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Acceleration Analysis of Bank SulutGo Lolak Branch Office Development Project Time

Deyke J. F. Mandang [1], Estrellita V. Y. Waney[2], Sherley Runtunuwu[3], Don Kabo[4*]
Manado State Polytechnic
Corresponding Author: Don Kabo donkabo74@gmail.com

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ABSTRACT

Project success is usually measured by short success time and minimal cost without ignoring the quality of the results. Construction project delays, namely procurement of materials that are not on schedule, labor performance that does not follow the current progress of the work, weather factors are also included in the delay in the implementation of work and the cause of delays in the project, one of which is the failure in the construction of the fence resulting in the collapse of the fence and the repetition of the work. The crash program method is one way that can be used to optimize time and cost in a project. This discussion uses time acceleration and the addition of overtime hours. means accelerating work that is on the critical path, each acceleration carried out will be evaluated based on the cost and how long the project can be accelerated in this way. The calculation results use time acceleration with the addition of overtime hours with the alternative used is the addition of working hours (overtime). The time of the project acceleration is 204 HK with a total project cost of Rp. 8,554,773,321.64, while the completion of normal time is 245 HK with a total project cost of Rp. 8,582,694,112.09. The acceleration result is a reduction in time of 41 HK with an additional total project cost of Rp. 27,920,790.45

INTRODUCTION

Construction projects are assessed based on time, cost, and quality. Success depends on contractors who are able to complete projects on time, efficiently, and with quality. However, delays often occur due to schedule inconsistencies with field conditions and project control challenges, which increase costs and reduce efficiency. This study calculates additional costs and time that can be saved by adding overtime hours in the construction of the Bank SulutGo Lolak Branch Office, which is useful for deepening knowledge about project management and time and cost optimization. Related Issues: In discussing the acceleration of project time by adding overtime hours, several important issues that must be considered include: the risk of decreased labor productivity due to fatigue, the potential for increased labor costs, and the impact on the quality of work results. In addition, the relevance of this study to the practical context in the field and its contribution to the development of the field of Applied Civil Engineering also need to be evaluated. Originality and Benefits: The topic discussed in this study has an original aspect in its application to the Bank SulutGo Lolak Branch Office construction project, where adding overtime hours is used as the main strategy to overcome delays. This study contributes to the development of a project time acceleration method, which can be applied to similar projects in the future. The results of this study are expected to provide new insights into construction project management, especially in optimizing time and cost with the time acceleration method by adding overtime hours.

Research on the construction of the IAIN Batola student dormitory building in Banjarmasin (Phase I) (Now, 2021) shows that adding overtime hours has a significant impact on the duration and cost of the project.

Without overtime: The project was completed in 210 days at a cost of Rp. 1,099,638,000.00.

- 1 hour overtime: The project was completed in 199 days (11 days faster) with an additional cost of Rp. 60,239,197.27, so that the total cost was Rp. 1,159,877,197.27.
- 2 hours overtime: The project was completed in 192 days (18 days faster) with an additional cost of Rp. 67,603,967.55, so that the total cost was Rp. 1,167,241,967.55.
- 3 hours overtime: The project was completed in 187 days (23 days earlier) with an additional cost of Rp. 75,432,408.04, so the total cost is Rp. 1,175,070,408.04.

The addition of overtime further reduces the project duration, but also increases the project cost gradually. Similar research was also conducted by (Aslinda Armalisa, Dessy Triana and Meassa Monikha Sari 2021) From the crashing analysis, it was obtained that the optimal time for adding 3 hours of overtime was to reduce the project duration from 115 days to 83 days with an additional cost of Rp. 423,098,748. Meanwhile, for 4 hours of overtime, the project duration was reduced from 115 days to 80 days with an additional cost of Rp. 496,684,545.4. And finally, research conducted by (Fika Giri Aspia Ningrum, Widi Hartono, 2017) found a total cost reduction of Rp. 1,012,856,772.54 from the normal cost of Rp. 90,620,898,879.84 to Rp. 89,608,042,107.30 with a duration of 392 days. For alternative work shifts, there was a greater cost reduction, namely Rp. 1,240,492,176.44, from Rp. 90,620,898,879.84 to Rp. 89,380,406,703.40 with a duration of 382 days. In the case of the construction of the Bank SulutGo Branch Office in Lolak, this project experienced a number of significant delays. The delays were caused by several factors such as material procurement that was not in accordance with the schedule, less than optimal workforce performance, and unfavorable weather conditions. One of the incidents that caused the delay was a failure in the construction of the fence which resulted in the collapse of the fence and required the work to be redone. This delay disrupted the initial plan to build a new branch office of Bank SulutGo which aims to expand services in the area.

METHODS

The method used in this study is a quantitative research method because this study is more directed at data analysis to solve a problem. The method and type of quantitative research is research that describes the condition of the project with analysis of existing data or is a method for solving a problem by collecting data, creating a network to determine the critical path using CPM (Critical Path Method) then analyzing the data and accelerating time by adding overtime hours. The final result that can be used as a conclusion from the research conducted.

The data used for this study include:

1. Budget plan (RAB)
2. S curve
3. AHSP North Sulawesi Province
4. Project plan drawing

RESULTS AND DISCUSSION

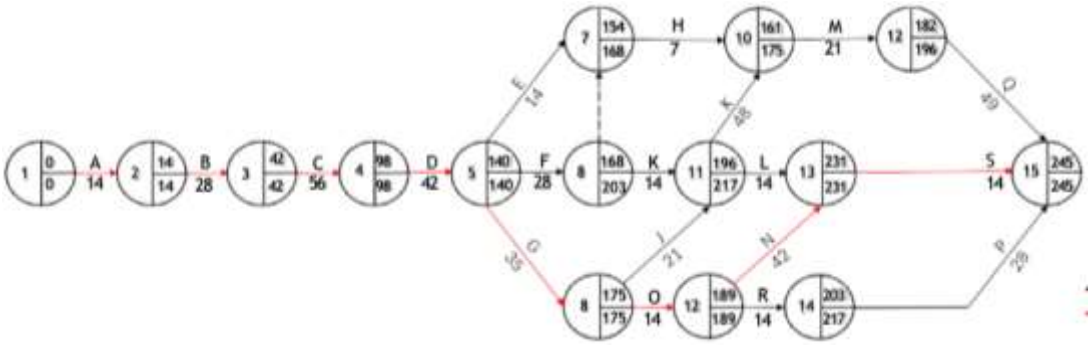

Figure 1. Critical Path Method (CPM)

Normal Activities

Normal Activity Path

Critical Activity Path

Table 1. List of Critical Jobs

Activity	Activity Name	Early		End	
		Start	Finished	Start	Finished
A	Preparation Work	0	14	0	14
B	Foundation Work	14	42	14	42
C	1st Floor Reinforced Concrete Work	42	98	42	98
D	2nd Floor Reinforced Concrete Work	98	140	98	140
E	Roof Reinforced Concrete Work	140	154	140	168
F	1st Floor Wall And Wall Coating Work	140	168	140	203
G	2nd Floor Wall And Wall Coating Work	140	175	140	175
H	2nd Floor Wall And Wall Coating Work	154	161	168	175
I	Roof Floor Door, Window And Stair Railing Work	196	161	217	175
J	Ceiling Work	175	196	175	217
K	1st Floor Floor Work	168	196	203	217
L	2nd Floor Floor Work	196	231	217	231
M	Roof Floor Work	161	182	175	196
N	Paint Work	189	231	189	231
O	Sanitary Work	175	189	175	189
P	Facade Work	203	245	217	245
Q	Mechanical And Electrical Work	182	245	196	245
R	Fire Fighting Work	189	203	189	217
S	Work Interior	231	245	231	245

Cost and Time Analysis and Calculation (Crashing)

Calculations are carried out one by one on activities or jobs that are passed through the critical path with the addition of 3 hours of overtime.

To calculate the acceleration time, use the formula, namely:

$$Crahing = \frac{A}{(B \times C) + (D \times E \times A)}$$

A = Volume

B = Productivity hourly

C = Working hours

D = Overtime

E = Decrease in Productivity

To calculate the acceleration cost using the formula:

$Overtime\ Cost$ = $(Hourly\ wage\ price\ x\ 1.5) + (2x2x\ Hourly\ wage\ price)x(Number\ of\ workers)$

$Acceleration\ cost = Normal\ Cost + Overtime\ Cost$

Crashing calculation on preparation work

$\frac{103^3,}{(0,92\times8)+(3\times0,6\times0,92)}$ = 11.42 days ~ 12 days

To calculate the acceleration cost get the result:

= Rp. 134,996,099.84

Crashing Calculation on Foundation Work

$\frac{65,22^3,}{(0,92\times8)+(3\times0,6\times0,92)}$ = 22.94 ~ 23 days To calculate the acceleration cost get the result:

= Rp. 624,163,205.48

Crashing calculation on reinforced concrete work on the 1st floor

$\frac{52,08^3,}{(0,92\times8)+(3\times0,6\times0,92)}$ = 44.22 days ~ 45 days For the calcion of acceleration costs, the results are:

= Rp. 1,888,282,708.36

Crashing Calculation On Reinforced Concrete Work on the 2nd Floor

$\frac{45,16^3,}{(0,13\times8)+(3\times0,6\times0,13)}$ = 35.45 days ~ 36 days

For the calculation of acceleration costs, the results are: = Rp.1.331.140.838,65

Crashing calculation on 2nd floor wall work

$\frac{93,28^3,}{(0,33\times8)+(3\times0,6\times0,33)}$ = 35.45 days ~ 36 days

For the calculation of acceleration costs, the results are: = Rp. 244.893.073,47

Crashing Calculations on Paint Jobs

$$\frac{205{,}90^{3},}{(0{,}61\times8)+(3\times0{,}6\times0{,}61)}$$ = 34.44 days ~ 35 days

For the calculation of acceleration costs, the results are: = Rp. 213.609.284,23

Crashing Calculations on Sanitary Work

$$\frac{9{,}00\ bh,}{(0{,}08\times8)+(3\times0{,}6\times0{,}08)}$$ = 11.47 days ~ 12 days

For the calculation of acceleration costs, the results are: = Rp. 116.918.988,25

Crashing Calculations on Interior Work

$$\frac{9{,}00\ bh}{(0{,}08\times8)+(3\times0{,}6\times0{,}08)}$$ = 11.48 days ~ 12 days

For the calculation of acceleration costs, the results are: = Rp. 204.404.395,15

Comparison Before and After Acceleration

Table 2. Changes in Total Costs

Stage	Normal Duration	Acceleration Duration	Difference Duration	Normal Cost	Cost	Difference Cost
Normal	245	-	-	8.582.694.112,09	-	-
Crashing	245	204	41	8.582.694.112,09	8.554.773.321,64	27.920.790,45

From table 2, it can be seen that the change in the total project cost from the acceleration of time is more expensive with a total value of additional costs reaching Rp. 27,920,790.45. The increase in the total project cost is due to the increase in direct costs and indirect costs that occur during the acceleration process.

CONCLUSION

The cost after the project was accelerated was Rp. 27,920,790.45 with the acceleration cost after the project of Rp. 8,554,773,321.64. The project completion time after acceleration was 204 working days with the addition of 3 hours of overtime. The difference in working days was 41 days from the planned 245 days.

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