Impact of the Pandemic COVID-19 on the Implementation of Construction Contracts

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Abstract. The COVID 19 pandemic has affected various sectors in the world, including the construction sector in Indonesia. The biggest impact is the impact on the health sector and the economy. The government budget for the construction sector has been cut very significantly, which has a negative impact on stakeholders, especially causing financial problems for business actors in construction. In this study, the identification of the impact of the COVID 19 pandemic was carried out on the construction sector, especially in the implementation of contracts. The research method used is through a quantitative analysis with questionnaire data which is distributed to stakeholders involved in the implementation of construction contracts. The results of identification study through questionnaires show that 80% of construction projects are still running in the current COVID 19 pandemic condition. However, pandemic conditions affect project performance, especially at the time of project completion. In addition, in implementing the health protocol, assistance, additional costs, improvement of human resource capacity, and special equipment are required, so that the health protocol can be implemented properly. On the other hand, most stakeholders stated that the online coordination system during the pandemic for the implementation of construction projects tends to be less effective. Hopefully, the research results can provide direction in finding the best strategy to reduce the impact of the COVID 19 pandemic on the construction sector, both in terms of health and project performance.

Keywords: Construction Contract, COVID 19, Health Protocol, Pandemic, Project Performance, Stakeholder.

1. Introduction

COVID-19 in Indonesia show an increase since mid-March 2020 [1]. The implementation of large-scale restrictions, social distancing to physical distancing has also put into effect throughout Indonesia. It has an impact on all sectors of industry, including the construction industry. The construction industry is an industry that supports infrastructure and economic development in Indonesia. The existence of infrastructure can support equitable development, create new jobs, and help equitable economic growth [2]. During the current COVID-19 pandemic, the management of construction resources is required. The visible impact on a construction project is a project that is caused by workers not being able to work at any time [3].

The construction industry is an expensive and complex industry, requires a lot of time, has many variables and unpredictable factors [4]. There are two groups of the construction industry, namely construction technology and construction management. Technology construction studied methods for
building and construction management manages the resources involved in a construction project. These resources consist of human resources, material, tools, finance, and implementation methods [5]. The COVID-19 pandemic is categorized as force majeure. The handling of force majeure is stated in the contract document. A construction work contract is an arrangement for working relationships between Service Users and Service Providers [6]. Improper implementation of contract changes can adversely affect project performance. Critical factors that affect performance, especially the time and cost of the project, are high inflation or increased material price, design change by the owner, defective design, weather conditions, delayed payments on contracts, and defective construction work [7].

In order to prevent the occurrence of COVID-19, one of which is by limiting interactions. According to WHO's report that, the spread of COVID-19 transmission could occur from physical and air interactions between humans. The Government of Indonesia under the Decree of The Minister of Health, also published Guidelines for the prevention and control of COVID-19 in March 2020 [8, 9]. One of the preventions of transmission of COVID-19 is limiting interactions, that the interaction limitations apply in construction projects where human resources are involved. This health protocol as a general guide for stakeholders in the implementation of the construction project. The stakeholders are project owners, contractors, sub-contractors, consultants, vendors/ suppliers, fabricators, and workers [10].

This limitation of activity has an impact on contract changes and project performance. The factors of project performance are the project schedule, cost, project quality [11], usability/ function, project owner satisfaction, consultant satisfaction, contractor satisfaction [12]. During the construction period, performance control is more dependent on teamwork than personal competitiveness to improve the project [13]. Changes in contracts due to a pandemic are expected to avoid disadvantage impact on project performance. Managing and improving project teams and anticipating risk appearance is very effective in project performance [14]. Poor relationships between collaborating parties damage project performance [15], and the project owner has an important role in project success [16]. Another problem affecting project performance is an interpersonal conflict due to poor communication [17]. Communication and coordination in team management through online platforms has proven to be the most significant step to take during the COVID-19 era [18].

Therefore, this research aims to obtain information on current contract conditions of construction projects are affected by COVID-19. The affected conditions observed were related to workforce management, contract document management, and project performance.

2. Method

The survey method applies to this research by an online questionnaire. Online questionnaires spread out non-randomly using the snowball technique via the google-form application. Questionnaires spread out to stakeholders related to the implementation of construction projects. The limitation of distributing for the stakeholder and community related to the construction project. The respondents involved in the planning, procurement, to implementation of construction project phases. The questionnaires spread out in the form of questions that were structured quantitatively.

Analysis data is done by distribution analysis. Data information has calculated the frequency of each independent variable and the dependent variable. The independent variable consists of 4 (four) variables, namely stakeholders, contract standards, types of funding sources, and project location. The dependent variable consists of 5 (five) variables: implementing the construction contract, implementing health protocol, work coordination, contract control, and construction contract issues. For each dependent variable, herewith the detail of the questions:

1. The construction contract implementation: whether or not a construction contract is running, the mechanism for terminating the construction contract, the phase of terminating the construction contract, whether or not implementation of a new procedure, the type of application of a new procedure, whether or not there are additional cost and the number of increase budget that have occurred.

2. The implementation of health protocols: whether or not the socialization is done, the level of ease in implementing health protocol, the workforce management during the COVID-19 pandemic, and the impact of implementing it.
3. Work coordination: work coordination mechanisms, additional facilities in work coordination, effectiveness, and efficiency of coordination, problems in coordination during the COVID-19 pandemic.

4. Controlling contracts: whether there is a contract change, components of contract changes, contract documents that are most susceptible to change, stages of construction implementation are most affected, and project performance components are most affected.

Construction contract issues related to work time, labor, provision of tools, coordination of work with stakeholders, cost/contract value, payments, changes in document administration, changes in specifications/scope of work, changes in parties, project environment, material supply, and other aspects related to construction.

3. Data and Discussion

Based on the questionnaires distributed, the number of respondents who filled out the questionnaires was 214 respondents. Several respondents were not related to the construction project, so only 200 of the data could be processed. The dominant distribution of respondents above the project owner is 62%, 55% of the project locations are on the island of Java, and the source of project funds is mostly from the APBN 34%. The following figure shows the respondent data distribution based on stakeholder categories, project location, and funds source.

![Distribution of Respondent Attributes](image)

**Figure 1.** Distribution of Respondent Attributes

3.1. The Continuity Project Data

Based on questionnaire data, during the COVID 19 pandemic, 75% of construction projects were still running, only 25% of projects were determinate. The determinate projects due to the epidemic, most of them were only temporarily suspended, namely as much as 72%; most of the work determinate were on unsigned contracts as much as 33%. The stakeholders try to take minimum risk that has the least impact on the project implementations. The Figure shows the condition of project continuity.
3.2. New procedures due to the pandemic of COVID 19

In accordance with the laws and regulations related to the pandemic period, namely the required health protocol to be applied to construction projects. 94% of respondents stated that there had been new procedures in implementing projects during the COVID 19 pandemic. Only 71% of respondents stated that the application of the Health protocol had been implemented in the implementation of construction projects. Stakeholders have recognized concern and compliance with efforts to prevent the spread of the COVID 19 virus in the construction project work cluster. However, there are still 29% of projects that have not implemented the health protocol, even though the health protocol is mandatory, based on the regulation of the Minister of Public Works and Public Housing (PUPR) and the Minister of Health. In implementing the health protocol, 62% of respondents stated a need additional costs, where 51% stated that the cost required for the implementation was less than 5% of the work contract's value. Given the burden of implementing this health protocol, stakeholders should consider these additional costs, since the health protocol's cost could interfere with project performance. Figure 3 below shows information regarding new procedures and health protocols in project implementation during a pandemic.

3.3. Implementing the Health Protocol

Regarding to health protocol, the questionnaire results showed that almost all projects that implemented the health protocol had socialized the protocol's application. However, in practice, only 49% of stakeholders stated that the health protocol could be implemented conveniently. 46% respondent stated that the health protocol was hard to implement, and only 1% of respondents stated that the Health protocol was not applicable. The figure shows the need for technical assistance, not only socialization on implementing the health protocol for stakeholders. This assistance can be carried out by the COVID 19 Task Force that is established based on the mandate of the PUPR Minister's regulation. Respondents stated that the impact of the health protocol was a change in behavior of project worker such as wearing masks, maintaining personal hygiene and equipment, and the existence of specific mechanisms in work
procedure in the field. Figure 4 below shows the information on the application of the health protocol in the implementation of a construction project.

![Figure 4](image.jpg)

**Figure 4.** Efforts on implementing health protocol in construction project during COVID 19 pandemic

### 3.4. The Impact of COVID 19 pandemic Condition on Construction Projects

Figures 5 and 6 below show a change in the coordination mechanism for project implementation due to the COVID 19 pandemic. Most respondents or as many as 86% used online facilities in project coordination during the pandemic period. Of the 86% of online media users in coordination, 80% stated that they did not fully use online media or did a combination of online and offline coordination. Only 6% of respondents stated that the coordination mechanism was completely offline (Figure 5). Figure 5 also shows that in implementing the online coordination mechanism, stakeholders need additional equipment that must be provided. About 33% of respondents stated that they provide a communication network connection through network operator services, 22% added a communication tool that could support online communication, and 21% stated they subscribed to webinar facilities. As many as 15% of stakeholders stated that they needed additional computers with specifications that support the webinar’s or online coordination.

![Figure 5](image.jpg)

**Figure 5.** Mechanisms and the Need of Additional Facilities for Coordination in construction projects during pandemic COVID 19

Although most of respondent use online media in project coordination, 60% of respondents stated that online mechanisms are efficient and efficient in implementing coordination. Since, the coordination process reducing transportation costs and transportation time. However, 43% of respondents stated that the coordination mechanism through online media was ineffective, due to the lack of human resource that has capacity on the operate of technology needed for online mechanism, limited infrastructure facilities, and poor internet network conditions. Moreover, 39% respondent stated that the online communication is inefficient. 80% of respondents still carry out coordination activities in a combination of online and offline mechanism.
3.5. The Impact of Pandemic in construction project

The COVID 19 pandemic has caused more than 50% of construction contracts to changes, the most significant change to the implementation time clause that is stated by 22% of respondents, as shown in Figure 7 below. However, there were also many changes to the contract value, which is stating by 16% of the total respondents, and changes in payment terms of up to 8%. Some stakeholders are facing pandemic conditions by reducing the workforce in the field, which will automatically impact the length of time completion. In some projects, pandemics resulted in changes to 10% of respondents' scope of work.

Changes to the timeframe were considered to have less risk in the contract execution process, and many respondents hoped that after the pandemic, the project could continue with in better conditions. The impact of contract changes is shown in detail in Figure 8 below.

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**Figure 6.** The level of effectiveness and efficiency of online coordination in construction project at pandemic

**Figure 7.** Contract change in construction project at pandemic
3.6. The Problems of Contract for Project Performance due to COVID 19 Pandemic

The main problem with the implementation of construction during a pandemic is related to the workforce's working time and coordination problems. Field workers have difficulty in coordinating due to the COVID-19 pandemic. There are various causes, including a reduction in field workers' capacity due to the need for physical distancing, lockdown in several cities of origin of workers, resulting in workers unable to access the project site for other reasons. Respondents' responses to project performance problems for changes and contract problems are shown in Figure 9 below; from this figure, it can be seen that contract problems have a linear impact on project performance.

3.7. The Impact of COVID 19 Pandemic for stakeholders

In the current COVID 19 pandemic eras, most projects can still be carried out with adjustments. The adjustments made to the time and scope of work through contract changes, especially for project owners and contractors that are still 80% of project running. Consultants are quite affected where less than 60% of the projects can be continued in pandemic condition. Most contractors require additional budgets to implement health protocols in contract delivery, as shown in Figure 10.
Figure 10. The impact of pandemic for stakeholders

Figure 11 shows a need for an additional budget of between 5-10% and it is not easy to implement for subcontractors and contractors, which also affects time performance, quality, and cost. Time is affected significantly by planning/design consultants.

Figure 11. Impact of Pandemic in Project Performance of Stakeholders.

Consultants require more offline coordination in ensuring high performance of their work than other stakeholders. Although most owners organize online coordination, 60% of owners think that online coordination is less effective, as illustrated in Figure 12 below.

Figure 12. Effectiveness of Communication and Coordination during the pandemic for stakeholders
Figure 13 shows the impact of the COVID 19 pandemic on project performance. The owner and most of the other stakeholders have problems with time performance, availability of labor, and material supply problems. This is because many areas are locked down so that they have an effect on supply chain system of material that can influence the performance of ongoing projects.

![Impact Pandemic COVID 19 to Performance](image)

**Figure 13.** Impact Pandemic to project performance for stakeholders

4. **Conclusion**

From the results of the questionnaire data analysis, the following conclusions were obtained:

1. Even though most construction projects were still running in the COVID-19 pandemic era, the pandemic has a significant impact on the implementation of construction contracts at every phase of work and stakeholders.

2. The planning stage is the most affected stage, where the consultant and owner are the most affected parties, especially the impact on-time performance.

3. The contractor's impact on cost performance was most significant than that of other stakeholders. The contractor mostly covers the additional cost of implementing the health protocol. It was due to the contractor having a high responsibility and role in preventing the virus's spread in the field.

4. The biggest problem of project implementation is the time of project completion that caused by labor problems and the difficulty of implementing the COVID 19 protocol in the field due to human resources' capacity.

5. There needs to be a technical guidance process by the COVID Task Force Team to ensure that the health protocol can be implemented properly in the field so that construction projects do not become clusters for the spread of the COVID 19 virus.

Regarding to finding of the research, the following diagram shows a propose model for risk identification in avoiding negative impact of the COVID 19 pandemic to the performance of project implementation (Figure 14).
Figure 14. Pandemic impact prevention diagram that needs to be considered by stakeholders

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