. Only Jaselskis and Suazo collected safety-related general information to some extent, but their study was essentially limited to hypothesis tests about personal protective equipment (PPE), and lost- and nonlost-time accidents [27].

As a result, this research was established to fill the aforementioned gaps. Its objective was to display general information about HS conditions in the Turkish construction industry from the perspective of construction labor. Current HS environment was described by examining 10 themes:

1. unionization,
2. social insurance,
3. occupational training,
4. medical reports,
5. physicians at workplaces,
6. safety training,
7. risks of construction trades,
8. PPE,
9. accidents, and
10. breaks.

2. HS BACKGROUND OF CONSTRUCTION INDUSTRY IN TURKEY

In Turkey, construction is an industry in which occupational incidents are frequent. Accidents are the most serious type of these incidents at construction sites. Their annual statistics compiled from two different sources (Social Security Institution of Turkey [1] and Turkish Statistical Institute [2]) can be accepted as a numerical indicator of safety performance of the industry. In this context, Figure 1 shows the numerical variation of construction injuries in 1992–2009. According to Figure 1, it is evident that the number of construction injuries has been in a general decreasing trend for the past two decades. It moved from 22 900 in 1992 to 6900 in 2009, indicating a 70% reduction in injuries. However, it was almost in a steady state after the year 2000, in which strict legislative regulations concerning the construction industry were passed because of two destructive and fatal earthquakes in Turkey in 1999. Considering this stable position in the past decade, ~7400 injuries occur per year. It also means that there are 20 injuries per day or 2 injuries per hour in the Turkish construction industry. In terms of percentages of construction injuries in total injuries of all industries, they are in a parallel move with the corresponding numbers. While 16.4% of injuries occurred in the construction

[1] http://www.sgk.gov.tr
[2] http://www.tuik.gov.tr/

industry in 1992, this rate went back to 10.7% in 2009, denoting a decline of 5.7% in construction. Considering the constant move in the past decade again, construction has had an average share of 9.9% in total employment injuries. As a result, although injuries are still among the primary safety problems in construction projects, the great improvement in this domain cannot be neglected.

Figure 2 presents statistical data on permanent incapacities caused by accidents or diseases in construction in the past 10 years. To illustrate the related numbers together with percentage values,

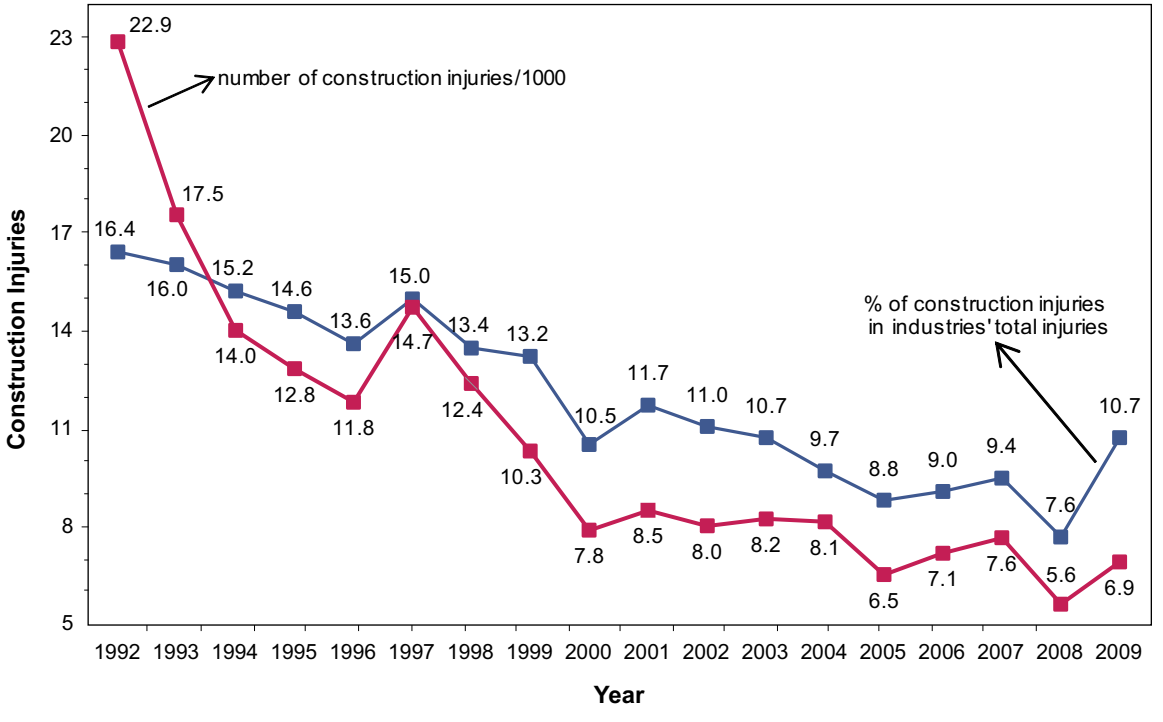


Figure 1. Construction injuries by year.

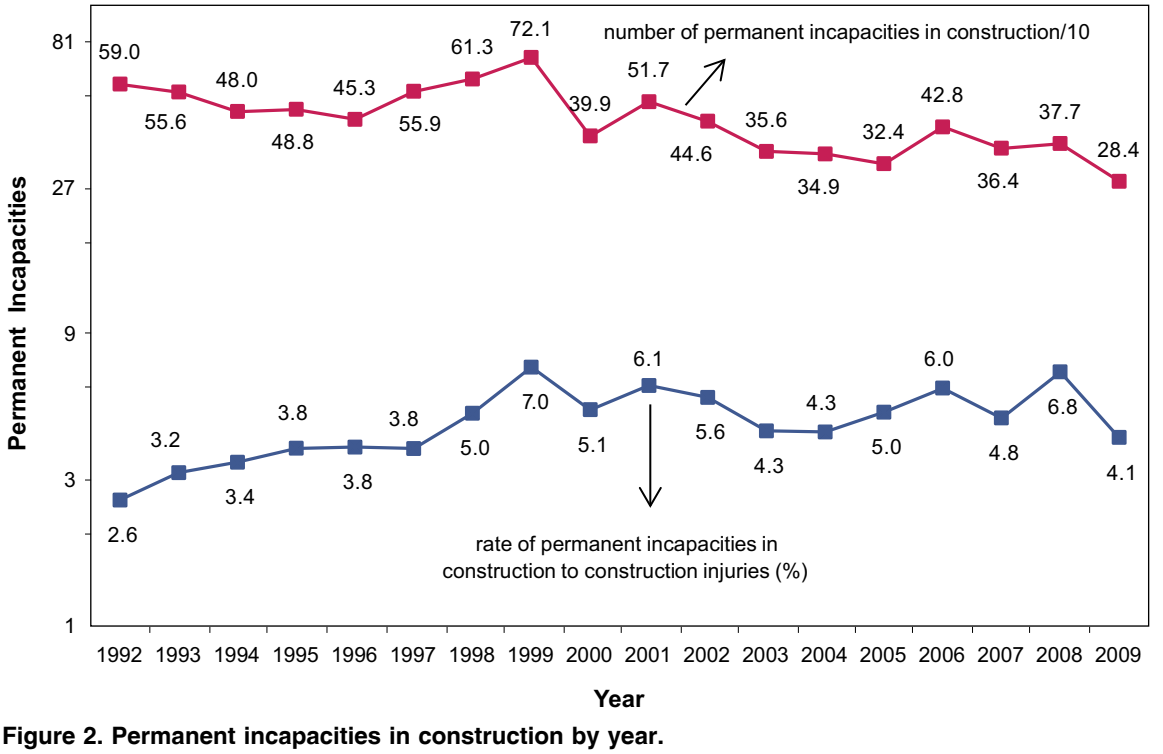


Figure 2. Permanent incapacities in construction by year.

a logarithmic scale was used for observing courses of two lines simultaneously. Figure 2 shows that although the number of permanent incapacities decreased in the construction industry in this period, their share in construction injuries increased. Namely, the number declined from 590 in 1992 to 284 in 2009, proving a fall of 52% in permanent incapacities. However, their share in construction injuries rose from 2.6% in 1992 to 4.1% in 2009, pointing out an increase of 1.6%. As mentioned in the previous paragraph, the year 2000 can be accepted as a milestone for the industry because of the two traumatic earthquake disasters in Turkey. Therefore, averages of the statistics of the past decade can be considered as they will better reflect the current construction climate. Hence, there are 384 cases of permanent incapacities in construction every year. In other words, one construction worker loses his working ability every day. To quote another statistic, permanent incapacities constitute an average share of 5.2% in construction injuries. All these numerical values indicate a serious improvement in permanent incapacities even if their share in injuries increased to a certain degree.

Besides permanent incapacities, deaths are also among significant safety records of construction. To give numbers and percentages of construction deaths together, Figure 3 is illustrated in a logarithmic scale. It shows an enormous decrease in the number of construction deaths in the past two decades, while their share in total deaths of all industries did not make any progress. A total of 559 construction deaths recorded in 1992 went back to 156 cases in 2009, which denotes an 82% reduction. On the other hand, except 2009, no significant change was observed during the period in terms of the share of construction deaths. Considering the values after 2000 because of the reason explained earlier, 308 deaths can be regarded as an annual average of construction. It corresponds to one construction death per day. In addition, there is ~30% of occupational deaths in the construction industry. These data demonstrate that deaths are still a major problem in the construction industry.

The share of deaths in injuries is another perspective of revealing dramatic industrial deaths (Figure 4). For construction, the share of deaths in injuries shows not only an increase but also an irregular trend. Considering the past decade, it can be noted that 4.2% of construction injuries

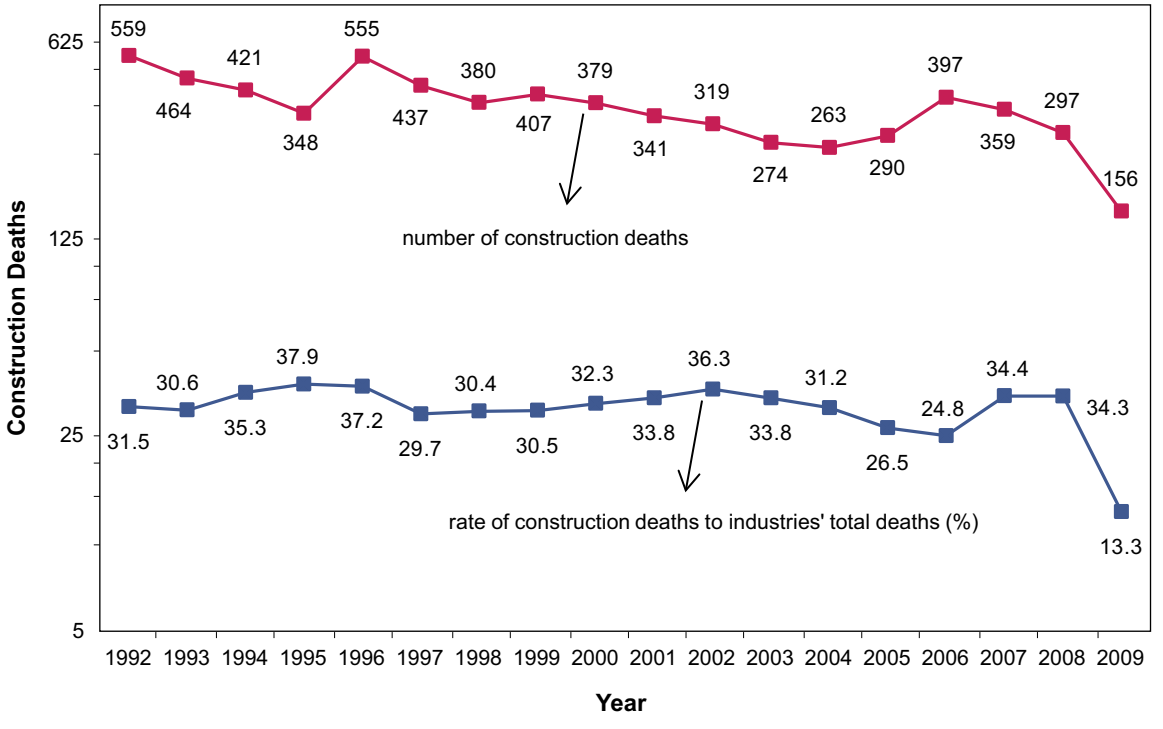


Figure 3. Construction deaths by year.

resulted in deaths. For all industries, however, it can be characterized as a stable line. On average, after 2000, deaths had a share of 1.4% in injuries. According to these percentage values, it is obvious that an injury has about three times more probability of leading to death in construction than that in all industries.

Occupational diseases are rarely encountered anomalies in construction safety, when compared with injuries, permanent incapacities, and deaths. Both their number and their share in construction injuries decreased to a negligible extent in time (Figure 5). Their number (101) in 1992 decreased to 9 in 2009, which indicates a huge declining

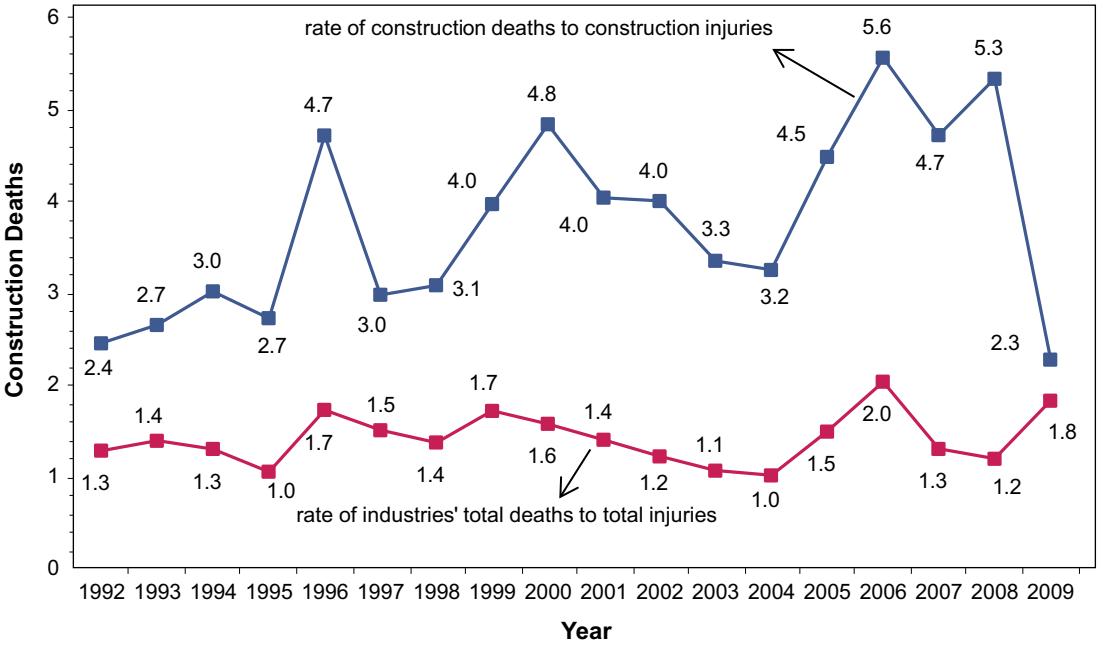


Figure 4. Deaths in construction and in all industries.

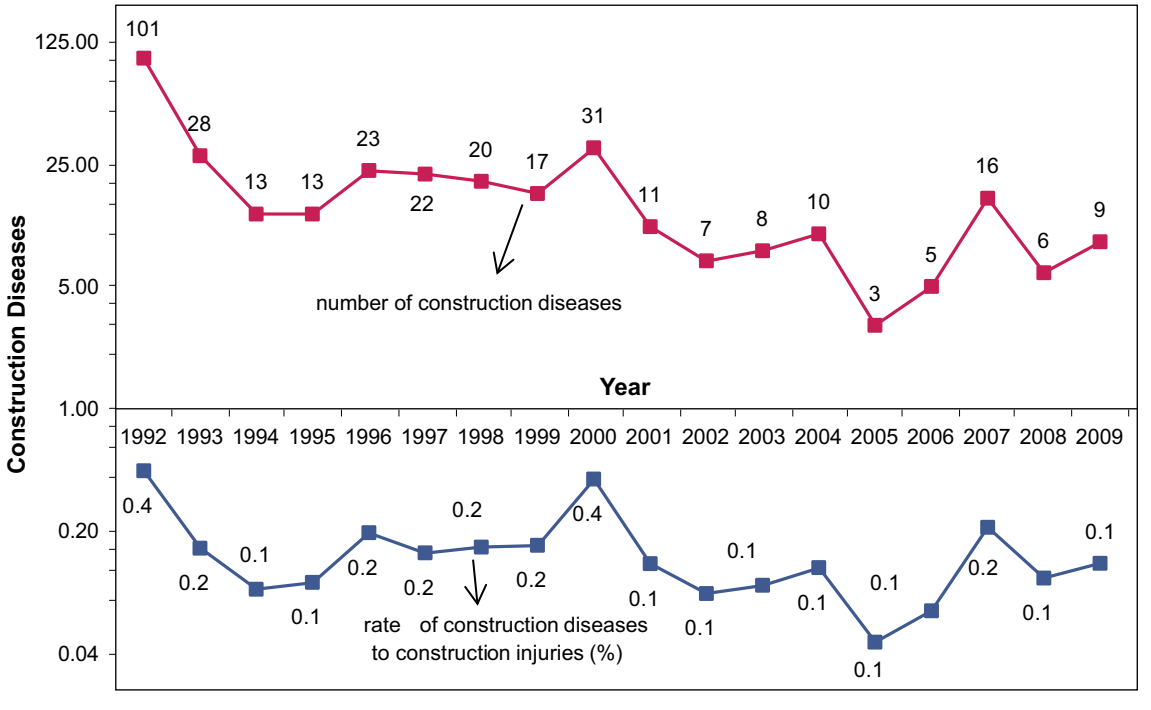


Figure 5. Construction diseases by year.

rate of 91%. Similarly, the share of diseases in injuries in the construction industry decreased from 0.4% to 0.1% between 1992 and 2009, corresponding to a reduction of 0.3%. When the period after 2000 is considered to make a projection for today's safety climate in construction, an average of 11 cases and a share of 0.1% in injuries are obtained for construction diseases every year.

3. METHOD

The statistical data used in this study were compiled with a questionnaire survey. It was administered to 800 workers from 32 different construction sites in Turkey between May and October 2010. The interviews were conducted face-to-face at the worksites. Although there are many trades in construction projects, this study focused on eight types of workers who are both usually employed in almost every construction project and are potentially very prone to occupational incidents. These were electricians, welders, bricklayers, painters, concrete workers, reinforcement fixers, forming workers, and unskilled workers. For each type, the same number of workers (i.e., 100) was surveyed to have a statistically homogenous weight. Thus, each of them gave an equal contribution of 12.5% to the survey results. In terms of the total number of workers, past research that studied construction workers' thoughts on HS affairs involved 108–652 workers. In this context, this study dealt with the largest sample (800) to date. Although it is difficult to assert that all construction workers in Turkey were completely represented by such a small sample and that this drawback can be accepted as a limitation of this study, it can be a common medium for international comparative HS research in construction, reflecting to some extent the Turkish perspective.

The survey comprised 21 questions; 10 used a 5-point Likert-type scale (Table 1), 6 were asked to find out the percentage value of each answer (Figures 6–11), 4 covered workers' demographic characteristics, while the remaining question was open-ended to encourage workers to freely express their other thoughts on occupational HS. First, several questions were prepared by reviewing the related literature. After applying this version of survey to 30 workers to test the pros and cons of the questions, some questions were added, some were removed, and some were modified. Thus, the final version to be administered to 800 workers was obtained.

To prove the validity and reliability of survey results, demographic characteristics of the respondents, such as experience, age, and working fields, are of the utmost importance. In this context, the fact that 87.8% of the participants had worked over 5 years in the construction industry indicates adequate experience of workers to accurately reflect the current working conditions and habits. Similarly, the fact that 91.5% of the surveyed workers were 20–49 years old is also a positive finding, because it shows that the respondents were in active or full-time working life without being too young or old. Considering the types of construction projects, 88.3% of the workers had been employed in building structures (residential, commercial, schools, hotels, and hospitals) at least once to date. Of the participants, 84.5% worked in engineering structures (highways, bridges, harbors, tunnels, dams, and infrastructure), while 59.8% had worked in industrial structures (power plants, refineries, and pipelines). It is evident that the surveyed workers were well aware of the various working climates in different fields of construction, which is another positive indicator for the health of answers given by the respondents throughout the survey.

4. RESULTS AND DISCUSSION

4.1. Unionization

The survey showed that only 5.8% of the workers were members of trade unions. Although it seems to be a very low percentage, it shows the existing industrial situation in reality. The last official records about the registered workers in the Turkish construction industry (2009) demonstrated that there were 761 326 workers and three unions in total and that these unions covered 24.6% of these workers [28]. Moreover, the

general perception of industrial practitioners in construction is that the number of unregistered workers nearly equals the number of registered workers in Turkey. If this is the case, the unionization rate of the construction industry is in fact half of the published figure. In fact, the main contractors and subcontractors in today's construction environment do not prefer union members in general. Their argument is that the construction industry deals with seasonal or project-based work and has flexible working conditions. In addition, it does not include definite job descriptions like in the manufacturing industry. This is also clear in other data of this study. Taking into account three types of construction employment, 71.2% of the participants were workers employed by subcontractors and 14.0% were daily workers. Only the remaining 14.8% consisted of workers of main contractors who had more potential of employing union members when compared with the other two types. This is because unions are fundamentally against subcontracting agreements due to their temporary nature. This means that subcontracting does not guarantee the continuity of work. Moreover, according to unions, subcontracting creates intense competition and inequality among their members, causing complaints and disputes related to wages.

Overall, in a working environment with such a low unionization rate, it is difficult to force firms to take the required HS measures and governments to enact impartial HS regulations.

TABLE 1. Results of Likert-Type Scale Questions (%)

Working with social insurance				
always	*usually*	*sometimes*	*rarely*	*none*
49.8	27.8	10.8	4.5	7.3
Regularity in paying insurance premiums				
always	*usually*	*sometimes*	*rarely*	*none*
4.8	8.8	21.5	30.5	34.5
Working in the same construction trade				
always	*usually*	*sometimes*	*rarely*	*none*
55.0	25.3	13.8	2.8	3.3
Personal medical report required at project inception				
always	*usually*	*sometimes*	*rarely*	*none*
29.8	20.0	12.8	24.3	13.3
Past construction projects with physicians				
all	*many*	*some*	*a few*	*none*
2.5	4.3	57.3	13.5	22.5
Frequency of physicians' visits				
full-time	*once a week*	*every 2 weeks*	*once a month*	*never*
52.5	5.3	2.8	17.0	22.5
Effect of physicians on workers				
very significant	*significant*	*moderate*	*insignificant*	*very insignificant*
39.0	36.3	18.5	3.0	3.3
Past construction projects where HS training was given				
all	*many*	*some*	*a few*	*none*
3.5	5.0	13.3	25.3	53.0
Negative effect of construction injuries on workers' motivation				
very significant	*significant*	*moderate*	*insignificant*	*very insignificant*
5.0	45.5	20.6	19.3	4.5
Construction sites where breaks are given				
all	*many*	*some*	*a few*	*none*
2.5	0.8	13.8	30.8	52.3

4.2. Social Insurance

Of the respondents in this study, 95.3% were insured at the time of the survey. However, it is clear that the real situation is somewhat different from the facts in Table 1. Only half of the surveyed workers (49.8%) had always had social insurance when working. In addition, 22.5% had worked mostly without social insurance, while 7.3% had never had social insurance.

Who pays workers' insurance premiums is also important. This study determined that insurance premiums of most insured workers (94.5%) had been paid by their employers. However, it should be noted that 5.5% of the insured workers paid their own premiums. The regularity of these payments is another aspect of the social insurance issue. Table 1 illustrates this in detail: the premiums of very few insured workers (13.6%) had been paid in a systematic manner. Moreover, 65.0% of the workers had encountered serious irregularities in premium payments.

In conclusion, employers in the construction industry in Turkey, such as principal and specialty contractors, still tend to hire uninsured workers. Moreover, they do not pay adequate attention to monthly payments of workers' insurance premiums. To complicate these problems even more, workers are likely feel a sense of lack of confidence, increasing the probability of accidents at construction sites. In fact, all these deficiencies are directly related to the lack of government inspections rather than the lack of legislative HS arrangements. Government inspections are quite insufficient for all industries in Turkey, since the number of inspectors working for the Ministry of Labor and Social Security is very low. With the existing officials, 10% of the companies can be audited only once a year [29]. In this context, current HS laws will gain functionality solely by increasing the number and quality of these inspectors, because they also check whether other HS commitments of employers are fulfilled, e.g., the availability of (a) HS precautions that should be taken at construction sites, (b) periodic medical reports of workers, and (c) technical personnel responsible for providing and controlling good HS conditions.

4.3. Occupational Training

As a well-known phenomenon of the industry, main contractors frequently hire poorly educated workers by using labor-only subcontractors when executing construction projects. This situation was also valid for the sample group in this study. Over half of the workers (52.0%) had primary education, while 22.0% graduated from secondary schools, and 26.0% had a middle school degree. Figure 6 shows this, too. In terms of occupational training, almost all surveyed workers (98.0%) had learned the crucial points of their trade either from skilled workers (64.5%) or by themselves (33.5%). However, according to Turkish labor law, workers who do not have training certificates cannot be employed in heavy and dangerous tasks such as many construction works [30]. Nevertheless, very few workers (2.0%) had been trained at apprenticeship courses organized by governmental and professional institutions in the industry. This situation can naturally lead to uneducated actions in procuring required HS measures at construction sites.

Continuity of working in the same field of construction is another factor that affects the quality of occupational training. If there is no permanent trade, labor productivity will likely decrease, and the cumulative experience that can be potentially gained in a specific task will lessen in time due to the learning curve effect. In this respect, most surveyed workers (80.3%) had stability, while the remaining ones had some drawbacks owing to the fear of unemployment (Table 1).

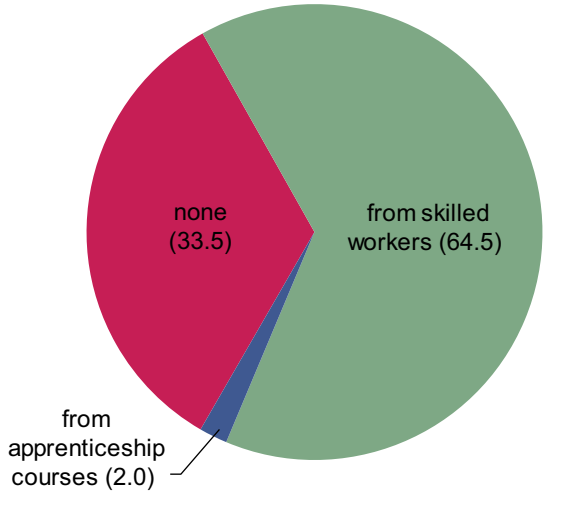


Figure 6. Types of occupational training (%).

Consequently, it is clear that there are serious problems in occupational training in the Turkish construction industry. Although construction workers are usually poorly educated because of harsh conditions of construction projects, it is necessary that they attend vocational training programs in their own trades when entering the industry. This seems possible because both the Ministry of Labor and Social Security and the Chamber of Civil Engineers frequently organize such programs all over Turkey.

4.4. Medical Reports

Employers in the construction industry have to pay adequate attention to HS conditions not only during the construction process but also when hiring workers at project inception. According to Turkish labor law [30] and the Turkish regulation on work health and safety [31], employers must demand personal medical reports from workers who are willing to take part in heavy and dangerous works such as construction projects, before they start to work. A worker must also provide this document, which states that their body is strong and anatomically suitable for the given task in terms of health, at least once a year throughout the project. Considering the related findings in this study (Table 1), approximately half of past construction employers of the surveyed workers (49.8%) used this legal instrument at project inception. However, a relatively large portion of past employers (37.6%) did not ask for medical reports. Section 4.5 discusses whether during construction, physicians employed by the contractors made regular health checks of workers.

In this context, with a high rate of working without medical reports, it is quite difficult to be sure that workers would work without experiencing major or minor HS problems. Thus, unsafe working conditions would have been created naturally from the beginning of a construction project. Contractors have the greatest responsibility in this regard.

4.5. Physicians at Workplaces

Occupational health physicians are very important for keeping workers healthy. According to Turkish labor law, an employer who employs at least 50 workers must hire at least one physician at their workplace [30]. Despite this provision, Table 1 shows that only 6.8% of the surveyed workers had worked where there were physicians. In addition, 22.5% had never seen a physician at construction sites.

Those physicians either work full-time or visit construction sites periodically. In fact, this may depend on the scale of the project. The larger the project, the more probable a full-time physician on-site. On the other hand, periodic visits are a relatively less costly option for construction employers. Whatever the reason, employers should choose the former option, which makes workers feel and behave more safely. Table 1 shows that in over half of the projects the respondents had worked at in the past, there was a full-time physician. However, in the other ones, physicians came on a monthly rather than weekly basis.

The impact of the employment of a physician on the workforce is hidden at the bottom of the iceberg in reality. Besides its concrete advantage, the presence of a physician at a construction site can also increase workers' morale. Table 1 shows real-world data about this invisible side of occupational safety. As expected, it positively and seriously affects a large portion of workers (75.3%). Only some participants (6.3%) declared the contrary. Their argument was quite interesting. They asserted that they did not feel they were working in dangerous working conditions since they were used to working without the support of a physician.

As a result, in the internationalized and technologically advanced era of the Turkish construction industry, constructer firms are still reluctant to employ physicians to cut costs despite the fact that workers are willing to see physicians at construction sites. However, occupational incidents involve unscheduled delays and legal penalties, which prevent employers from saving money. Moreover, workers' health, of course, cannot be measured with financial values. This reluctance may likely arise from their incomplete professional structures. Also, the employers' lack of education and easy access to the industry can be accepted as other important factors.

4.6. Safety Training

Concerning knowledge of occupational safety that must be given to workers at workplaces, the related body of current Turkish laws stipulates some conditions. According to the Turkish Regulation on Work Health and Safety, an employer must provide workers with the required HS training and instructions about work activities, workplaces, potential risks, protective and preventive measures, and other personnel [31]. This training must take place especially when (a) workers are newly employed, (b) the workplace or work definition change, (c) work machines are altered, and (d) working methods change. However, there seems to be a significant difference between legislation and its execution in this regard. Table 1 shows that over half of the participants (53.0%) had worked without attending any HS training in previous construction projects. Only a small number of workers (8.5%) said that they had generally been trained. As it is not expensive and time-consuming to organize training programs on-site, construction employers may likely underestimate the role of HS training because they consider it an unnecessary duty, accepting that workers know and can meet the requirements of their tasks and trades.

In fact, in addition to training, employers and employees have a number of mutual commitments in providing safe working conditions. These are stated separately in different bodies of legislation: Turkish labor law [30], Turkish regulation on work health and safety [31], Turkish regulation on health and safety in construction works [32], and Turkish regulation on responsibilities of safety engineers [33]. According to them, employers must (a) take and regularly check the required safety precautions, (b) provide safety tools and work equipment, and (c) provide safety training and information about workers' legal rights and safety experts' responsibilities. That is why, employers who employ at least 50 workers must hire at least one safety expert, establish an HS committee at the workplace, and prepare an HS plan. Employees must, in turn, (a) carefully act in accordance with safety procedures, instructions, and measures taken by their employer, (b) properly use safety tools and work equipment, and (c) responsibly attend training meetings on HS. Employees must choose at least one representative.

4.7. Risks of Construction Trades

In construction projects, there exist many different trades. Each one has its own risk level, which workers know best. It is essential to determine the risk level of each trade to take corresponding measures against potential incidents. Figure 7 shows that almost all workers (98.5%) regarded the investigated eight construction trades as *risky*. Moreover, no electricians or forming workers selected the *somewhat risky* or *not risky* options.

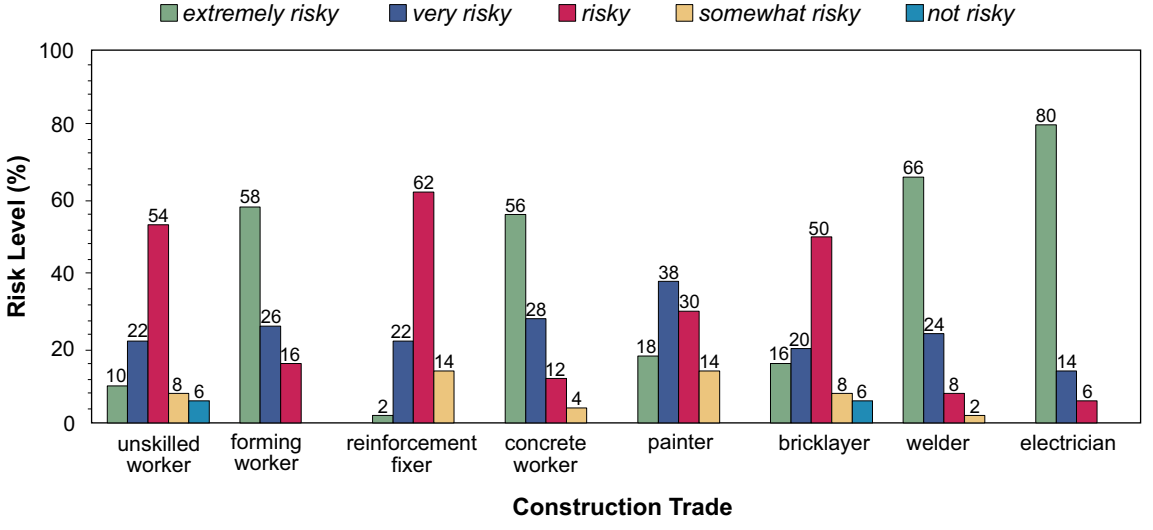


Figure 7. Risk levels in construction trades.

Only a few bricklayers and unskilled workers (1.5%) described their work as *not risky*. In general, the *extremely risky* option was chosen by 80.0% of electricians, 66.0% of welders, 58.0% of forming workers, and 56.0% of concrete workers for their respective work. Painting work was described as *very risky* by 38.0% of painters, while 62.0% of reinforcement fixers, 54.0% of unskilled workers, and 50.0% of bricklayers regarded their respective work as *risky*.

Accordingly, it should be noted that there were no big differences between risk levels in the main construction trades in essence. Since workers classified these trades as highly risky, preventive and proactive actions against accidents and diseases should be seriously taken to decrease workers' anxieties.

4.8. PPE

The Turkish regulation on personal safety equipment significantly emphasizes that employers must provide PPE without any charge and keep it in hygienic conditions [34]. Employers must also provide practical training and information on when and how PPE will be used, and against which risks. However, Figure 8 shows that practice is quite different. Figure 8 illustrates 10 items of PPE, which are available at construction sites. Among them, a hard hat had been available in almost every project where 96% of the workers had worked, while 86% of the respondents stated that reflector vests and gloves had been mostly available. Boots/shoes were the other PPE that had generally been available at construction sites where 80% of the participants had worked. However, at most about half of the workers had had the remaining equipment, i.e., overalls (59%), rain gear (57%), goggles (52%), helmet (51%), ear plugs (39%), and harness (39%). Some workers had even never seen ear plugs (18%), helmets (13%), or goggles (10%) at construction sites.

The other important point in considering HS affairs is how frequently construction workers wear PPE. Figure 9 shows that many workers used a hard hat (86%), reflector vest (85%), rain gear (76%), overalls (74%), gloves (71%), and boots/shoes (70%), if available. However, other equipment such as a harness (32%), goggles (27%), helmet (27%), and ear plugs (26%) was used by one third or one fourth of the respondents only. In addition, numerous workers had never worn ear plugs, helmet, harness, or goggles, even if they were available at the construction site.

Hence, it can be concluded that Turkish construction contractors generally provide a hard hat,

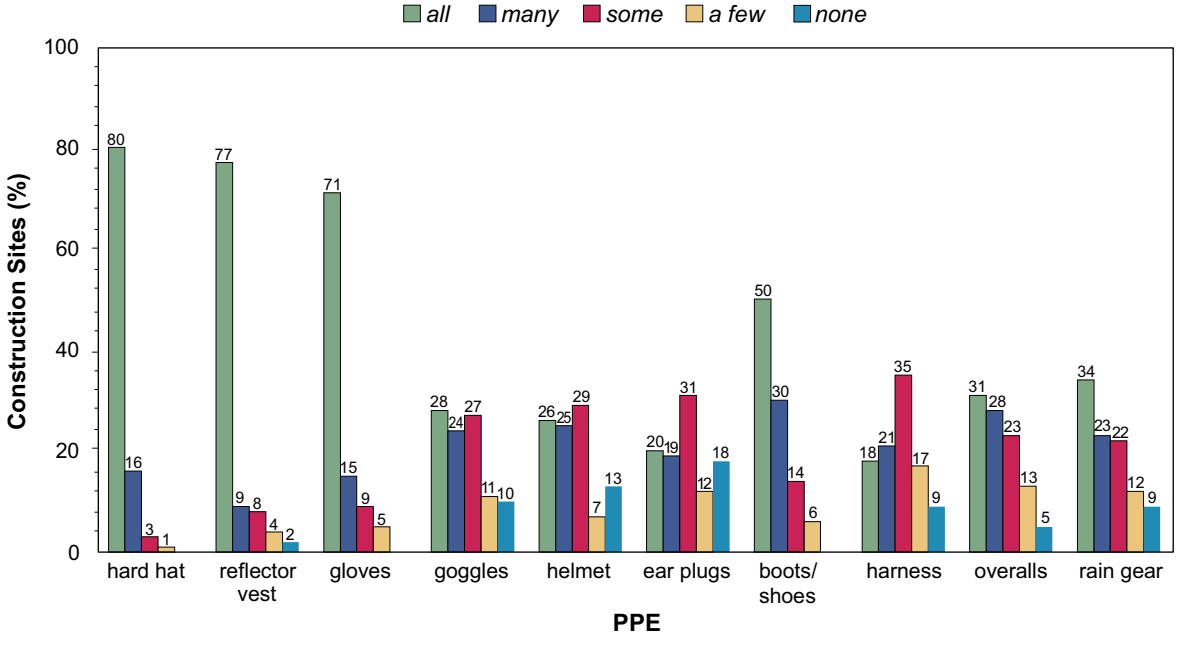


Figure 8. Construction sites where personal protective equipment (PPE) is available.

reflector vest, gloves, and boots/shoes. However, they do not regularly procure the other six pieces of PPE necessary during a construction process. This is especially true for ear plugs, helmet, goggles, and harness. This likely indicates that contractors avoid investing in PPE and consider it a costly burden on the total project cost. On the other hand, it is obvious that workers attach importance to wearing a hard hat, reflector vest, rain gear, overalls, gloves, and boots/shoes. For the remaining equipment such as harness, goggles, helmet, and ear plugs, workers do not pay the required attention. This is because, according to the participants, these safety tools prevent them from working in a comfortable and productive manner. In this regard, both contractors and workers need to be inspected constantly.

4.9. Accidents

Construction accidents are among the most common work-related incidents (see section 2). This also seems to be valid for the sample group considered in this study. In total, 29.5% of the respondents had been injured at least once in their working lives in the industry (Figure 10). The

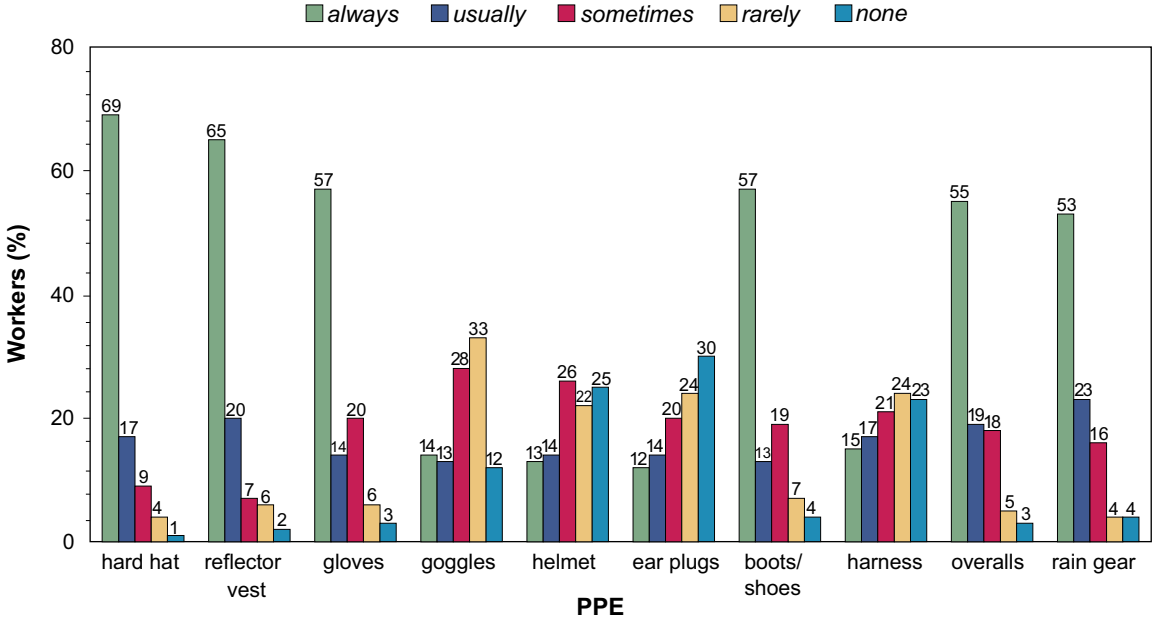


Figure 9. Workers wearing personal protective equipment (PPE), if available.

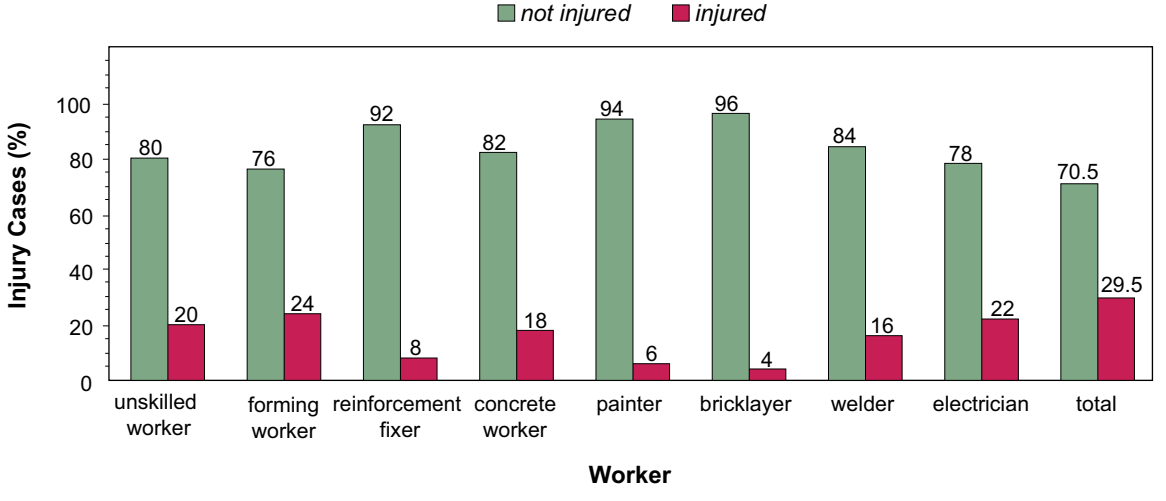


Figure 10. Injury cases of surveyed workers.

rate of injuries was especially high for forming workers, electricians, unskilled workers, concrete workers, and welders. In addition, there were at least a few injured workers in each construction trade.

Although casualties in construction may result from both tangible and intangible causes, their result is, in fact, much more important in executing projects. Both injured workers and those who witnessed occupational accidents may experience some negative consequences. Among them, workers' motivation may be the most important one. Table 1 illustrates the effect of construction injuries on motivation. As an unexpected finding, only half of the surveyed workers (50.5%) declared that they were seriously affected by injuries at construction sites. Moreover, according to relatively many participants (23.8%), accidents did not have any negative influence on them.

Overall, many workers in the construction industry suffer injuries or observed occupational incidents. Because this is an industrial reality, some workers interestingly seem to be accustomed to experiencing or witnessing accidents. Therefore, it cannot be claimed that construction workers always experience performance-based complications after incidents at worksites.

4.10. Breaks

Breaks, other than lunch breaks, are necessary to keep workers fresh and relaxed throughout daily working hours. However, Table 1 shows that few of the surveyed workers (3.3%) declared that they had had breaks in past projects. Moreover, 52.3% of the participants had never had such breaks. Considering the types of breaks for the remaining 47.7% of participants, Figure 11 shows that short, rare breaks had been given in construction projects where 88.8% of these participants (i.e., 42.4% of the total) had worked in the past. In fact, this is an expected outcome since employers do not want to allow much time for breaks. On the other hand, short, frequent (8.4% = 4.0% of the total) and long, rare (2.9% = 1.4% of the total) breaks do not compensate for the contractors' desire to allow short breaks only.

As the number and time of breaks workers are allowed during a working day decrease, the possibility of having accidents on a construction site increases. Of course, it is natural that employers wish work time to be productive. However, this study found that lack of breaks, other than lunch breaks, may likely reduce workers' concentration and make them prone to accidents. In this context, contractors can benefit from short, rare breaks, which enable both employers to save total break time and workers to better focus on construction activities.

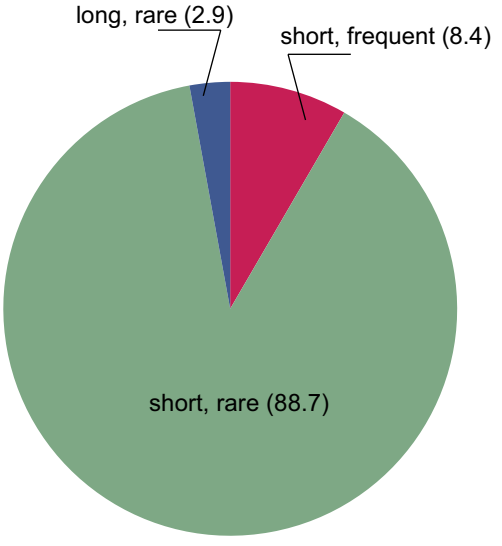


Figure 11. Types of breaks (%).

5. CONCLUSIONS

Like in many countries, the construction industry in Turkey can be described by its bad safety record. Despite a great improvement in the related statistics in the past two decades, it is still alarming. On average, the construction industry is responsible for 9.9% of total employment injuries in the country, which means that there are two construction injuries per working hour. Of construction injuries, 5.2% result in permanent incapacities. In other words, one construction worker loses his/her working ability every day. Similarly, the construction industry is responsible for 30.1% in occupational deaths in Turkey or, in other words, deaths constitute 4.2% of construction injuries. Both these values approximately correspond to one death per day.

The survey results exposed some important findings that should be considered carefully. The

first of them is union membership. Because of the characteristics of construction projects, many contractors are not willing to employ construction workers who are members of unions related to the construction industry, and most workers avoid becoming members in such a business climate. Hence, these unions are not directly included in HS-based decision mechanisms in controlling working conditions and in imposing sanctions against responsible construction firms. Namely, the need for executing HS legislation to protect workers from construction incidents cannot be adequately satisfied without considering unions.

In the Turkish construction industry, uninsured workers are another significant barrier to safe working conditions at construction sites. Insured workers are not free from HS problems, either. There are great irregularities in their insurance premiums, which their employers should pay every month. These two problems in the industry probably lead to workers' lack of concentration on work, which makes them prone to accidents.

In terms of health conditions at construction sites, it should be noted that contractors do not demand workers' personal medical reports. This creates a very risky working environment at inception, and lasts throughout the construction process since contractors are reluctant to hire physicians. In addition to being deprived of health checks, construction workers also suffer from the lack of occupational and HS training programs, which are short and inexpensive by nature. Workers who do not have necessary knowledge to fulfill the requirements of their trades both technically and safely feel that they perform their tasks in highly risky working conditions. The fact that breaks, except for lunch breaks, are not allowed at construction sites may raise the risk level. However, it is interesting that some workers consider accidents to be normal anomalies at construction sites despite that fact that many of them have either suffered from injuries or witnessed occupational incidents in the past. Regarding PPE and construction safety, both contractors and workers pay attention to procuring and wearing some articles such as a hard hat, reflector vest, gloves, and boots/shoes. However, neither contractors nor workers attach much importance to a harness, goggles, helmet, or ear plugs.

Consequently, in a working environment with insufficiencies in the quantity and quality of external control mechanisms, such as unions and government inspectors, it is evident that contractors will tend to neglect their legal responsibilities of paying workers' insurance premiums. Increasing the number of government inspectors may be a short-term urgent solution to this problem. Contractors have some duties. They should implement internal self-control mechanisms in the form of site inspectors and managers. In this context, they should execute their projects in a way that complies with HS regulations. Some of them are cost-free activities such as providing safety training and allowing some breaks at work. However, when required, they should not consider investments on PPE and hiring physicians as extra cost items in the construction process. Otherwise, in case of occupational incidents, they will likely experience great financial losses because of long delays and legal/criminal penalties. Finally, workers have several responsibilities in maintaining a healthy and safe working environment, too. They should attend occupational training programs to learn the requirements of their own trades in detail. More importantly, whatever their arguments, they should constantly use all PPE provided by their employers to take care of themselves at construction sites.

The framework introduced by key questions in this study includes the determination and investigation of the general safety climate in the Turkish construction industry. These findings can be accepted as preliminary research for pinpointing local or regional safety conditions, which may also be valid for other developing countries with a similar working climate. In this respect, both the framework and the overall findings can provide different benchmarking tools for academic and practical comparisons in the international arena.

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