PLANNING ANALYSIS AND PROJECT SCHEDULING TO CONSTRUCTION PROJECT PERFORMANCE

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Abstract. This research aims to analyze the factors of planning and projects scheduling on the performance of construction projects. The research was carried out in Medan using a survey method. The sample of this research was 30 managers of building construction projects whichbeing carried out in Medan in 2016 and sampling method waspurposive random sampling. The research instrument applied questionnaire and interview developed by the researchers. Research data obtained were analyzed by using statistical analysis descriptive. The results of the study found that there are 5 factors which impacted the performance of construction, namely: 1) the desire of owner to complete the project sooner, 2) lack of commitment of contractoron implementation work schedule, 3) mismatch between the drawing plan and the field condition, 4) there is a phase which is not in accordance with the schedule of work, and 5) delay of owner to approve the design drawing.
Keywords: planning, scheduling, performance, project, contra

1 INTRODUCTION

Project planning is a major factor for all construction operations to run and control a construction project. Planning is a map for setting project objectives and guidance for contractors to run and direct the resources to do the work in accordance with its function. The key to successful project success is good planning and work is done as planned. According to [1], it is clear that proper planning, that systematically arranged and taking into account the objective factors will serve as: (1) Communication tools for all project organizers, (2) Basic allocation of resources, (3) Tools to encourage planners and executors look ahead and realize the importance of time elements (4) Handling and benchmarks of control functions. If a construction project is not well planned and controlled, it will result in a decrease in project performance, namely: cost performance, time performance and quality performance. The project performance is not in accordance with the specified schedule, so the project is categorized as late.Related to project scheduling, [2] explains that between 2010 and 2013, there are 411 construction projects and about 67.4% of construction projects undertaken by the contractor can not be completed on time due to poor planning and scheduling, affecting the processing of permits, additional work, delays in the supply of equipment and materials. It is also found by [3] that 45 of the 75 projects studied have experienced delays exceeding 30% of the pre-set schedule. In line with the results of research conducted by [4], 40% of the projects implemented in Oman have been delayed.Such delay events are a common problem in construction that affects performance related to job delays, cost swelling is considered a criterion of success or failure [5], [6], [7]. the contractor's delay in completing the construction work, the contractor will be fined a penalty in accordance with the contract, in addition the contractor will also experience additional overhead during the project, which will result in damage to the company's name (image). This will be detrimental to the contractor because they will face the obstacles to get involved in subsequent construction work. From the owner side, the delay of the project will bring the impact of reduction of income due to the operation delay of the facility. The results [8] found that delays in construction projects would

harm both parties, the owners and contractors. From the Owners, delay in completion of project work will cause a loss of operation time of the project result, so that the use of development result will be delayed, while for the Contractor, the late project completion will lose time and cost, because the profit expected by the contractor will decreased, or did not even having profit at all. In addition to possible project delays may result in lost job opportunities for other construction projects. This is also in accordance with the results of research conducted by [9] that project delays are often the source of disputes and demands between owners and contractors, so it will be very expensive in terms of both contractor and owner. The contractor will be fined a penalty in accordance with the contract, in addition to the contractor will also experience additional overhead during the project that is still ongoing. From the owner side, project delays will have an impact of reduced revenue due to delays in the operation of the facility. This requires the ability of the construction contractor to be more efficient in the management of the construction project [10], [11]. The delay in completing the construction project is a challenge for national construction service business actors to be able to join the foreign construction service business, so that the national construction service resources need to be improved in order to be competitive in competing for the construction work. [13] argue that the results of the planning should be fully integrated and communicated to all stakeholders in project implementation ie owners, project managers, consultants and contractors, so as to maximize the efficiency of project implementation relating to time, cost and quality.

Scheduling is a process that sorting the tasks/types of work on a set of work to be performed. Scheduling starts from the beginning of the work, the duration of the work and the completion date of an activity. Scheduling is arranged with the target to be fulfilled a project goal that is cost, time and quality according to planning. According to [14] the project objectives have 4 targets, namely: economic costs, fulfilled quality, time is not exceeded and safety is fulfilled. If one of the project objectives is not met then it can be interpreted that the project failed. Failure of construction or failure of the building is a long process of a process of work execution performed by the contractor because it is not in accordance with the contract, especially the RKS and Drawing Plans that have been set. Construction failures and building failures are caused by unachievable project performance indicators. Project planning and scheduling are key and tools to be able to control and monitor project performance. From the results of the conducted research, the fact that the scheduling made by the contractor at the time of carrying out construction work only 31.85% which actually implemented in accordance with the planned schedule. In general project delays often occur due to planning changes during the implementation process, poor managerial in the contractor organizations, unstructured/disunified work plans, incomplete drawings and specifications, or contractor failure in carrying out the work. Given the indicators that affect the performance of the construction, it is necessary to review and analyze the causes of delays caused by the planning and scheduling aspects of the construction project, so that the planned time can be carried out in accordance with the schedule, the cost incurred in accordance with the agreed budget, and the quality of work is fulfilled..

2 MATERIAL AND METHODS

Scheduling is the translation of project planning into a sequence of steps of implementation of work on a time scale to reach the target. Scheduling determines when activities are initiated, postponed, and completed, so that the financing and use of resources will be timed according to predetermined needs. In essence, a construction work is divided

into a set of small jobs so that it can be considered as a stand-alone work unit and has a certain schedule estimate as well, in order to improve the accuracy of the project completion period and sharpen the dependency analysis between activities, because the more detailed the works, the more components will be had. Thus, more variations in open dependence relationships may occur and which may result in a shorter project completion period, which is due to activities that can be caused in parallel [14]. According to [15] scheduling aims to make efforts to meet the requirements of project specifications specified in terms of quality, time and cost, coupled with the assurance of safety factors. In related matters, [16] explained that the scheduling is closely related to the timing and how the coordination is in the field. Timing and coordination in the field can be done well if at the beginning already has the right scheduling system. Therefore contractor usually need to make Master Schedule at the beginning of the project. This master schedule describes the work schedule in general, because the master schedule was created at the beginning of the project which is the guide for the construction executor to run the project. In developing a project plan, the construction implementer must be thoroughly knowledgeable, the lack of knowledge, the application of the project management concept will result in an incomplete project plan resulting in the loss of project performance. [17] Lack of knowledge about the application of theory in implementation is considered to be the application of scheduling planning which is not good [18].

Performance is one of the most important factors that could lead to the failure of a construction project. Project performance is how the project works by comparing the real work with the estimates of work on contracts which are agreed by the owner and contractor. Performance has a diverse understanding of economic, welfare, technology, and resources. More performance discussions focused on a certain number of outputs [19]. Performance is said to be higher if the increase in output is higher than the addition of resources as input factors. Measures of performance can be seen on the aspect of cost, time, and quality in which all three are hereafter according to [20], said to be the dimensions of productivity. As with the general performance notion, the performance components for construction projects still depend on aspects of resources that include human resources (HR) and technology. Both of these are then known by the term input in which will be associated with performance dimensions. Construction project workers have a major role or task to combine inputs with specific techniques or skills through a project plan both strategic and operational planning to subsequently produce a construction project. It can be concluded that project performance can be interpreted as a business or project work to carry out its project activities appropriately with the benchmark of project success seen from the main indicators of safety, cost, quality and time. Performance measurement is important in the evaluation and control process company. The ultimate goal of performance appraisal is to help set standards and targets, tools for progress, motivation, communicating strategy and organization and influencing behavioral change. Companies need to assess what factors affect performance. The company is said to have a good performance if it excels on indicators of profitability, growth, sustainability and competitiveness. (Sudarto, 2011) [21]. Performance measurement aims to eliminate non value-added activities and optimize value-added activities.

According to [22] performance measurement consists of six indicators, namely:

1. Quality
   The quality of work is measured by employee perceptions of the quality of work produced and the perfection of tasks to the skills and abilities of employees.
2. Quantity
   The resulting amount is expressed in terms such as number of units, number of completed activity cycles.

3. Timeliness
   It is the activity level completed at the beginning of the stated time, viewed from the point of coordination with the output and maximizing the time available for other activities.
4. Effectiveness
   It is the level of use of organizational resources (energy, money, technology, raw materials) maximized with the intention of increasing the yield of each unit in the use of resources.
5. Independence
   Is the level of an employee who will be able to perform its work function.
6. Workcommitment
   Is a level where employees have a working commitment with the agency and and the responsibility of employees to the office

METHODS

This research analyzes the factors of planning and project scheduling on the performance of construction projects related to time performance. The research method used is survey method. According to Medan city statistics in 2015 that in Medan there are 363 General Contractors. But the contractors involved in the construction project are only 120 contractors and the contractors who have a completed the job schedule is up to 60 contractors. Research sample is determined by purposive randomize sampling technique. So the sample of this study amounted to 30 people who work as a Contractor. Data collection techniques were conducted using questionnaires and interviews. The questionnaire used was a weighted questionnaire based on scale criteria. The validity of the instruments in this study is based on content validity. The intended criteria are as follows:

1 = Very small influence (SKP) = No impact on project schedule 0% -2.50%
2 = Small influence (KP) = Project schedule delay occurred 2.51% - 5.0%
3 = Medium Effect (PS) = Project schedule delay of 5.1% - 7.50%
4 = Big influence (BP) = There is a delay in project schedule between 7,51% - 10%
5 = Very big influence (SBP) = Project schedule delay occurred> 10%

Data analysis technique used is descriptive statistical analysis technique, step 1) Determining Scores Against Statement Questionnaire, 2) Determining Ranking On Respondents Answer. To determine the rank of factors thatgenerallycausing delays in the project in the respondents' answers were analyzed by interest index based on the average value of respondent's statement using the following formula:$Mean = I = \sum_i^a = 1 \ {aiXi}/{N}$.

3 RESULTS AND DISCUSSION

The research data obtained can be described as follows:

In relation to the respondent's position, the things described are: 1) Respondent's Type of Occupation, 2) Respondent's Experience, 3) Respondent's Education, and 4) Experience in the field of controlling. For more details can be seen in Figure 1 s / d 4..

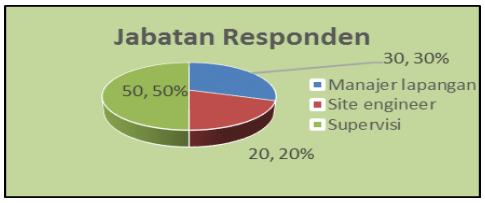

Figure 1. Position Type of Respondents

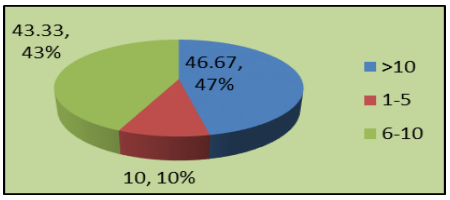

Figure 2. Respondents Experience

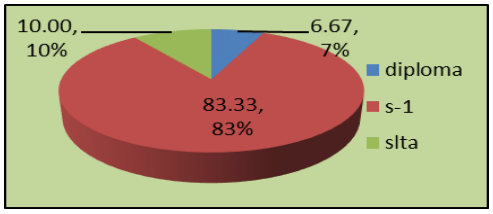

Figure 3. Respondent Degree

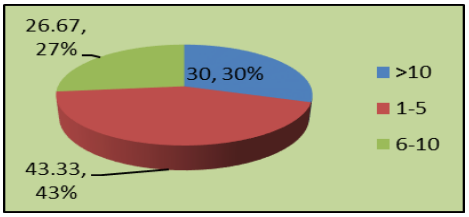

Figure 4. Respondent Experience In Controling Field

Of 30 respondents 50% who answered the questionnaire served as supervision, 47% had experience> 10 years, 83% educated S-1 and 43% experienced 1-5 years on similar projects.Based on project data managed by the respondents can be seen in the table 1.

Tabel 1: Project Data

	Project Data	Respondent Number	Percentage
1	Project budget under management> 1M	30	100 %
2	Type of Project (Building)	30	100 %
3	Project Delay (Sometimes)	20	67%

Based on Table 1 it can be concluded that all respondents have experience managing projects with financing> 1M, the project being done is a building project and 67% of respondents in managing the project often experience delays.

In this research, the respondent's opinion about the effect of delay on the performance of time in terms of planning and scheduling. Of the 14 statements given to the respondents as contractors in the building project, there are 4 statements that have a significant influence on time performance in the planning and project scheduling aspects, namely: 1) Owner's Request to speed up the execution of the work 2) Lack of Contractor Commitment to Schedule Implementation of the Work, 3) There are Implementation Stages that are not in accordance with the Schedule of Work, 4) Incompatibility between the image and the state of the field, which can be seen in table 2.

Table 2: Ranking Factors Influence Time performance on Aspects Planning and Scheduling

No	**Pengaruh Kinerja Waktu**	**Mean**	**Ranking**
1	There is no time target given by the owner for project completion	1.567	11
2	Scheduling work is not planned in detail and thorough	2.100	10
3	There are stages of implementation that are not in	3.300	4

	accordance with the schedule of work		
4	Owner's delay in approving design drawings	3.300	4
5	The owner's delay in approving the contract	2.700	7
6	There is an owner request to speed up the execution of the work	3.700	1
7	There is a sudden change of schedule decision	3.200	5
8	Incompatibility between the image and the state of the field	3.367	3
9	Incomplete Specifications BQ (Bill of Quantity) estimates are less accurate	3.100	6
10	There is no material procurement schedule	2.600	9
11	No Schedule of equipment procurement	2.633	8
12	Unrealistic project scheduling	2.700	7
13	contractor's commitment to the implementation schedule of the work	3.667	2
14	Changes in specifications	3.100	6

Owner Request to Accelerate Job Implementation

According to the respondents that the demand factor of owner to speed up the implementation of the work greatly affect the delay of time performance on aspects of Planning and Project Scheduling. This is because if the owner request to accelerate the implementation of the work will cause many aspects of loss include: 1) shortage of labor, 2) additional costs for overtime, and 3) changes in project schedule.

This statement is considered very influential because the commitment of the contractor as the executor of the field to the planned schedule must be made in detail and can be adjusted in actual field that must be made rationally, feasible, communicative, manageable and can multi function.

- **Rational**: The schedule must have a logical and rational logic of relations between jobs. This should refer to the implementation methods deemed correct and agreed upon by the relevant party at the beginning of the work. In addition, the schedule should refer to the condition of resources and the level of difficulty of existing implementation as well as holidays both nationally and locally. A good schedule must also fulfill a logical element.
- **Feasible**: a schedule is not advisable to be too tight or even impossible to achieve based on similar work experience. In addition to considering certain predictable factors, the schedule should also take the unpredictable factors into consideration. A feasible schedule also provides a sufficient time contigency to perform problem solving in case of an unpredictable problem.
- **Managable**: The intention of the managable is that the schedule is easy to create, update, simulate, separate or merge if necessary, revised in case of field changes such as scope changes, implementation methods, and so on. Schedule is also expected to make the complexity of work to be seen much easier to implement. So the schedule is not a schedule with thousands of work items, but the important thing is the schedule is able to map and group so many complex jobs to look much simpler.
- **Multi Functions**. A good schedule should be utilized for various interests and needs. So that not only as a tool of time control of project implementation, but also can be directly become a progress, or can be easily done to transform master schedule form to monthly schedule, 2 weekly schedule, until weekly schedule. Schedule can be a measuring tool to

determine the extension of subcontractor time, becoming a powerful tool for determining effective project acceleration strategies, and other functions. So making a master schedule is one of the main things in good project planning.

Lack of Contractor's Commitment Job Implementation Schedule

According to the respondents that the lack of commitment factor of contractor to the implementation schedule of work, greatly affect the delay of time performance on the aspect of Project Planning and Scheduling. This is caused by schedules that are planned to be difficult to apply in the field, so the work becomes obstructed resulting in uncontrolled schedulers. This delay is also caused by the lack of a schedule control tool that can be done quickly, so that the work that delayed is hard to be monitored and performed early action.

Incompatibility between the Figure and the Field Condition

According to the respondents, the Incompatibility factor between the drawing and the field situation greatly affects the time delays in the aspects of Project Planning and Scheduling. This is caused by the drawing of work (shop drawing) is a communication medium between design and implementation that is used as a implementationreference of work that is ready to be implemented in the field. Constraints that often occur in the shop drawing in the field implementation is there are images that are not detailed, there is difference inthe imageof work contract, BQ and work plan and termsregarding work items and volume of work.

There are Implementation Stages that are not in accordance with the Schedule of Work

According to the respondents that the factors in which the implementation phases are not in accordance with the schedule of work greatly affect the delay in thetime performance on aspects of Project Planning and Scheduling. This is caused by the contractor in arranging the schedule of activities does not take into account the resources that will be involved in the project, so the schedule cannot be implemented optimally.

Owner's Delay in Approving Design Picture

According to the respondents that the owner's delay in approving the drawing of the picture strongly affects the delay of time performance in the aspects of Planning and Project Scheduling. This is caused by the owner that wants the construction as planned which is contained in the shop drawing by the consultant planner, because the condition of land that does not allow the work to be realized in accordance with the picture.

4 CONCLUSIONS

Based on the results of the study and discussion it can be concluded that the main factors affecting thetime performancedelay in the planning and scheduling aspects are: 1) Owner's Request to Accelerate Job Implementation, 2) Lack of Contractor Commitment to Work ImplementationSchedule, 3) Incompatibility between Image and Field condition, 4) There are Implementation Stages that are not in accordance with the Schedule of Work, and 5) Owner's Delay in Approving Design Picture

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