JOURNAL OF GREEN SCIENCE AND TECHNOLOGY

ANALYSIS THE CONSTRUCTION MANAGEMENT ANALYSIS OF THE KARAWANG GOVERNMENT OFFICE

Hangger Muhammad Ma'rifatullah*, Fathur Rohman**

*) Student of Civil Engineering Major, Faculty of Engineering, University of Swadaya Gunung Jati Cirebon
**) Lecturer of Civil Engineering Major, Faculty of Engineering, University of Swadaya Gunung Jati Cirebon

Abstract

The purpose of this thesis is to know volume of work on construction of Karawang Government Office Project, analyze method of implementation of work, to know the cost of implementation on construction of Karawang Government Office Project, and the comparison of time duration between scheduling prediction of owner with scheduling prediction of author.

This type of the research is quantitative. That describes the condition of a particular project with existing data related to the construction of local government buildings. That existing data is processed in such a way as to produce the final conclusion.

The result of the research is Based on Budget Cost calculations to complete Karawang government office construction until the final stage, more or less costly Rp.41.906.713.365,-. From the calculation of weight of work is estimated completion of Karawang government office construction work takes 75 weeks. With the CPM method can be known critical path occurs in the project are Excavation and Pile Up Work – Pile Foundation Work – River Stone Foundation Work – Reinforced Concrete Work – Wall, Brick, and Plastering Work – Door Frame, Leaf Door, and Window Work - Ceiling Work – Sanitation Set Work - Lighting Installation Work – Lift Work.

Keyword : Construction Management, Barchart, S Curve, Critical Path.

1. PREMILINARY

Developments in the era of globalization in various sectors, including the economic sector, education, tourism and technology that so rapidly and must be supported with a strong infrastructure and nice comfortable. To fulfill that matter we need the management of construction that focused on physical management so as to give optimal function.

The management of construction is an application of knowledge, expertise and also skills to achieve goals or objectives that have been determined in order to obtain optimal results in terms of performance, time, quality and safety. Construction management requires modern management knowledge as well as an understanding of the design and construction process. Construction projects have a specific set of objectives and constraints such as a required time frame for completion. While the current technology, processes will different, the management of such projects has much in common with the management of similar types of projects in other speciality.

Every project have implementation plan and implementation schedule, so it can be known when the project will start and when the project will be completed. Implementation of the project always refers to first development project plan, but usually the implementation of project are not in accordance with schedule that have been made at beginning of planning, so the impact is delay of work and increased cost required in the project. Project delays can be anticipated by accelerating the implementation or increasing the workforce but must still pay attention to the cost factor to be issued.

The construction of Karawang Government Office is located at Lubangsari street, Karawang district. The construction of Karawang Government Office which is being implemented and just reached the first stage of development so the author is interested to analyze the construction management on construction of building that later can be known in schedule of the building construction project is good or not good. This analysis is expected to obtain optimal results in terms of performance, time, quality and safety.

Based on premilinary, so the scope of research of the problems used are :

1. How to distribute time and cost of construction of Karawang Government Office Project?
2. Calculate volume of building and calculate the budget plan.
3. The analytical method used in this project is critical path method, Barchart and S curve.

The purpose of this research in Karawang Government Office are :

1. To know volume of work on construction of Karawang Government Office Project.
2. To analyze method of implementation of work on construction of Karawang Government Office Project.
3. To know the cost of implementation on construction of Karawang Government Office Project.
4. To know the method of analysis of CPM, Barchart, S Curve, and Cash Flow.

2. METHOD

There are 3 methods of data analysis conducted in this research, specifically BarChart Method, S Curve Method and CPM Method (Critical Path Method) as corrective action to analyze the network to make the project implementation ideal.

1. Barchart

A barchart is a set of events placed in a vertical column, while time is placed in a horizontal row. The start and finish time of each activity along with its duration is indicated by placing the horizontal beam on the right side of each activity. Estimated start and finish times can be determined from the horizontal time scale at the top of the chart. The length of the block indicates the duration of the activity and usually the activities are arranged on the basis of the chronology of the work.

The use of barchart aims to identify elements of time and sequence in planning an activity, comprising start time, finish time and at time of reporting. Barchart depiction consists of columns and rows. In the column arranged sequence of activities arranged in sequence,

while the line indicates the period of time which can be days, weeks or months.

2. S Curve

The S curve can show project capabilities based on activity, time and workloads represented as a cumulative percentage of all project activities. The visualization of the S curve provides information on the progress of the project by comparing the schedule to the plan.

The S curve progress, graphically presents some measure of cumulative progress on the vertical axis and against time on the horizontal axis. This progress can be measured by the amount of money that has been spent, the quantity survey of the project work, the amount of labor used.

$$\text{Percentage of work load} = \frac{\text{Volume x Unit Price}}{\text{Building Price}} \text{ x } 100\%$$

The S Curve function there are :

a. Determine the completion of the project portion.
b. Determine the cost of project implementation.
c. Determine arrival of materials, tools, and workers to be used for a particular job.

3. Critical Path Method

In the network method known as the critical path, the path that has a series of activities components, with the total amount of time the longest and shows the fastest project completion time. So, the critical path consists of critical sequences, starting from the first activity to the final project activity.

The data source is anything that can provide information about the data. Based on the type, the data is divided into two, that are primary data and secondary data.

1. Primary data is data created by researches for the special purpose of solving the problem being handled. The data is collected by the researcher directly from the first source or place of the research (survey).

   Data obtained from primary data are :

   - Sorted implementation work from start to finish of project (ex : Before doing the beam work, must complete the column work).
   - Worker, tools, and materials productivity (ex : 1 worker can do $10m^2$ wall painting using a can of paint and a brush in 1 day).
   - Methods used to built the building

   (ex : The method used in the building is Bottom-Up).
2. Secondary data is data that has been collected for purposes other than solve the problem is being done. This data can be found quickly. In this study the secondary data sources are literature, articles, journals and internet sites related to research which is conducted.

   Data obtained from secondary data are :

   - Structure and architecture shop drawing
   - Unit price analysis
   - Unit price of worker, tools, and materials
   - The rules for planning, scheduling and analyzing the management construction (SNI)

3. TIME AND COST

Time or schedule is one of the main goals of the project. The delay will result in various forms of loss, such as additional costs, loss of product opportunities entering the market, and others. Time management has the primary objective for the project to be completed accordingly or sooner than the plan with due regard to cost, quality and project scope limits.

Time planning is a very important part of the project completion process. The work plan (Time schedule) is a detailed time division of each type of activity / type of work on a construction project, from the beginning to the final work (finishing).

Cost management includes all activities related to the procurement and use of project funds, starting from the process of estimating the amount of funding needs, searching for and selecting sources and types of financing, planning and controlling the allocation of cost

usage to accounting and lending / financial administration.

The overall cost of construction usually involves calculating the analysis of the five key elements by Dipohusodo (1996), there are :

a. Material Costs

The cost of materials used is the cost at the job site. In order to obtain the cost, it must be known the purchase price of the material and the cost of moving it to the job location.

b. Labor Costs

Labor component estimation is the most difficult aspect of overall construction cost analysis. Influential factors that must be taken into account include: workplace conditions, skills, duration of work, population density, competition, productivity and local cost of living index.

c. Equipment Costs

Estimated equipment costs include purchase or lease, mobilization, demobilization, transfer, transportation, installation, dismantling and operation during construction.

d. Indirect Costs

Overhead is an additional cost that must be incurred in the implementation of activities or work but not directly related to the cost of materials, equipment and labor. Overhead costs are generally divided into two, namely general overhead costs and project overhead costs.

e. General Costs

The overhead cost is the pay of central and field office personnel, central office expenses such as office rent, telephone, etc., travel and accommodation, documentary fees, bank interest, notary fees, small equipment and consumables. These general overhead costs can be taken from the profits set on one project.

f. Project Costs

Expenditures incurred on the project but not included on material, wage or equipment costs, namely: office building, field and equipment, field office telephone costs, field accommodation needs such as electricity, clean water, drinking water, sanitation, and so on. Roads and parking lots, limits of protection and fences in the field.

4. BUDGET PLAN

The Budget Plan is a calculation of the amount of costs required for materials and wages, as well as other costs associated with building or project implementation. Budget cost is the price of building materials that are carefully calculated, meticulously and qualified. Budget costs in the same building will vary in each region, due to differences in material prices and labor costs.

In preparing the budget cost in this study is done by a costly budget. A meticulous cost budget is a carefully calculated and precise building or project, in accordance with the terms and conditions of costing the budget.

Basically, there are 5 main functions of the Building Budget Plan :

1. Budget Plan as a settlement of the cost amount of each field of work in the process of build a building. Budget plan includes detailed costs covering the procurement of construction materials, workers wages, and other expenses such as licensing fees and infrastructures costs.
2. Budget Plan as the total determinant of material needs of building materials required. The calculation of material requirements is based of the measurement of the volume of building structures.
3. Budget Plan as the basis for the selection of labor used. Budget plan describes the construction works to be performed and the labor needed to do the work.
4. Budget Plan as a determinant of equipment used to support the smooth of construction. Budget plan also decides whether the equipment needs to be purchased or leased.

Budget Plan as monitoring of savings of development implementation activities. From budget plan also can be spending budget cost that yield profit.

5. RESULT

A. General Description

The Construction of Local Government Building II Karawang located in Lubangsari

street. That is intended as a place of work of government officials that are in karawang regency. The building is large enough and the high that reaches 5 floors, so it can accommodate the number of government employees, compared with the previous local government buildings so it takes more space than ever in order to provide comfort for employees and staff to make better performance.

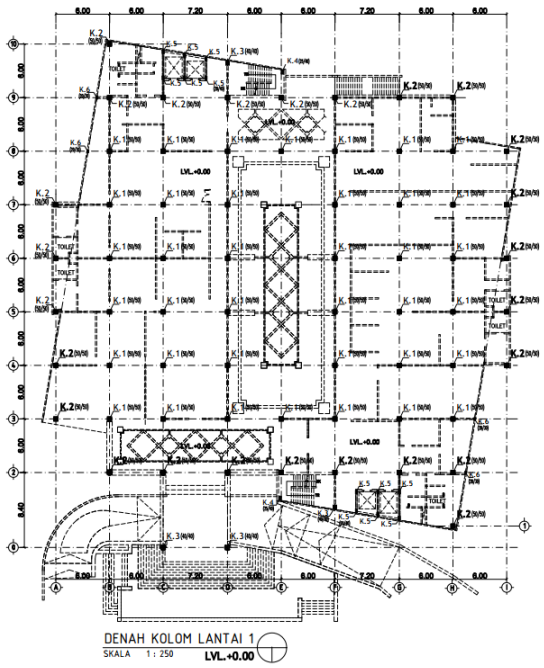

Image 1 Construction Site Plan

B. Volume of Work

Volume is counting the amount of job content in one unit. Volume is also referred to as Work cubication according to Bestek Picture and Detail Picture. volume arrangements arranged systematically with table lines with grouping of preparatory work, soil and foundation work, concrete structure work, wall work, floor and wall plaster work, frame work, doors and windows, ceiling work, paint work, roof work, sanitair, electrical installation work and water installation work.

Table 1 Duration of Each Work

NO	JOB DESCRIPTION	DURATION (WEEK)
I	**PREPARATORY WORK AND OTHERS**	75
II	**STRUCTURE WORK**	
A	EXCAVATION AND PILE UP WORK	
1	Sloof and Pile Cap Excavation Work	4
2	Striping Work	10
3	Pile Up and Compaction Soil Work	4
4	Pile Up Sand Work	1
B	PILE FOUNDATION WORK	6
C	LANE CONCRETE WORK	1
D	RIVER STONE FOUNDATION WORK	3
E	REINFORCED CONCRETE WORK (K250)	3
	GROUND FLOOR -3.60	3
	FIRST FLOOR +0.00	10
	SECOND FLOOR +3.96	12
	THIRD FLOOR +7.92	11
	FOURTH FLOOR +11.88	11
	ROOF +15.84	5
F	STEEL CONSTRUCTION WORK	2
III	**ARCHITECTURE WORK**	
A	WALL, BRICK, AND PLASTERING WORK	7
B	FLOOR WORK	6
C	DOOR FRAME, LEAF DOOR & WINDOW WORK	5
D	CEILING WORK	5
E	CURTAIN WALL FRAME WORK	3
F	PAINTING WORK	7
IV	**MECHANICAL & ELECTRICAL WORK**	
A	CLEAN AND DIRTY WATER INSTALLATION WORK	5
B	SANITATION SET WORK	4
C	LIGHTING INSTALLATION WORK	4
D	LIFT WORK	2

In the CPM, compile the components in the order of their dependency logic through the basis of making the working period, so it is known for activities from the beginning of the project until the completion of the project as a whole.

There are several possibilities that can occur from the relationships between activities that are organized into links for activities with the logic of dependence:

1. An activity may be carried out simultaneously with other activities.

2. An activity may be carried out if the reverse activity has been completed.
3. An occupation by itself without having to wait for the previous activity.

The sequence of activities in accordance with the logic of its dependence on the construction project Karawang Government Office, the sequence of activity - activity and the following can be in the table below:

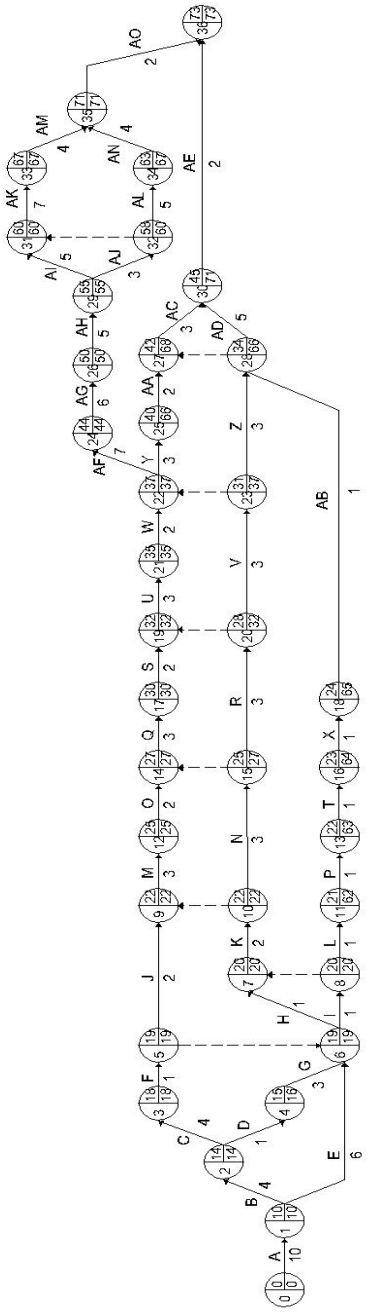

Image 2 Critical Path

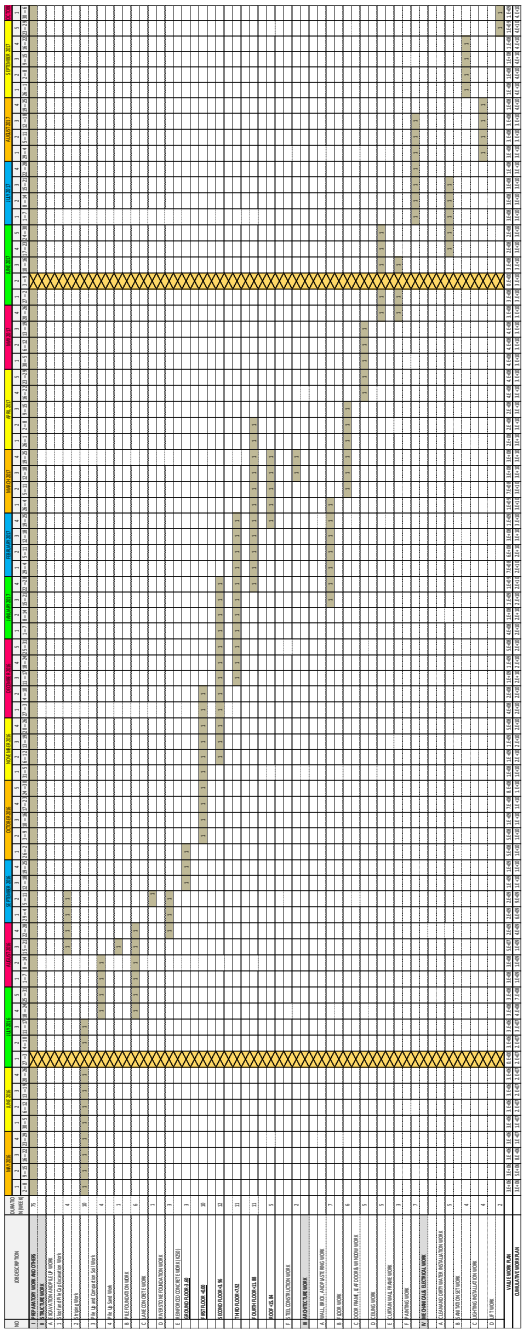

Image 3 S Curve

6. CONCLUSION

Based on the results of research analysis conducted on Karawang government office project implementation, It can be concluded :

1. Based on Budget Cost calculations to complete Karawang government office construction until the final stage, more or less costly Rp. 41.906.713.365,-
2. From the calculation of weight of work is estimated completion of Karawang

government office construction work takes 75 weeks.

3. With the CPM method can be known critical path occurs in the project are Excavation and Pile Up Work – Pile Foundation Work – River Stone Foundation Work – Reinforced Concrete Work – Wall, Brick, and Plastering Work – Door Frame, Leaf Door, and Window Work – Ceiling Work – Sanitation Set Work – Lighting Installation Work – Lift Work.

REFERENCES

Ir.Irika W M.T., Lenggogeni M.T., 2013., Manajemen Konstruksi, PT Remaja Rosdakarya Offset, Bandung.

A.D. Ausen., R.H. Neale., 1991., Memanajemeni Proyek Konstruksi, PT Pustaka Binaman Pressindo, Jakarta Pusat.

Wulfram I E., Manajemen Proyek Konstruksi., Andi, Yogyakarta.

Widyan Hadi Brian,. 2018., Analisis Produktivitas Pemancangan Dengan Alat Jack-In Pile Jenis Hydraulic Static Pile Driver Pada Proyek Apartemen Graga Golf Surabaya.

\

PUPR Karawang., 2016/2017,. Unit Price Analysis

Harold Kerzner, Ph.D. Project Management A Systems Approach To Planning, Scheduling, and Controlling.

State Administration Agency, 2007, Pretentious or Dummy Activity, Float Variation of an Activity.

Minister Rules No 11-PRT-M-2013.

Management Definition., 2013, Manajemen Konstruksi : Teknik Sipil, [online],(http://dessyblo.blogspot.co.id/2013/01/manajemen-konstruksi.html, accessed on January 2nd)

Management Construction,. 2014, Pengertian Manajemen Konstruksi [online], (http://sipilmyjob.blogspot.co.id/2014/12/pengertian-manajemen-konstruksi.html, accessed on January 2nd)

Budget Cost,. Budget Cost Building Project, [online] (http://arafuru.com/sipil/pengertian-rencana-anggaran-biaya-rab-proyek-bangunan.html, accessed on January 4th)

Budget Cost, 2010, Budget Cost Meaning, [online]

(http://vofifitriana.blogspot.co.id/2010/09/pengertian-rencana-anggaran biaya.html, accessed on January 4th)

Management of Cost, Time, and Project Quality, 2013, [online], (http://kampus-sipil.blogspot.co.id/2013/12/metode-manajemen-biaya-waktu-dan-mutu.html, accessed on January 9th).