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## Socio-Economic Effects of Covid-19 on Construction Sector in Turkey

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### Abstract

The world has been living tough times both socially and economically because of the novel coronavirus. Social effects of Covid-19 have seen right after precautions taken by governments all around the world. However, precautions brought economical problems. Construction industry is also affected from this situation. To better understand the effect of Covid-19 on construction industry, questionnaire is carried out among people from construction industry. Questions are selected specifically for targeted people in construction industry. Survey is conducted electronically. Participants remained anonymous during survey. Totally 598 participants took part in questionnaire voluntarily. Survey questions are about job safety, finding a new job and precautions. Results indicated that, Covid-19 caused increase in unemployment in construction industry, making it harder to find a new job. This study proves that ordinary workers in the construction industry are the most vulnerable part for Covid -19 pandemic.

**Keywords:** Construction sector, covid-19, unemployment, job safety

### 1. INTRODUCTION

The world is facing a situation that it has not encountered for a long time. This situation caused by a novel type of virus. This virus is in the family of coronavirus. Coronavirus can cause common cold [1]. However, new kind of corona virus caused a new disease called severe acute respiratory syndrome in 2002. That virus is called as Sars CoV. Another type of corona virus caused a new outbreak in Saudi Arabia in 2012. This illness is named as Middle East Respiratory

Syndrome. Those two corona viruses claimed 1632 lives around the world [2]. In late December 2019, Dr. Li Wenliang and his colleagues identified new group of patients in Wuhan, Hubei Province, China with atypical pneumonia with severe features [1, 3]. This new disease is called as corona virus disease-19 (Covid-19) by World Health Organization (WHO) [2] and the novel virus is named as Sars-CoV-2 by International Committee on Taxonomy of Viruses [4]. Initial twenty-seven cases were tracked down to Huanan seafood market [1,

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5]. After the initial cases, Covid-19 started to spread all around the world very quickly. WHO declared new outbreak as public health emergency of international concern on 30th January of 2020 [6, 7]. There were 7818 reported confirmed cases all around the world on 30th January 2020 [7].

Covid-19 is declared as pandemic because of high degree of spread and severity by WHO on 11th of March. The reported Covid-19 cases are stated as 118000 on same statement of WHO. Since Covid-19 can infect the society easily and rapidly, governments all around the world started to take precautions to control pandemic infection inside the country. Those measures include international and domestic travel bans, partial or total lockdowns, cancelling social gatherings like cultural and religious activities, sports games, scientific and political events [2]. Those precautions helped to contain the virus however, they yielded economical problems in society. Those precautions affected to people especially who are working in tourism and transportation sectors [2]. Decline in hotel reservation resulted decrease in prices of agriculture commodities by 20%. Survey conducted among the British Plastic Federation revealed that, 98% of participants are concerned with negative impact of the pandemic on business operations and 80% of the participants are expecting decline in turnover over the next two quarters. The chemical production is estimated to decline by 1.2% globally. Education system is also affected from ban on public gatherings. 900 million learners affected from closing education facilities all around the world [6].

Finance markets are also affected from Covid-19 outbreak globally. World Trade Organization (WTO) and Organization for Economic Cooperation and Development (OECD) announced that the pandemic is the largest threat to global economy since 2008-2009 [2]. Pandemic damaged the supply and demand chain [6]. A recession is

expected during and after outbreak which will yield high unemployment rate and lost income and high inflation [2, 8]. Precarious countries are more susceptible to economical effects of the pandemic [8]. US stock markets fell dramatically. Other stock markets around the globe followed US stock market. In order to stop decrease in stock markets, monetary and fiscal policies are implied quickly. Those policies include lowering interest rates and announcing rescue packages. For example, US Federal Reserves lowered interest rates to 0% while Bank of England has cut the interest rate to 0.1%. Those precautions caused an increase in the stock markets. Meanwhile, G20 countries promised 5 trillion dollars to protect global economy and UN started humanitarian response plan [6, 9, 10]. According to those data, it is clear that, Covid-19 possesses great risks and uncertainty globally in financial markets and recovery time might be as long as two decades [9, 10]. Timothy Laing investigated how Covid-19 effected mining industry.

When it comes to studies regarding how Covid-19 affects construction industry, there is not so many studies available currently. In one of those studies, Ubaidillah and Riyanto investigated effect of work culture and extrinsic work motivation on construction company strategy to deal with Covid-19. Their study is conducted by making observations and supporting interviews. According to their results, work culture and extrinsic work motivation play a key role on company strategy [11].

Department of Labor, Occupational Safety and Health Administration (OSHA) issued some tips for people who are working in construction industry to prevent from Covid-19 [12]. Those tips include encouraging workers to stay at home if they are sick, wearing masks over nose, avoiding physical contact with others. Osha also gives some responsibilities to construction company to keep workers uninfected. Those

precautions include training workers how to properly put on and take off protective clothing and equipment, promoting personal hygiene, providing alcohol-based hand rubs containing at least 60% alcohol when workers are not able to reach to soap and water. OSHA also states keeping in-person meetings as short as possible, limiting the number of workers in attendance. Encouraging workers to report any safety and health concerns are also encouraged. Similar precautions are also issued by the Ministry of Environment and Urbanization. Those precautions forbid usage of same equipment mutually, entering construction site without body temperature measurement, limiting unnecessary personnel entrance to construction site.

According to same document, office workers should either work from home or take shifts. Those precautions are necessary to take; however, it might cause losing jobs. According to survey conducted by Adams-Prassl et al. working from home rates are 35% and 25% in USA and UK respectively in construction industry. 60% of participants stated that they will have economical struggles in the future due to Covid-19 [13].

Ogunnusi et al. (2020) conducted 71 surveys from employees in the construction industry to examine the changes and new opportunities created by the Covid-19 pandemic on the current construction industry. By analyzing the survey data in SPSS statistical analysis program; procurement process, worker safety, time, cost etc. It was concluded that the pandemic affected the construction sector by 90%. In addition, it has been observed that sudden modernization and digitalization in the construction sector create job opportunities in the sector [14].

Alsharif et al. (2021) investigated the early effects of Covid-19 on the construction industry, according to a survey of thirty-four phone calls conducted in the United

States. According to the interviews, project delays and cost increases were stated as the most negative features. In addition, there were complaints about the decrease in material supply and production. Furthermore, the study sheds light on the negative aspects of the sector during the pandemic process and presents findings to intervene in the sector and government institutions [15].

Pamidimukkala and Kermanshachi (2021) conducted research on articles, industry publications and reports to identify the problems faced by construction workers in the field of health and safety during the Covid-19 process and to find solutions. As a result of the study, seventeen main problems caused by Covid-19 were identified and categorized. As a result of the study, it was observed that health concerns have a psychologically devastating effect on workers. Moreover, strategies for worker problems were presented by presenting sterilization etc. suggestions for the problems identified in the study [16].

Rokooei et al. (2022) examined the effects of Covid-19, which has taken a negative place in world trade since 2020. For this reason, a total of 567 responses were collected by conducting a Likert scale survey with the experts in the construction sector 3 times (once every 6 months) on different dates. The survey results were analyzed statistically, and the change in the pandemic perceptions of civil engineers over time was examined. As a result, it has been observed that despite the decrease in the effects of Covid-19 in the construction sector in the group responses over time, its effect is remarkably high, and the sensitivities have changed, albeit slightly, according to the difference in experience [17].

Alfadil et al. (2022) searched the environmental factors of the Covid-19 pandemic on the construction sector by using the systematic review method,

making use of the publications in the literature. After 2010, studies with risks similar to pandemics were examined worldwide and it was observed that Malaysia and Egypt were most affected by these risks. As a result of the research, it has been suggested that the financial and supply chain factors are restricted in the contracts and that the specified costs and durations will reduce the quality of the project [18].

Elnaggar and Elhegazy (2022) studied the financial effects of the Covid-19 pandemic on Egypt's construction sector by conducting a 16-question survey. In this survey, factors such as cost items, human and machine effects, and facilities were examined and analyzed, and measures were proposed for different periods. These recommendations include strengthening infrastructure, rapid response to problems, improving workers' health and safety, and increasing digitization [19].

Effects of Covid-19 on various economic markets such as mining, financial markets, production and chemistry industries are already started to be investigated by several researchers. However, studies regarding its effects to construction industry are quite limited until now according to the best knowledge of the authors. Therefore, a questionnaire is conducted to field and office engineers and workers in order to reveal direct effects of Covid-19 to construction industry in Turkey. Results of this study provide insight to current situation of the participants and their future expectancy after Covid-19 pandemic.

## 2. METHOD

A questionnaire is a systematic method of data collection. It is possible to collect many diverse types of data with the questionnaire method. In this study, job performances, knowledge levels, preferences, etc. such data are collected. The purpose of the survey is to determine the socio-economic effects of Covid-19 on construction sector

in Turkey. The questions used in the survey form are closed-ended questions. Question types are two options (yes / no), best answer, scaled answers (Likert scale) and sequential options.

The survey is prepared between April 2020 and May 2020 to determine the first effects of the Covid-19 pandemic on the construction industry. Online data are collected by preparing a google form for the survey. At the beginning of the survey, the participants are used to categorize them into smaller and more specialized groups based on demographic questions and criteria such as age, education level, and marital status. One of the aims of the study is to determine the crucial differences between the answers given by the five different groups. Engineers in the public sector, construction workers, construction site engineers and project engineers are selected as the audience of this study. In addition, the survey conducted in employers. The questionnaire is prepared and electronically distributed to people. All participants are volunteered for this study. Participants are informed about their answers will be used for research purposes.

After preparing the draft questionnaire, it is assessed to improve the questionnaire and identify possible errors. Testing is conducted to ensure the reliability and validity of the questionnaire before it is distributed to the masses. The survey firstly is applied to a smaller group representing the larger group. In this study, Comrey and Lee (1992) guidelines are used for the sample size. They suggested that 50 samples are poor, 300 samples are good, 500 samples are very good, and 1000 samples are perfect [20]. A total of 598 people participated in this questionnaire.

Since construction industry is composed of many components when human resources are considered. Those components can be given as field engineers, design engineers, workers and foremen in the site, contractors

and engineers working in state institutions. Due to different jobs, they perform, they are susceptible and affected by Covid-19. In order to take this fact into consideration, different surveys are prepared for different groups. All groups are asked about the future of construction industry in common. Balance of payments are considered for site engineers, office engineers and contractors. In order to correlate the answers about payments from engineers, contractors are asked if they can pay regularly to their personnel. It is also asked if engineers lost their jobs and if contractors fired some of their employees. It is also questioned that if the engineers had to get a new job other than construction. Answers to those questions will be given provided in next section.

The data filled in by the participants are automatically saved to the Google Excel page and the data is transferred to the Microsoft Excel program. Percentage distributions are made in the Microsoft Excel program. The data is analyzed using SPSS Statistics software. Values are assigned as "None=1", "Little=2", "Moderate=3", "Very=4" and "Too much=5" in SPSS. When analyzing data with SPSS, the data we are working on should be distributed normally or close to normal. Kolmogorov-Smirnov test is conducted to control the normality of the distribution. According to the test results, it is seen that the distribution of the data is suitable.

### 3. RESULTS

A total number of 598 people from Turkey participated in our survey. 52 people work in state institution, 81 people are employers, 139 people are project engineers, 276 people are field engineers and remaining participants are foreman who work in construction industry and employers. 508 participants are male while only 90 participants are female only. Newly graduated civil engineers and engineers

working for state institutions take part in this study.

#### 3.1. Social Backgrounds of Participants

In order to determine the social background of the participants, information about their age, their marital status, their level of education and where they live are collected. 51% of participants stated they are single. Majority of participants stated their age between 26 – 35. Those people constitute 56% of all participants. Second largest groups' age is between 36 – 45. Age distribution of participants are given on Fig.1.

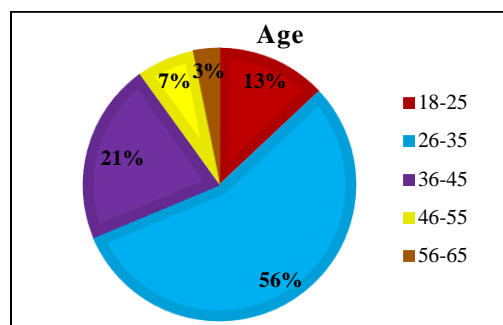


Figure 1 Age distribution of participants

69% of participants hold undergraduate degree, 20% holds Master of Science (M.Sc.) degree and 1% has Ph.D. degree. The remaining participant are either graduated from high school or primary school. Those people mostly work in private companies. Percentages related to where those people work are given on Figure 2 below.

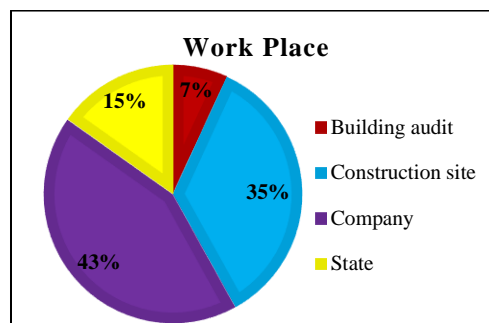


Figure 2 Workplaces' of participants

When current accommodation status is asked to participants, it is seen that 65% of

participant gave the answer with family which corresponds to 391 people. The ratio of people living with family is well above the sum of married participants. If we consider 9% of participants stated living on construction site, some part of the students and newly graduated engineers are living alone or with flat mates. Those people have not thought to move into their family due to economic difficulties. Although only 17% of foreigners are married and 33% are student, 37% are living with their family.

### 3.2. Effect of Covid – 19 in General

In order to determine and evaluate the general effect of Covid-19 pandemic to participants’ daily life, questions were asked regarding if they or someone around them had Covid-19, if they take necessary precautions, and if they believe those precautions prevents them to get infected, what they think about change of solidarity in society, source of the news, if they support 14-day curfew and when they expect the end of pandemic.

25% of participants answered that their lives are seriously affected from corona virus disease. However, 20% of participants reported that they are taking too much personal precautions. Figure 3 and Figure 4 provides more detailed information about participants’ reactions to effect of Covid-19 and how seriously they take precautions to prevent from Covid-19. However, results show that, majority of participants take necessary precautions at distinct levels.

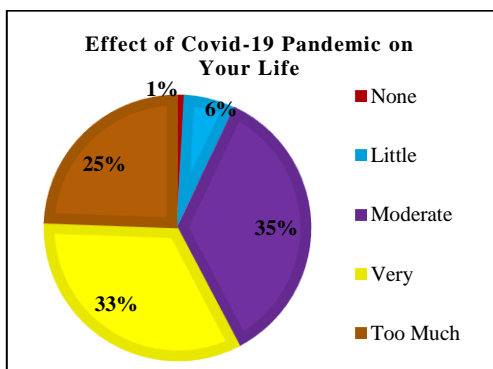


Figure 3 Effect of Covid-19 to lives of participants

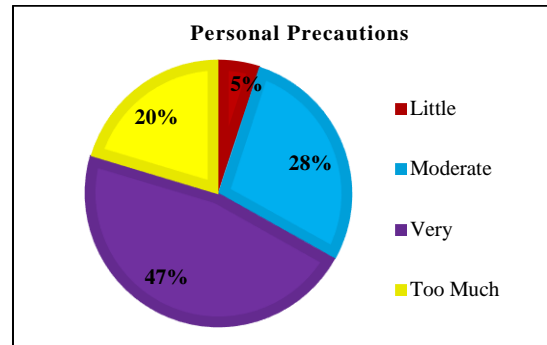


Figure 4 How seriously participants take precautions

As stated earlier in this paper, governments took some decisions to stop spread of Covid-19 in society. Participants are asked if they are satisfied with these regulations. 6% of participants said they are not satisfied with the precautions by government. The answers to these questions can be seen in detail on Figure 5 below.

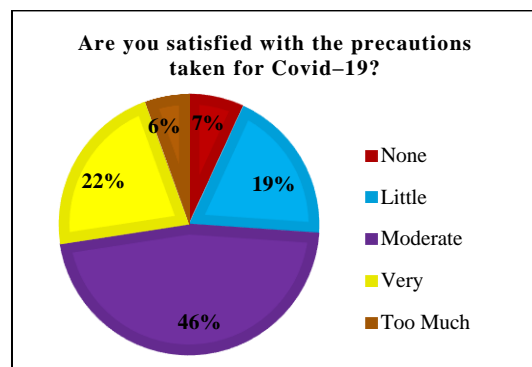


Figure 5 Level of satisfaction of participants against measures taken by government

1% of participants had Covid-19 in Turkey during this survey carried out. This could be due to related to the Figure 4 given above. According to Figure 5, only 5% of participants stated that, they take little precautions. 83% of participants reported that no one around their selves had Covid-19. However, 1% of them reporting that there are 11 or more people they know had Covid-19.

### 3.3. Social Effects of Covid-19

Covid-19 has changed our lives and our behaviors. In order to understand these changes several questions are asked to

participants. Participants are asked if they see any change in the solidarity between people after Covid-19. Majority of participants answered this question with yes. However, 44% of participants between people did not change.

This study also reveals that; people are changing their way of getting news. Most of the participants in our study group said that they get news related Covid-19 from social media. 1% of participants from said that they are getting news related to Covid-19 from all resources available.

Countries like Italy issued complete lockdowns and some other countries like Turkey issued partial curfews to stop spread of Covid-19. Therefore, it was important to determine if construction industry supports or does not support these decisions. Therefore, participants are asked if they support 14-day curfew or not. 58% of the participants supported curfew, however, 22% of them are against 14-day long curfew.

The last question in this section of the study is to learn prediction of participants about when pandemic will be over. 5% of participants think that Covid-19 will never end. 30% of participants think that pandemic will end in July or August. Figure 6 gives all ratios given in this question.

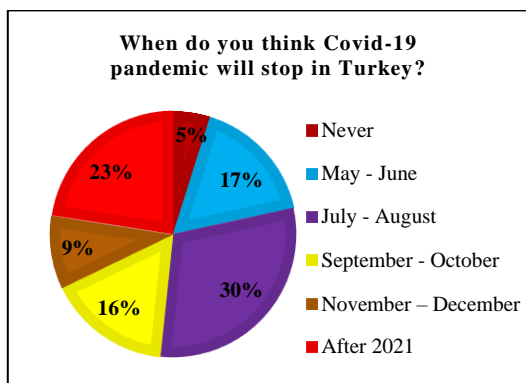


Figure 6 Predictions of participants about when the pandemic will end

### 3.4. Effect of Covid-19 on Construction Industry

To determine the satisfaction degree with the current status of construction industry, a question is asked. The majority of the participant expressed that they are happy with the current status of construction industry. However, as it may be seen from Figure 7 below, there are substantial amount of people who are not happy or satisfied with the current status of construction industry.

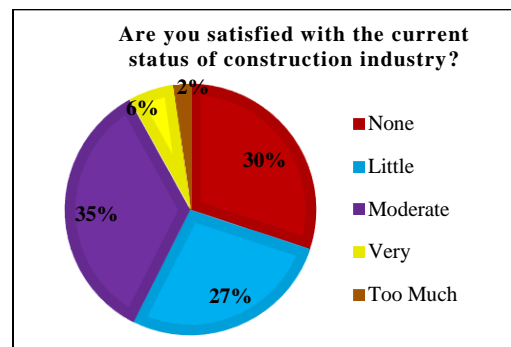


Figure 7 Satisfaction Ratios of Participants about Construction Industry

The second question is asked if the participants think construction industry is affected or not from Covid-19. These answers are provided in Figure 12. To sum up Figure 8, it is seen that 50% of participants think Covid-19 highly affected construction industry, while only 4% of them said Covid-19 did not have influence on construction industry.

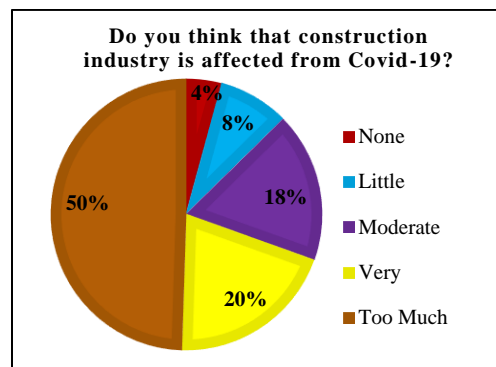


Figure 8 Thoughts of participants about Effect of Covid-19 in Construction Industry



The most important factor to determine the economical effect of Covid-19 is to ask participants about their employment status during time of survey and ask them if they lost their job due to Covid-19. Results showed that there are 62% and 61% employment rate in field engineers and project engineers in private sector. Only 3% of field engineers and 1% of project engineers lost their job due to Covid-19. However, this ratio increases enormously for foreman which becomes 22%. These numbers suggest that ordinary workers are more susceptible to effects of Covid-19. Figure 9 provides figures for construction sector below. 26% of foreman had to take unpaid holiday. It should be noted that 24% of them were already unemployed.

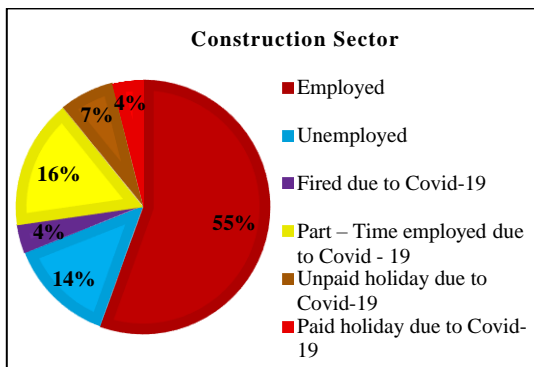


Figure 9 Employment Status' of Construction Sector

Engineers working on state institutions are relative in a good condition rather than other participants of this study. Only 2% of participants from Turkey took unpaid holidays, 52% started to work part-time. Engineers working in state institutions in other countries did not take any holiday but half of them started to work part time.

In order to properly determine the effect of Covid-19 in job market of construction industry, employers were asked how they manage this extraordinary situation. 16% of employers said that they had to ask their employees to take unpaid holidays, 55% of them said they asked their employees to come to office on specified days and 20% said employees are on paid holidays.

It is important to control approval process of the new projects. 87% of participants said time needed for approval process is longer after Covid-19.

Contracts are made for a time interval which means that, contractors should finish the work in a given time period. It is also important if the contractor decided to stop construction or continue. The answers of field engineers are quite important to this question because it directly affects if they keep or lose their jobs. Those answers are provided in Figure 10.

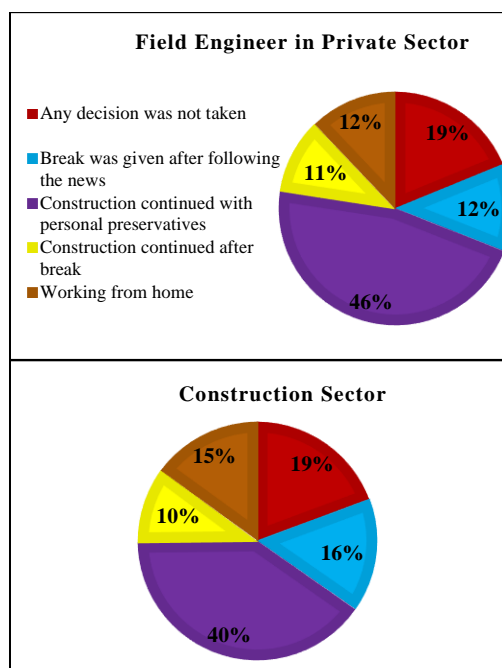


Figure 10 Answers to question regarding decision to continue construction by field engineers

It is seen that half of participants said that they were given personal preservatives in order to prevent from Covid-19 and continue construction. 19% of participants said that no decision is taken. When the same question is asked to the project engineers, following results are obtained. 33% of participants said that they continued to work after personal preservatives are distributed. Significant amount of project engineers can work from home in Turkey. It is also important to determine if the new construction projects are about the begin or

not during Covid-19. Therefore, question of if you are able to get a new contract after Covid-19 is asked to project engineers and workers. Their answers are provided in Figure 11.

It is also important to get a regularly paychecks for each person in construction industry. Therefore, to reveal current status of payments we also asked if they are able to get their pay checks regularly. When the engineers are considered, most of them were able to get their paychecks regularly. Only small amount of them were able to get it partially while, few of them told they do not get their paychecks. In case of project engineers, higher amount of them reported either they get partial paychecks, or they do not get their paychecks. When the same question is asked to workers, only 28% of them said they get their paychecks regularly, 60% said they get it partially.

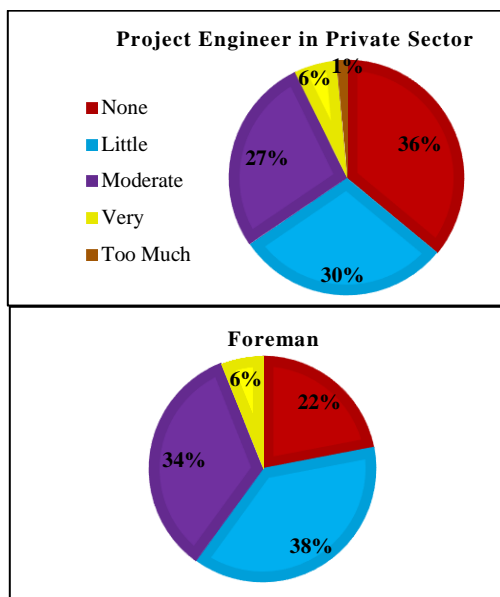


Figure 11 Answers given if project engineers, and workers are able to get a new contract

When the participants are asked if they had to work in another industry, 10% of field engineers and 12% of project engineers answered this question as yes. However, answers of ordinary workers are quite higher than these values. 22% of workers said they had to work in other industries.

In order to conclude this section, we asked the question if the participants are optimistic about future of the construction. 55% of participants are found to be optimistic about future of construction industry. They think that conditions of construction industry will be better in the future.

One-way analysis of variance ANOVA test is used for statistical analysis. One-way ANOVA is used to calculate the significance of the difference between three or more independent means in a normally distributed series.  $P < 0.005$  is obtained in results of one-way ANOVA, for the answer to the question of "Do you think that construction industry is affected from Covid – 19?" in all occupational groups. Since the p value is less than 0.001, there is a very high level of statistically significant difference between the groups.

### 3.5. Effect of Covid-19 into Construction Companies on Stock Markets

It is known that construction industry is very prone to economical and social crisis. This is validated by a study conducted by Chen et al [21]. Researchers investigated the Japanese construction companies on US stock markets during global financial crisis. This study concluded that those companies were affected from that crisis. Therefore, in this study, change of prices of these companies are considered during Covid-19. It is seen that prices of shares of these companies were affected Covid -19. When world health organization declared pandemic, sharp decreases observed on those same companies. However, with the measures taken by several governments, prices of these shares increased. These changes proved that stake prices of construction companies are susceptible to health crisis.

#### 4. CONCLUSION

A detailed survey is prepared in order to determine how Covid-19 affected construction industry. Survey targeted all people working in construction industry. Results provided us some important aspects about effects of Covid-19 outbreak. A total number of 598 people participated in our survey. Following results can be drawn according to answers given to our survey.

- Majority of the participants expressed that Covid-19 has influenced their lives. Exceedingly small amount of people said their life does not change after pandemic.
- Participants are very keen on taking necessary precaution not to get Covid-19 and prevent spread of it between co-workers. Answers also revealed that, employers also take necessary precautions at workplace. However, workers/foreman believe that more precautions may be taken by the employers.
- Only 1% of participants from Turkey diagnosed with Covid-19. Most of the participants stated that, no one they know had Covid-19. However, there are participants who told that they know people diagnosed with Covid-19.
- In order to stop spread of Covid-19, most of participants supports 14-day long curfew. However, participants are not willing to take unpaid holiday.
- People in construction industry lost their jobs due to Covid-19. Role in the industry affects the chance of losing job. These observations are also valid in case of getting paychecks. Engineers are more likely to keep their job and get regular payments while, foreman/workers are more vulnerable to losing job or losing income even though they work. Workers also has the

highest ratio for changing working industry.

- Newly graduated engineers think that finding job is harder during Covid-19.
- Half of the construction works continued by providing engineers and workers take necessary precautions.
- Stake prices of construction companies are also susceptible to global health issues encountered.
- The construction industry was seen unprepared for global pandemics. To being prepared for future pandemics, the construction industry needs several research in this area.
- Since the construction industry has many different stakeholders, separate studies should be conducted for each one.
- Due to much of the work area in the construction sector is face-to-face, occupational health should be given more importance.
- To prevent the losses caused by such pandemics on the construction sector, the insurance system should be better supervised by the authorized institutions.

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**The Declaration of Conflict of Interest/ Common Interest**

No conflict of interest or common interest has been declared by the authors.

**Authors' Contribution**

The authors contributed equally to the study.

**The Declaration of Ethics Committee Approval**

This study does not require ethics committee permission or any special permission.

**The Declaration of Research and Publication Ethics**

The authors of the paper declare that they comply with the scientific, ethical and quotation rules of SAUJS in all processes of the paper and that they do not make any falsification on the data collected. In addition, they declare that Sakarya University Journal of Science and its editorial board have no responsibility for any ethical violations that may be encountered, and that this study has not been evaluated in any academic publication environment other than Sakarya University Journal of Science.

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