Analysis of Delay Factors and Claims of Construction Projects (Case Study: Apartment Buildings in Jakarta)

Jonbi[1], Azaria Andreas[1],Resti Nur Arini[1], Marlay Yuze[1]
[1]Civil Engineering Department, University of Pancasila
E-mail: nanojbg@gmail.com

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ABSTRACT

The implementation of construction it is often found inaccuracies in both time and cost between planning and the conditions of implementation on the site. This will result in delays in the execution of the work. In the end there will be a decrease in terms of quality and delay in completion of work. This research aims to analyze the factors causing delays in a building construction project, and identify claims that can be compensated for additional time and costs by the owner. This case studies of this research is analyzing delay in building project, and then the data will be analyzed using the Relative Important Index (RII) approach to obtain the factors with the highest value. Source of respondents chosen is limited from those who have experience in the field of building construction projects. The results shows the indicate of the delay in the implementation of the most important projects caused by late payment by the project owner (owner). In this study, the potential for delays in a construction project caused by the owner reaches 60% while by the contractor by 30%, the rest by force majeure.

Keywords*: Delay, Claims, Projects, Construction, Relative Important Index*

INTRODUCTION

The three main problems in the construction industry sector are delays, rising costs, and decreasing quality of work (Larsen, 2016; Arditi 2017). Delays in construction projects will significantly impact the project's ultimate goal, that is, according to the desired cost, time and quality (Kazaz dkk, 2012). Increasing costs and construction completion times have become global phenomena over the past 70 years. This resulted in an increase in construction costs which reached 28% (Flyvbjerg dkk, 2002, 2003).

Completion of construction projects in Indonesia often experiences delays from the time specified in the contract documents agreed by the parties involved. In addition to the late completion time, construction projects are also identical to the difference between designs and plans that have been made, which have an impact on the implementation of work.

A construction project can be said to be successful if it can be completed on time, right on cost, according to the required specifications, and can meet the satisfaction of stakeholder stakeholders (Gebrehiwet, 2017). But unfortunately almost all projects cannot be completed in accordance with the allotted time.

Delays in construction projects will eventually become disputes involving service providers and service users. Construction disputes are common in the construction industry. Disputes are caused by claims submitted by each party (providers and service users) which cause delays in the project.

For service users, project delays can mean loss of revenue, while for service providers, delays result in lost income opportunities (Assaf dan Hejji, 2006). According to Badan Arbitrase Nasional Indonesia (BANI) as of August 2018, 1.300 cases had been resolved. Of that amount, the construction industry is one of the industry that dominates the most disputes with a percentage of disputes that occur up to 33% or 420 cases.

Based on several problems of delays in the construction world, this research was conducted with the aim of analyzing the factors that cause delays in project implementation in the site, and identification of factors that could be submitted as claims from contractor to construction service users or the owner.

Claims in the form of compensation for additional time to finish and / or additional cash from the owner that caused the claim. Claim compensation analyzed is from the contractor's perspective of delays that occur during project implementation.

Construction Delay

The contractor is the party that responsible for completing the project according to the cost, time and quality of work. According to Arditi (2017), project completion time can be affected by unexpected events. Unexpected activities involving several variables such as: 1) Contractors, for example due to project planning including ineffective scheduling, rework due to errors. 2) The owner of the project (owner), for example due to changes in the scope of work (change order) and design, late payment, etc. 3) Design consultant design and supervisors, namely lack of experience, are not accurate in the process of investigative analysis at the project site. 4) Project workers (labor) who usually cause project delays due to absenteeism, low productivity, etc. 5) Design from design Consultant, for example due to design obscurity, design errors, etc. 6) Construction materials such as late delivery and price escalation. 7) Construction equipment that experiencing problems such as broken heavy equipment, or inappropriate use of equipment. 8) Project internal factors for example due to project complexity, and changes in management conditions. 9) Project external factors in the form of natural disasters, regulatory changes, political conditions (Gunduz dkk, 2013).

Meanwhile, a case study from Indonesia, according to Susanti (2020) in her publication stated that delay factors mainly caused such as inaccurate budgeting and resource planning, land acquition process, works approval from both the owner or designer, additional works from owner, and performance of subcontractor and vendor.

Nagata (2018) stated that, delays can be defined as things that occur as a result of something that happens outside the predicted, outside the planned, or actions/ activities that are not timely. Keane dan Caletka (2015) also state that states that delays can be categorized into 3 types or types, namely, 1) excusable compensable delays, 2) excusable non-compensable delays, and 3) non-excusable delay.

Excusable compensable delays are delays caused by activities that occur outside the control of the contractor, but remain under the control of the owner in the form of a design revision, and changes in the scope of work. In this case, the contractor can receive additional time and cash compensation from the owner.

Excusable non-compensable delays are delays caused by activities that occur outside the control/ responsibility of both the contractor and the owner such as weather conditions, strike workers, and demonstrations. In this case, the contractor will only get extra time from the owner.

Meanwhile, non-excusable delay is a delay caused by the activities carried out by the contractor such as poor condition of heavy equipment, poor material logistics, so the contractor will not receive extra time or cash compensation from the owner.

Construction Claim

The contractor can claim in the form of compensation for costs and/ or additional time for the execution of work to the owner according to the type of delay that occurs. However, in its implementation the contractor must be able to prove whether delays that occur are included in the types of excusable compensable delays, and/ or excusable non-compensable delays.

The preparation of an analysis of construction claims is absolutely necessary for the contractor to obtain compensation in the form of additional costs and/ or additional time.

So that the output of this claim analysis is the additional cash and time that can be claim to the owner. However, sometimes the proof of claim that carried out by the contractor is often not approved by the owner, which consequently can lead to a dispute state.

METHODS

This research uses both quantitative and qualitative approach, with data collection methods through surveys. Based on surveys, information can be obtained from individuals related to project conditions. In quantitative research, the sampling method used will determine the level of information obtained from the population including its level of accuracy.

This research is a case study on an apartment building construction project and commercial area which is experiencing delays in the form of problems. Data sources obtained in this study include:

- Primary data obtained from respondents related to project delay factors at the site.
- Secondary data in the form of literature data for the implementation of comparative studies in the form of benchmarking factors for delays in general in several countries.

To be able to identify the factors that cause delays through a questionnaire. The preparation of the questionnaire was carried out by giving a list of factors causing delays in the construction project that had been identified. The questionnaire will be filled out by respondents by assessing factors using a Likert scale (1-5) where respondents will give a score (5) if they strongly agree, (4) if they agree, (3) if in doubt, (2) if not agree, and (1) if strongly disagree.

Then the questionnaire was distributed and filled out by respondents who were the project team. Respondents were then asked to fill out a questionnaire indicating the perception of the relative importance of 61 factors causing the project delay which were divided into 10 main groups of causes, which were as follows:

- Labor: workforce expertise, labor discipline, work motivation, absenteeism, availability of labor, replacement of new workers, and communication between workers.
- Material: material delivery, material availability, material quality, material damage in storage, changes in material requirements, scarcity due to specificity, and inaccurate delivery time.
- Equipment: equipment delivery, equipment damage, equipment availability, equipment productivity, and the ability of labor to operate the equipment.
- Characteristics of the project site: surface conditions and subsurface of the project site, the response of the environment around the project site, storage of materials and equipment, access to the project site, and work space requirements
- Project environment: intensity of rainfall, nearby social and cultural conditions, workplace accidents and unexpected events (eg natural disasters).
- Project changes: design changes by the owner, design errors by the design consultant, and mistakes from the land investigation.
- Scope and contract of work: planning drawings/ specifications are not appropriate and / or incomplete, changes in scope of work at the time of implementation, lack of added work, requests for changes to work completed, disagreement between the contractor and the design consultant in making the work drawings.
- Planning and scheduling: incomplete identification of the type of work, planned work sequences that are not well structured, determination of the duration of working time that is not careful, work plan owner who often changes, including methods of implementing construction that is not appropriate.
- Monitoring and evaluation system: differences in schedules between subcontractors in the completion of the project, submission of unscheduled material samples from the contractor, the long process of approval of material samples by the owner, delays in the inspection and material testing process, the occurrence of work defects that must be repeated, processes and procedures evaluating the progress of work that is long and late.
- Managerial: project supervision, quality control of work, experience of field managers, calculation of material requirements, design changes, communication between contractors and consultant consultants and supervisor consultants, communication between contractors and owners.
- Finance: payment by the owner to the contractor, material and equipment prices.

Analysis of the data collected from all respondents will then later use the Relative Importance Index (RII) method to be able to determine the various causes of delay observed from the results of questionnaire surveys and interviews. The data analysis will also be assisted by using Statistical Package for Social Sciences (SPSS) software. The value of RII obtained will vary from 0 to 1.00, where values close to 1.00 are getting better. The formula / formula from RII is as follows:

$$RII = (\sum W) / (A * N) \quad \text{.....(1)}$$

Which,
W : Weight given to each each factor by the respondent (1- 5)
A : highest score
N : total respondent.

RESULTS AND DISCUSSION

Profile of Research Respondents

Respondents involved in this research are those directly involved in the implementation of the project (contractor) consisting of: Project manager, site manager, site engineer, supervisor, quality control and quantity surveyor. The purpose of taking diverse respondents is to be able to receive more diverse information related to factors causing project delays and from a broader perspective.

Table 1. Research Respondents

No	Position	Number
1	Project Manager	4
2	Site Manager	5
3	Site Engineer	5
4	Supervisor	8
5	Quality Control	5
6	Quantity Surveyor	5
	Total	**32**

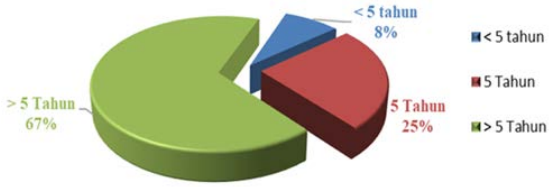

Figure 1. Demographics of Respondents based on Length of Experience

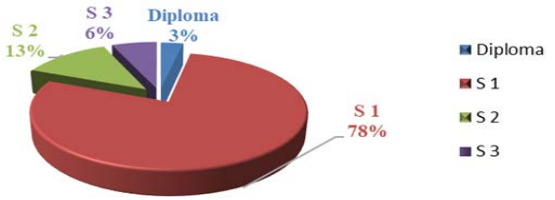

Figure 2. Demographics of Respondents based on Last Education

Respondent demographics indicate that the most respondents came from those who had worked more than 5 years on construction projects and undergraduate education (S-1). After analyzing the profile of respondents, then analyzed the value using SPSS software. The following table shows the results of the analysis and after ranking 10 factors that caused delays in project implementation at the study site.

Relative Importance Index Analysis

Table 2. 10 Big factors of delay RII analysis

No	Project delay factor	RII (%)	Rank
1	Payment by the owner	0,88	1
2	Change of scope of project	0,87	2
3	Change of design by the owner	0,85	3
4	Request for a change of work completed	0,79	4
5	The process and procedure for evaluating work is long	0,76	5
6	Error in land investigation	0,76	6
7	The owner's work plans that change frequently	0,73	7
8	Workforce discipline	0,73	8
9	Project supervision	0,73	9
10	Bad weather	0,71	10

From the results that shows in Table 2, comparing to what Susanti (2020) state in the publication, there are several key points that lead to delay in construction industry in Indonesia. That key points such as the owner as a project initiator, which is usually lack of preparation (land acquisition, budgeting, etc), and then the contractor as a executor of the project, which is usually or mostly lack of preparation (understanding project scope, procure material, and managing risk from all parties). Stated that delay factors mainly caused such as inaccurate budgeting and resource planning, land acquition process, works approval from both the owner or designer, additional works from owner, and performance of subcontractor and vendor.

Based on table 2. it can be seen that the factors causing project delays can be explained as follows:

1. Late payment by the owner, is a major factor in the delay in this project, based on interviews it is known that economic conditions have a major impact on the sustainability of construction projects in Indonesia. late payment results in changes in the company's cash flow. This has an impact on service provider companies, which in this case are implementing contractors, as a result the disrupted company cash flow is very influential on labor payments, resulting in the large number of project workers leaving or striking.
2. Change of project scope, the existence of added work and / or less from the service user certainly causes the workflow that has been arranged in the master schedule is affected. Either the addition of new work items or the reduction of work items during implementation would certainly lead to a request for change (addition) of time from the contractor. However, this must still be adjusted to the value of the contract of work, because in the contract already stated the percentage of the value of the contract permitted for additional work is less.
3. Design revises by the owner, this often happens in the implementation of construction projects. In a construction project a very significant change in design occurs because of the demand for service users. In general, changes in the form of designation changes, and materials used. This change requires time in the process of submitting

the design to the designer (in this case the consultant planner) to the service user, and the approval process. This certainly requires additional time both to redesign, and its implementation.

4. Request for changes to the work that has been completed, changes to the work that is already in the process of work, or that has been completed requires a long time, especially for the dismantling and implementation of new work. This process will take additional time if work changes involve new material that has not been ordered
5. Errors in land investigations. One type of error that generally occurs is, less in terms of soil data sampling at the project site, there is an error in determining the type of soil and the value of soil parameters. Errors in soil investigations will have an impact on the use of the type and amount of foundation used, because it depends on the carrying capacity of the soil obtained. This inaccuracy may cause changes in the type and number of foundations during construction. So the service provider has to re-coordinate with the consultant planner and even the owner. In the end the problem of mistakes in land investigations can result in less added work.
6. The process and procedure for evaluating the progress of work that is long and past the agreed time, the process of evaluating the work is carried out every 25th. However, due to one reason or another, there is a change in the work evaluation schedule. This will usually require adaptation time by providers and service users for only a few months. However, if there is a change in the evaluation schedule, this causes a change in the work evaluation flow which then impacts on increasing evaluation time. The evaluation process includes the approval process, after evaluating the work. The contractor was asked to change the evaluation documents according to the results of the joint evaluation and was asked to obtain approval from various parties, this resulted in additional time.
7. Discipline of labor, recruitment of workers who have a low level of discipline will affect the productivity and quality of the construction itself. The decrease in productivity will indirectly impact the delay in project implementation. This low discipline can cause problems in the environment around the project, and cause security problems
8. The owner's work plan that is often changing, as explained in the previous point, if the owner still has not determined the design allotment of the building function including it is still easy to change the design, this will make it difficult for the planning consultant in terms of providing the design for the contractor. in the implementation of construction. It is also important for the owner to be able to limit himself and set 1 design that will be used by the contractor in executing project implementation in the field.
9. Project supervision, project oversight that is not carried out optimally both for tennis implementation in the field, and project administration can ultimately cause delays. This also includes the professional ethics of supervisors in the field in terms of giving approval, recommendations or in the form of notes to contractors during the construction process. It is important for the project supervisor to have his own work implementation data, and work progress data. So that it can be compared with the data held by the contractor in terms of joint inspection.
10. Bad weather from intensity of rainfall, at certain locations known to have high rainfall. This factor certainly affects the implementation of work and the sub-jobs most affected are usually the foundation and structure work, so in preparing the master schedule it is necessary to consider the potential delays caused by weather problems.

Potential Claim Submission

Of the 10 factors that already analyzed to be the most affecting factors in this project, then further analyzed and separates into 3 groups source of the delay. The analysis results are obtained as follows:

1. *Excusable compensable delays are for points (1), (2), (3), (4), (5), and (7).*
2. *Excusable non-compensable delays are for point (6)*
3. *Non-excusable delay is for points (8), (9), (10).*

Comparative Study

The comparative study is comparing the main factors causing the delay in the implementation of construction in Indonesia with several other countries as in Table 3 according to Hussain et al (2007); Gebrehiwet (2017); Al-Momani (2000); Sambasivan (2007). This comparative analysis is carried out by benchmarking in several other countries.

Table 3. The Main Factor Causing Delays In Project Implementation In Several Countries

No	Country	Researcher	1	2	3	4	5
1	Pakistan	Hussain dkk, 2007	Difficulties in project finance	Late payment progress	Land use dispute	No project learning occurred	Low project appreciation
2	Ghana	Gebrehiwet, Luo, 2017	Late payment to the contractor/ supplier	Price and inflation fluctuations	Cancelation funding from sponsors / clients	The scope of work is too diverse	Weak administration of funding institutions
3	Jordan	Al-Momani, 2000	Imperfect design	Project owner is less determinant of project implementation	The scope of work is often changing	Weather conditions and project site conditions	Delay in the tender process at project preparation
4	Malaysia	Sambasivan, 2007	The contractor did not have sufficient preparation	Implementation of site management that is not organized by the contractor	Tender produce inexperienced contractors	Cancelation funding from sponsors / clients	Problems between contractors and their subcontractors
5	Indonesia	Susanti, 2020	Inaccurate budgeting and resource planning	Delay in works approval	Land acquisition process	Rework	Owner additional scope

The results of comparative studies that have been carried out from 4 countries, obtained there are 5 main factors that cause delays in project implementation, but the order of the main factors are different. In Pakistan, the majority of delays occur because contractors have difficulties with project funding. This could indicate that it could be due to the existence of quite strict regulations/ policies by the funders (lenders) to the contracting companies in the country, aside from other reasons.

As for Jordan, the dominant factor is when the design consultant can not produce a comprehensive design, and cause so much adjustment at the implementation. Whereas in Malaysia the project delay was caused by a contractor who did not have sufficient preparation, such can be happen because of the unstrict of regulation. If related to other factors causing delays, the majority of contractors in Malaysia still do not have a sufficient level of maturity to carry out a construction project. In Ghana in Africa, the majority of project delays are caused by the owner who is always late making payments to the contractor, and so the contractor will also be hampered by the payment to the supplier or sub-contractor. Associated with research conducted. For the Indonesian State in this case study, the main factor in project delays is due to payment by the owner. Based on the analysis, it turns out that the 5 main factors causing the delay in project implementation are different in each country.

CONCLUSION

Delay in the implementation of apartment building projects and commercial areas (such in this research case study) majority is caused by payment by the project owner (owner). The potential for delays in a construction project caused by the owner is 60% and 30% from the contractor, while the remainder is the delay caused by force majeure.

The results of the analysis for the types of excusable compensable delays that can receive claims are as follows: late payment from the owner, change of project scope, changes made by the owner, a request for changes to the work that has been completed, the process and procedures for evaluating the old work to exceed the schedule which has been agreed upon, and the owner's work plans that often change.

While the results of the analysis for types of excusable non-compensable delays include errors in carrying out survey surveys of land. And for the results of the analysis of types of non-excusable delay, among others, which comes from labor discipline, the project supervision process, and the project supervisor consultant.

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