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Original Article

Time and Cost Analysis Using the Fast Track Method in the ITS Bank Building Construction Project

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Abstract

Higher education institutions are required to provide a conducive learning environment to produce excellent and competitive human resources. One of the keys supporting factors is the availability of adequate infrastructure, including accessible financial services within the campus. Institut Teknologi Sepuluh Nopember (ITS) responded to this need by constructing a banking building as part of its efforts to create an integrated digital campus ecosystem. However, the project faced significant delays from the original schedule, prompting the need for acceleration strategies that maintain both cost and quality. One such strategy is the Fast Track method, which allows construction activities to be carried out in parallel to shorten the project duration. This study aims to analyze the project's time and cost using the Fast Track method, a project acceleration technique that enables activities to be performed simultaneously to reduce execution time. The research was conducted on the ITS Banking Building construction project, which has a contract value of Rp 11,871,000,000 and a planned duration of 120 calendar days. The analysis involved identifying critical activities using the Critical Path Method (CPM) and then rescheduling using the Fast Track approach to calculate the optimal time and cost. The results of the study show that the optimal project duration after applying the Fast Track method is 112 working days, which represents a 6.7% reduction from the original 120 days. The optimal cost after acceleration using the Fast Track method is Rp 9,696,512,763, representing a 9.3% reduction from the initial cost of Rp 10,694,683,195pa.

Keywords: Fast Track, Project Delay, Time and Cost, Critical Path Method.

1. Introduction

Delays in construction projects are a common issue that significantly affect project success, particularly in terms of completion time, quality of outcomes, and budget (Buya et al., 2022; Wirabakti et al., 2017). In the context of constructing a banking facility within a higher education institution such as ITS, project delays can impact not only institutional operations but also hinder services for the academic community that rely on integrated and efficient financial access. Therefore, effective time and cost management are essential to ensure the successful development of campus infrastructure.

Modern construction project management demands an integrated approach that aligns scheduling with cost efficiency. The Critical Path Method (CPM) is one of most popular techniques used to determine the critical activities in project planning (Rakasyiwi et al., 2022). This is a way for project planners to determine which tasks are so important, if they slip or delayed, the project itself is directly extended. However, even with CPM-based scheduling, delays may still occur due to field conditions, design changes, or weather disruptions.

A project's success largely depends on how well time and cost are planned and controlled. The Critical Path Method assists in determining the project's longest sequence of tasks and highlights activities that must not be delayed as they affect the total duration (Isnubroto et al., 2024). Moreover, CPM emphasizes the importance of inter-task relationships to identify the correct sequence of work. Each activity may have multiple predecessors and successors (Sholahuddin & Octavia, 2024).

In addressing project delays, acceleration methods such as Fast Track are increasingly being applied to shorten project durations by executing activities in parallel that were initially planned sequentially (Klau et al., 2024). Although this method has the potential to significantly reduce the overall project time, its implementation requires careful coordination and rescheduling of interdependent activities. In the case of the ITS Banking Building construction project, there are indications of delays in work progress, thus necessitating a well-measured and effective acceleration strategy. Therefore, the application of the Fast Track method in this study becomes a crucial focus to evaluate potential time and cost optimization.

The Fast Track method accelerates project execution by carrying out sequential activities simultaneously, without requiring substantial additional resources (Lalu et al., 2019; Rahayu et al., 2018). However, its application must be carefully analyzed, as it may pose risks due to schedule adjustments and increased interaction among activities (Fazio et al., 1988). This method offers the advantage of reducing project duration without incurring unexpected additional costs (Abrar et al., 2022).

The primary objective of this research is to analyze the effectiveness of the Fast Track method in accelerating time and achieving cost efficiency in the ITS Banking Building construction project. Specifically, this study aims to answer three main questions: (1) What is the critical path of the project? (2) What is the optimal duration after implementing the acceleration method? and (3) What is the optimal cost required? This research contributes significantly to the field of construction management, particularly in the application of project acceleration methods based on the Critical Path Method and Fast Track in educational infrastructure projects. The study is expected to provide practical guidance for contractors, project managers, and academics in planning and controlling time and cost more effectively, especially in construction projects within educational institutions.

2. Literature Review

2.1. Construction Project

In general, a construction project is a complex undertaking that involves various types of work to complete it. The larger the project budget, the higher the level of complexity involved. Issues that may arise in relation to this include delays in completion time and cost overruns (Anggraini, 2019).

2.2. Project Objectives and the Triple Constraints

As noted by Abrar et al. (2022), every project has specific objectives, such as constructing a residential house, a bridge, or a factory installation, and may also include products resulting from research and development efforts. In the process of achieving these objectives, there are constraints that must be met, namely the allocated budget (cost), the project schedule (time), and the required quality (scope/quality).

2.3. Project Management

According to Fadhlurrahman et al. (2024) project management is an integrated process in which individuals, as part of an organization, are involved in maintaining, developing, controlling, and executing a program by utilizing limited resources efficiently, effectively, and in a timely manner to complete a planned project. All of these efforts are directed toward predetermined goals and are carried out continuously over time.

2.4. Construction Costs

According to Musli et al. (2023), construction costs are the expenses incurred to carry out a project. Financing policies are generally influenced by the financial condition of the company concerned.

2.5. Critical Path Method (CPM)

2.5.1. Definition of CPM

The Critical Path Method (CPM) is a project management technique used to plan and manage projects by focusing on the critical path, which is the sequence of activities that determines the total project duration. To create a work network and identify the critical path using the CPM method, the process begins by preparing a project schedule in Microsoft Project. In project management, project activities are tasks or actions that must be completed to achieve the project's objectives. The sequence of work refers to the order in which these activities must be performed to ensure the project runs smoothly (Saputra et al., 2024).

2.5.2. Network Planning

To create a work network, it is essential to first identify all the activities involved in a project, the duration of each activity, and the dependencies between activities (predecessor and successor activities). Each activity must have clearly defined predecessor and successor activities. In CPM, the method used is Activity on Arrow (AOA), where activities and their durations are represented along arrows. Below are the key elements in CPM.

2.6. Microsoft Project Program

According to Isnubroto et al. (2024), Microsoft Project is a computer application/software that can be used to plan and manage project management. Scheduling and monitoring activities can be carried out using this software.

2.7. Fast Track Method

The advantage of the Fast Track method is that project duration can be shortened without incurring unexpected additional costs. After inputting data into Microsoft Project, the activities on the critical path can be identified. The critical path refers to tasks that have no float time. These critical path activities are the ones targeted for acceleration. Accelerating tasks on the critical path will affect other related activities, ultimately influencing the overall project duration (Wijanarko & Oetomo, 2019).

3. Methods

3.1. Research Design or Research Flow Diagram

The research subject in this study is the contractor responsible for executing the ITS Banking Building construction project, namely CV. Poltek Nasional.

3.2. Research Object

In this study, the research objects are the project implementation time schedule document, the budget plan document (RAB), and the weekly project progress reports.

3.3. Research Location and Time

This research was conducted on the construction completion project of the ITS Banking Building.

3.4. Data Collection Procedure

The steps and techniques of data collection aim to determine the necessary parameters and the appropriate method for collecting data. The steps taken are as follows, a) Formulating the objectives of data collection, b) Determining data parameters, c) Determining the method of data collection, The methods used in data collection include observation and documentation methods.

3.5. Data Analysis

In this study, the Fast Track method will be used, particularly in project scheduling. The project to be scheduled is the construction of the ITS Banking Building. In the Fast Track method, there are two types of time and cost estimates for each activity in the work network: the normal time and cost estimate, and the crash (accelerated) time and cost estimate.

4. Results and Discussion

4.1. Project Contract Data

Project contract data is a crucial element in the planning and execution of a construction project, as it includes fundamental information that serves as a primary reference for time and cost control. The ITS Banking Building construction project has an execution period of 120 calendar days and a maintenance period of 180 calendar days. To support this research, the following project data is required:

Project Name : ITS Banking Building Construction Project
Supervising Consultant : CV. Ideatama Karya
Consultant Contract Value : Rp 196,106,400
Executing Contractor : CV. Poltek Nasional
Contractor Contract Value : Rp 11,871,000,000
Project Duration : 120 Calendar Days
Maintenance Period : 180 Calendar Days

4.2. Project Budget Plan

The data used in this research is sourced from secondary data. Secondary data refers to data obtained from other parties that are relevant to the issues addressed in this study. In this research, the secondary data used includes the Budget Plan and Time Schedule.

Table 1. Project Budget List

No	Work Item	Amount (IDR)
1	Preliminary Works	31,490,436.20
2	Sitework	64,930,970.00
3	Building Works	
	– Foundation Work (KJRB)	2,092,741,634.00
	– Superstructure Work (Concrete)	1,623,009,492.27
	– Architectural Work	4,250,117,653.98
	– Mechanical, Electrical & Plumbing (MEP)	1,045,304,393.10
4	Road & Parking Work	661,118,053.98
5	Drainage & Bridge Work	144,911,661.99
6	Landscaping Work	668,354,199.93
7	Utility Connection Fees	107,705,000.00
8	Final Cleaning	5,000,000.00
	Total	10,694,683,195.14

Source: Research Data, 2025

The cost breakdown is divided into eight main categories of work, each with a different cost proportion according to the complexity and technical requirements of the respective tasks.

4.3. Discussion Using the Critical Path Method

After all the necessary data were entered into the Microsoft Project application, it was determined that the duration of the ITS Banking Building construction project is 120 working days. This duration was established based on the logical sequence of activities, the estimated execution time of each task, and the interdependencies among the jobs, all of which were systematically inputted. Based on the analysis results using Microsoft Project, several types of work were identified as being on the critical path, as follows:

A. Road & Parking Works

1. Preparation
   a) 501 – Mobilization & Demobilization of Heavy Equipment – 7 days
   b) 502 – Surveying (Uitzet) and Installation of Bouwplank (Road) – 7 days
2. Road Elevation Raising
   a) 504 – Backfilling with Sirtu and Compaction (Layer 1) – 14 days
3. Access Road Elevation (South Side – Arief Rahman Hakim)
   a) [Activities not specified]
4. Paving Supply and Installation
   a) 519 – Stone Dust Layer – 21 days
   b) 520 – Natural Concrete Paving Block (8 cm thick) – 21 days
   c) 521 – Colored Concrete Paving Block (8 cm thick) – 21 days
   d) 522 – Natural Concrete Paving Block (6 cm thick) – 21 days
   e) 523 – Colored Concrete Paving Block (6 cm thick) – 21 days
   f) 524 – Stopper/Uskup Installation (Grey) – 21 days
   g) 525 – Concrete Kerb Installation (Size: 60/28/15 cm) – 21 days
   h) 526 – Kerb Installation at Road-End Meeting Asphalt (Size: 60/28/15 cm) – 21 days

B. Drainage & Bridge Works

1. General Works
   a) 531 – Mobilization & Demobilization of Heavy Equipment – 21 days
   b) 532 – Excavation for Box Culvert DUB 2x(300.200) – 21 days
2. Dewatering Works
   a) 534 – Sandbag Cofferdam Installation (Size: 43x65 cm) – 21 days
   b) 535 – Pump Operation – 21 days
3. Precast Concrete Box Culvert Works
   a) 536 – Supply of Precast Box Culvert Monolith Top 3000.2000.12000 with 20-Ton Axle Load, 1-Side Tread – 21 days
   b) 537 – Precast Box Culvert Monolith Bottom 3000.2000.12000 with 20-Ton Axle Load – 21 days
   c) 538 – Supply of Precast Box Culvert Monolith Top 3000.2000.12000 with 20-Ton Axle Load, 2-Side Tread – 21 days
   d) 539 – Tread Plate Installation (200/300) for 20-Ton Axle Load – 21 days
   e) 540 – Bamboo Pile Installation, 8–10 cm Diameter, Spaced 40 cm over 4 m (for Box Culvert) – 21 days

4. Concrete and Backfilling Works
   a) 541 – Lean Concrete Casting (f'c 8 MPa, K.100), 10 cm thick – 21 days
   b) 542 – Compacted Sand Backfill (10 cm thick) – 21 days
   c) 543 – Backfilling of Box Culvert – 21 days
   d) 544 – Top Slab Concrete Casting (f'c 20.75 MPa, 15 cm thick) – 21 days
   e) 545 – Wiremesh Reinforcement Installation (M8-150, for top of box culvert) – 21 days

C. Landscape Works

1. Garden Works
   a) 549 – Backfill for Land Elevation (using excavation soil) – 21 days
   b) 550 – Garden Soil Backfill – 21 days
   c) 551 – Planting of Dwarf Elephant Grass – 21 days
   d) 552 – Planting of Ketapang Kencana Trees (Height: 5 m) – 21 days

2. Street Lighting Works

   Excavation & Backfill
   a) 554 – Excavation for Cables – 7 days
   b) 555 – Backfilling of Cable Trenches – 7 days

   Feeder Cable Installation
   a) 557 – Feeder Cable NYFGBY 4x16 mm (from PJU Panel to LVMDP Panel) – 7 days
   b) 558 – Feeder Cable NYFGBY 4x6 mm (from PJU Panel to Lamp) – 7 days
   c) 559 – PVC Pipe dia. 2" (Type AW) for Cable Conduits – 7 days
   d) 560 – PVC Pipe dia. 1.5" (Type AW) for Cable Conduits – 7 days
   e) 561 – Galvanized Water Pipe 2" x 2 mm – 7 days
   f) 562 – Galvanized Water Pipe 1.5" x 2 mm – 7 days

   Street Light Installation
   a) 564 – PJU Light Installation – 7 days
   b) 567 – NYY Cable Installation 3x2.5 mm (with conduit) – 7 days

   Panel Connection Equipment
   a) 569 – MCB 1 Phase 2 A/4.5 kA – 7 days
   b) 570 – Junction Box/Inbow Box 15x15 cm – 7 days
   c) 572 – Lamp Pole Ornament, Single Arm – 7 days
   d) 573 – Lamp Pole Ornament, Triple Arm – 7 days
   e) 574 – Concrete Pole Installation, Dia. 200 mm, Height 9 m – 7 days
   f) 575 – Control Box, Size 30x30x40 cm – 7 days
   g) 576 – Site-Mixed Concrete – 7 days
   h) 577 – Reinforcement Steel P6-100 – 7 days
   i) 578 – Formwork – 7 days
   j) 579 – Foundation for Concrete Pole – 7 days
   k) 580 – Drilling for Concrete Pole Installation – 7 days

   Building Drainage Works
   a) 583 – Excavation Work – 21 days
   b) 584 – Installation of Open U-Ditch Concrete 40x60 cm – 21 days
   c) 585 – Installation of Covered U-Ditch Concrete 40x60 cm – 21 days
   d) 586 – Installation of Open U-Ditch Concrete 30x40 cm – 21 days
   e) 597 – Installation of Covered U-Ditch Concrete 30x40 cm – 21 days
   f) 598 – Backfilling – 21 days

Utility Connection Costs

a) 591 – Electricity Connection Fee (13,200 VA – PLN) – 7 days
b) 592 – Clean Water Installation Fee (PDAM) – 7 days

Final Cleaning Works

a) 596 – Site Cleaning – 7 days

The activities on the critical path have long durations and large volumes of work, as described in the table above. Upon analysis, it was found that several activities scheduled at the beginning actually occur toward the end of the project, resulting in no time float. These activities include, 1) Road and parking works, 2) Drainage and bridge works, 3) Landscape works, 4) Utility connection costs, 5) Final cleaning works.

4.4. Acceleration Duration Analysis Using the Fast Track Method

The Fast Track method is a project acceleration strategy by carrying out certain activities in parallel or overlapping, which would normally be performed sequentially. Based on the analysis using Microsoft Project, several types of work identified on the critical path can be executed in parallel or with overlap namely, 1) Drainage and bridge works, 2) Landscape works, 3) Utility connection works.

Table 2. Duration Analysis

No	Type of work	Duration Fast Track (Day)
1	Drainage and bridge works	21
2	Landscape works	21
3	Utility connection works	7

Source: Research Data, 2025

There are specific conditions for time acceleration using the Fast Track method, where the duration can be shortened by less than 50%. Therefore, for ease of calculation, it is assumed that the duration is accelerated by 50%. The following is the calculation for applying the Fast Track method to activities on the critical path, specifically the procurement and installation of paving blocks, which in the initial schedule had a duration of 21 days. This can be accelerated as follows:

I = 50% × 21 days
= 10.5 days ~ 11 days
Acceleration = Initial duration – Fast Track duration
= 21 days – 11 days
= 10 days

Thus, the procurement and installation of paving works experience an acceleration of 10 days. The results of this analysis serve as the basis for evaluating the effectiveness of the Fast Track method in accelerating the completion of the ITS Banking Building construction project without compromising cost stability and work quality. It can be concluded that the application of the Fast Track method has reached its maximum potential, and no new critical paths have emerged. Therefore, based on the reduced project duration shown in the Microsoft Project analysis, the ITS Banking Building project can reduce the schedule by 8 days—from the original 120 days to 112 days. This means the construction project has been accelerated by approximately 6.7% from the initial schedule.

4.5. Cost Analysis Using the Fast Track Method

In this project, the direct cost accounts for 90%, while the indirect cost accounts for 10%, which consists of 4% for overhead and 6% for profit. After implementing the Fast Track method in the project, the additional costs incurred are as follows:

1) Reduced Cost
   = Indirect cost per day × Reduced time from Fast Track
   = Rp 8,912,236 × 112 days
   = Rp 998,170,431
2) Total Indirect Cost
   = Original indirect cost – Reduced cost
   = Rp 1,069,468,319 – Rp 998,170,431
   = Rp 71,297,887
3) Total Fast Track Cost
   = Direct cost + Total indirect cost
   = Rp 9,625,214,875 + Rp 71,297,887
   = Rp 9,696,512,763
4) Cost Savings
   = Normal cost – Total Fast Track cost
   = Rp 10,694,683,195 – Rp 9,696,512,763
   = Rp 998,170,431

4.6. Comparison of Optimal Time and Cost with Normal/Initial Planned Time and Cost

Based on the calculations using the Fast Track method, the results are as follows:

Table 3. Fast Track Calculation Results

No	Description	Duration (Days)	Direct Cost	Indirect Cost	Total Cost
1	Normal	120	Rp 9,625,214,875	Rp 1,069,468,319	Rp 10,694,683,195
2	Fast Track	112	Rp 9,625,214,875	Rp 71,297,887	Rp 9,696,512,763

Source: Research Data, 2025

Based on the table 3 above, a comparison chart of cost and time between the Fast Track method and the normal project schedule will be created as follows:

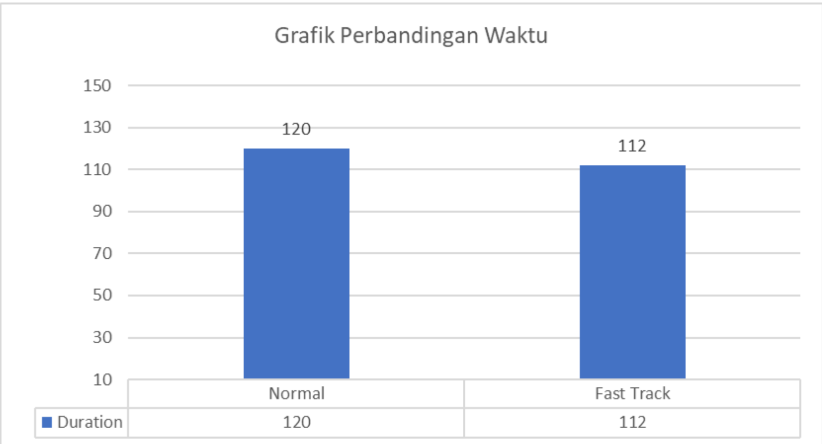

Figure 1. Time Comparison Chart
Source: Research Data, 2025

The optimal time after implementing the Fast Track method in the ITS banking building construction project is 112 working days, which represents a 6.7% reduction from the initial plan of 120 days.

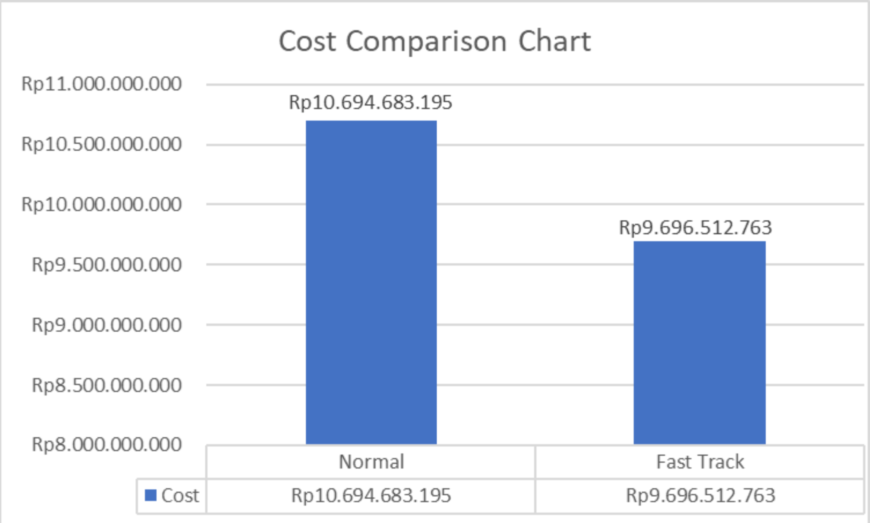

Figure 2. Cost Comparison Chart
Source: Research Data, 2025

The optimal cost after applying the Fast Track acceleration method is Rp 9,696,512,763, which is 9.3% less than the initial cost of Rp 10,694,683,195. Based on the calculation results, it can be concluded that the Fast Track method is effective for implementation in the ITS Banking Building construction project, as it results in reduced project duration and provides an opportunity to optimize project costs.

5. Conclusion

In accordance with the objectives of the study and the results of the discussion, the following conclusions can be drawn, 1) Based on the analysis using Microsoft Project software, several work items fall on the critical path namely, a) Road and parking works, b) Drainage and bridge works, c) Landscape works, d) Utility connection costs, e) Final cleaning works. 2) The construction schedule for the ITS Banking Building project can be accelerated to 112 days, which is a 6.7% reduction from the original plan of 120 days. 3) The optimal cost resulting from acceleration using the Fast Track method is Rp 9,696,512,763, or 9.3% lower than the initial estimated cost of Rp 10,694,683,195.

To improve the quality and detail of future research, several suggestions can be considered, 1) In every construction project, management and control should always be conducted, especially for activities on the critical path, by enforcing work discipline according to the planned schedule to ensure the project progresses as targeted. 2) Research using the Fast Track analysis can be further developed, and it is hoped that future researchers will explore alternative acceleration methods that are more effective and efficient.

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