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Evaluation of Scheduling for the Construction of the Jejangkit Bridge Using the Microsoft Project Application Due to Work Delays

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A R T I C L E I N F O

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A B S T R A C T

The Jejangkit Bridge construction experienced delays due to material shortages and implementation constraints. This study aims to evaluate project scheduling using the Microsoft Project application with the PDM method. Data were sourced from the S-Curve, Contract Quality Plan, and project reports. The results show that the planned project duration was 225 days, while actual implementation reached 240 days due to delays. By applying overtime in key activities, the project could be rescheduled to meet the original timeline.

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INTRODUCTION

Every project implementation requires good project scheduling management. A project is considered successful if its completion is efficient in terms of time, as the time factor is one of the most critical aspects in project delivery. Therefore, proper time management analysis is essential, especially in complex projects such as bridge construction which involves multiple interrelated work items.

Previous studies on construction project management have generally focused on planning techniques such as CPM, PERT, or the use of general project control tools. However, limited attention has been given to rescheduling efforts when projects experience delays due to field constraints such as material shortages, equipment unavailability, or implementation obstacles. This creates a research gap, particularly in evaluating how scheduling tools can be applied to overcome such delays in bridge projects.

In the case of the Jejangkit Bridge construction, several obstacles were encountered. These included delays in the availability of reinforcement materials, late delivery of concrete mixer trucks during casting, and delays in minipile installation due to casting and embankment obstructions. In addition, shortages of formwork materials such as polywood boards caused further disruption, as the same formwork was still being used on the Jejangkit Bridge before it could be transferred to the Bahandang Bridge project. These issues led to project delays that were not initially anticipated, making the actual implementation deviate from the planned schedule.

Therefore, rescheduling is required by considering the constraints found in the field. Microsoft Project, which incorporates the Precedence Diagram Method (PDM), can be used as an effective tool to plan, analyze, and control project schedules. This software allows for the identification of the critical path, the total project duration, and the rescheduling of delayed activities, thereby improving the efficiency and effectiveness of project management.

The objective of this study is to evaluate the scheduling of the Jejangkit Bridge construction project using Microsoft Project with the PDM method, in order to identify the impact of delays and to propose rescheduling strategies so that the project can meet its planned completion time.

THEORETICAL REVIEW

Microsoft Project is a project management software designed to schedule, plan projects, manage resources, and track time efficiently. This application compiles a critical path schedule and provides incident chain methodology and critical chain with support from third parties. Existing schedules can be leveled using resources, and the chain can be visualized in the form of a Gantt chart. In addition, Microsoft Project is able to recognize various user classes, each of which has a different level of access to projects, views, and other data. The features of Microsoft Project include project planning, communication and collaboration, co-authoring, reporting, roadmap, and others.

In general project management theory, several methods are commonly used as the basis for scheduling. The Critical Path Method (CPM) is a scheduling technique that determines the sequence of critical activities and calculates the

minimum project duration. The Program Evaluation and Review Technique (PERT) applies probabilistic time estimates—optimistic, most likely, and pessimistic—to identify the expected duration and uncertainties in project completion. Meanwhile, the Precedence Diagram Method (PDM), which is widely applied in Microsoft Project, represents activities in a network diagram with logical relationships such as Finish-to-Start, Start-to-Start, Finish-to-Finish, and Start-to-Finish. These methods provide the foundation for analyzing delays, optimizing resource allocation, and ensuring that project completion aligns with the planned timeline.

METHODOLOGY

The methodology in this research includes a case study on the Jejangkit Bridge which was built in Jejangkit 2 and Bahandang Village, Barito Kuala Regency, South Kalimantan. The type of data used is secondary data. The data source is obtained directly from the Jejangkit Bridge package construction project:

1. Time Schedule
2. Implementation Method
3. Project Report

In order for the research process to run smoothly, primary data and supporting data are needed. The data in question are as follows:

1. Management of S-Curve or Time Schedule that aims to obtain the type of work required, as well as the details of manpower and duration needed for each type of work.
2. Identification of the implementation method to obtain work dependencies and slack.
3. Development of a Microsoft Project Plan model.
4. Development of a Microsoft Project Realization/Constraint Simulation model that aims to identify the total duration and the impact of delays in activities.
5. Development of a Microsoft Project Problem Solution model that aims to obtain a total duration in accordance with the Microsoft Project Plan.

Data validation was carried out by cross-checking secondary data (time schedules, methods, and reports) with the official Contract Quality Plan and S-Curve documents, as well as confirming information through discussions with project supervisors. This validation ensured that the data used in the analysis were accurate, reliable, and consistent with actual field conditions.

RESULTS AND DISCUSSION

Work item is an item that refers to a unit of task or action given to someone to complate. Here are some work items and durations on the Jejangkit Bridge construction project :

Table 1. Work Item and Duration

No	Nama Item Pekerjaan	Days	Predecessor	Lagtime
1.	**DIVISI 1. UMUM**			
2.	**Jembatan Sementara**			
3.	Pembuatan Jembatan Sementara	63		
4.	Pembongkaran Jembatan Sementara	7	3FS+148 Days	
5.	Pengeboran, termasuk SPT dan Laporan	28	45	5+3WK→31
6.	**DIVISI 3. PEKERJAAN TANAH & GEOSINTETIK**			
7.	Galian Biasa	14	29SS-6 Days	7+6WK→29
8.	Galian Struktur Kedalaman 0-2 meter	14	7	8+6WK→23
9.	Timbunan Pilihan dari Sumber Gallian	14	32SS+ 7 Days	
10.	Geotekstil Separator Kelas 1	28	26FF+7 Days	
11.	**DIVISI 5. PEKERASAN BERBUTIR**			
12.	Lapis Pondasi Agregat Kelas A	28	13FF	
13.	Lapis Pondasi Agregat Kelas B	21	27SS+21 Days	
14.	**DIVISI 6. PERKERASAN ASPAL**			
15.	Lapis Resap Pengikat - Aspal Cair/Emulsi	7	12FF	
16.	Lapis Perekat - Aspal Cair/Emulsi	7	15FF	
17.	Laston Lapis Aus (AC-WC)	7	18FF	
18.	Laston Lapis Antara (AC-BC)	7	15FF	
19.	Bahan Anti Pengelupasan	7	18FF	
20.	**DIVISI 7. STRUKTUR**			
21.	Beton Struktur, fc'30 MPa	119	25SS+7 Days	
22.	Beton Struktur, fc'20 MPa	14	21FF-35 Days	22+3WK→26
23.	Beton, fc' 10 MPa	105	8SS+5 Days	
24.	Baja Tulangan Polos-BjTP 280	133	23SS-28 Days	
25.	Baja Tulangan Sirip-BjTS 420B	126	24SS+7 Days	

26	Penyediaan Baja Struktur Grade 345 (Kuat Leleh 345 MPa)	49	22SS-7 Days	
27	Pemasangan Baja Struktur	35	36FF	
28	Fondasi Cerucuk, Penyediaan dan Pemancangan	14	46FS+21 Days	
29	Dinding Turap Baja, Penyediaan dan Pemancangan	84	40SS-28 Days	
30	**Penyediaan Tiang Pancang Beton Pratekan Pracetak ukuran 200 mm x 200 mm**			
31	Penyediaan Tiang Pancang Beton Pratekan Pracetak ukuran 200 mm x 200 mm (a)	42	5FS+21 Days	
32	Penyediaan Tiang Pancang Beton Pratekan Pracetak ukuran 200 mm x 200 mm (b)	14	10FF	
33	Penyediaan Tiang Pancang Beton Pratekan Pracetak ukuran 500 mm	105	35SS+14 Days	
34	**Pemancangan Tiang Pancang Beton Bertulang Pracetak ukuran 200 mm x 200 mm**			
35	Pemancangan Tiang Pancang Beton Bertulang Pracetak ukuran 200 mm x 200 mm (a)	42	5FS+21 Days	
36	Pemancangan Tiang Pancang Beton Bertulang Pracetak ukuran 200 mm x 200 mm (b)	7	32FF	
37	Pemancangan Tiang Pancang Beton Pratekan Pracetak ukuran 500 mm	91	33SS+14 Days	
38	**Pengujian Pembebanan Dinamis Jenis PDLT (Pile Dynamic Load Testing)**			
39	Pengujian Pembebanan Dinamis Jenis PDLT (Pile Dynamic Load Testing) (a)	7	37SS+14 Days	39+2WK→ 40
40	Pengujian Pembebanan Dinamis Jenis PDLT (Pile Dynamic Load Testing) (b)	7	39FS+14 Days	
41	Pasangan Batu	42	46FS+21 Days	
42	Sambungan Siar Muai Tipe Asphaltic Plug, Fixed	7	9SS	
43	Sandaran (Railing)	7	41FF-7 Days	43+1WK→ 50
44	Papan Nama Jembatan	7	17FF-7 Days	44+1WK→ 4
45	Pembongkaran Lantai Jembatan Kayu	7	3SS	
46	Pipa Drainase Baja diameter 100 mm	14	42SS-63 Days	46+3WK→ 28 46+3WK→ 41
47	**DIVISI 9. PEKERJAAN HARIAN & PEKERJAAN LAIN-LAIN**			
48	Marka Jalan Termoplastik	7	17FF-7 Days	
49	Rambu Jalan Tunggal dengan Permukaan Pemantul Engineering Grade	7	17FF-7 Days	
50	Patok Pengarah	7	49FF+16 Days	
51	Unit Lampu Penerangan Jalan Lengan Tunggal, Tipe LED	7	49	

Source : Jejangkit Bridge Project

1. Microsoft Project Plan

The following are the results of the project plan work calculation using Microsoft Project

Figure 1. Microsoft Project Plan

In the calculation using Microsoft Project Plan, the total project duration is 225 days. It is known that there are 30 work items that are considered critical, which means that if one of the critical jobs is delayed due to several obstacles, the total duration of the project will change.

2. Microsoft Project Realization model

Microsoft project realization model is the stage of implementing the Jejangkit Bridge project that reflects the construction activities that actually occur in the field, both in terms of time, work order, and resource users. Simulating constraints can help ensure that the project can be completed on time, cost-effectively and with good quality. Here is a simulation of the constraints in the Jejangkit Bridge project:

a) Plain Reinforcing Steel Work-BJTP 280Reinforcement work, the start date on the plan is August 5, 2024 and the end date is December 15, 2024 with a duration of 19 weeks. While in the field the start date is August 15, 2024 and the end date is December 25, 2024 which has been postponed.
b) Fin Reinforcement Steel Work-BJTS 420B
Reinforcement work, namely Fin Reinforcement Steel-BJTS 420B,the start date on the plan is August 12, 2024 and the end date is December 15, 2024 with a duration of 18 weeks. While in the field the start date is August 22, 2024 and the end date is December 25, 2024 which has been postponed.
c) Precast Reinforced Concrete Pile Driving Work measuring 200MM X 200MM(b)
Minipile Piling Work, the start date on the plan is December 9, 2024 and the end date is December 15, 2024 with a duration of 1 week. While the start date in the field is December 24, 2024 and the end date is December 30, 2024 which has been delayed.

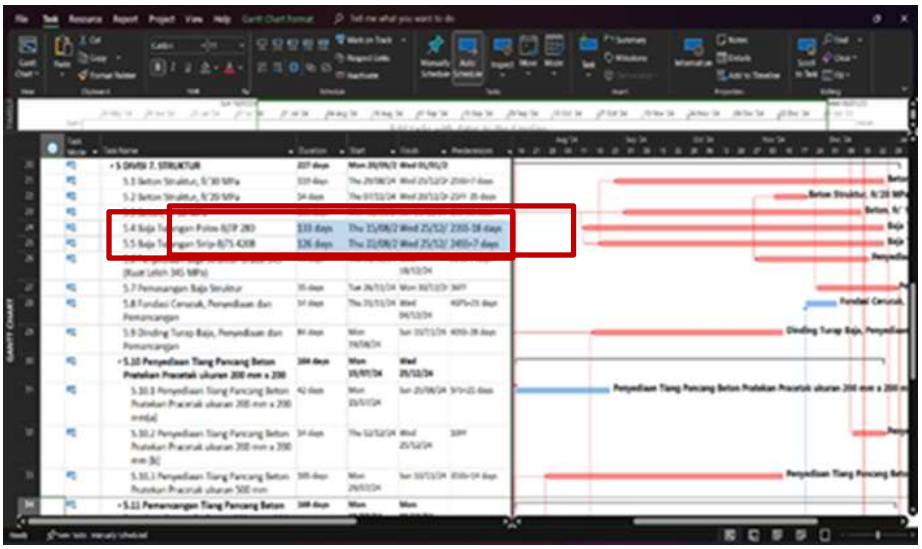

Figure 2. Microsoft Project Realization

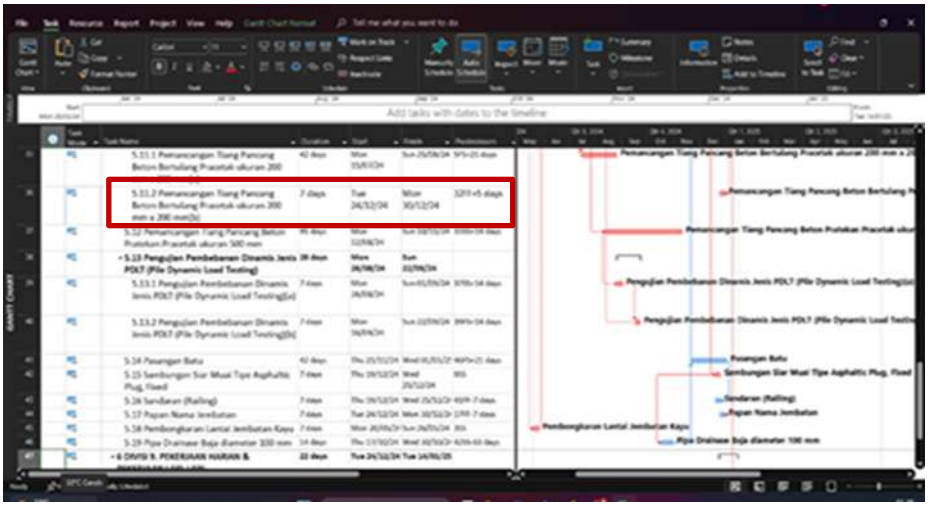

Figure 3. Microsoft Project Realization

The total duration of the project after simulating the three project delays obtained the total duration of the project is 240 days, which is from May 20 2024 to January 14, 2025 as seen in the picture above. The total duration of the project plan is 225 days.

3. Microsoft Project Problem Solving

The solution to project delays is to add overtime hours to late work or critical work.

Table. 2 Work delay

No	Pekerjaan	Start (rencana)	Finish (Rencana)	Start (realisasi)	Finish (realisasi)
1	Baja Tulangan Polos-BJTP 280	5 Aug'24	15 Des'24	15 Agus'24	25 Des'24
2	Baja Tulangan Sirip-BjTS 420B	12 Agus'24	15 Des'24	22 Agus'24	25 Des'24
3	Pemancangan Tiang Pancang Beton Bertulang Pracetak ukuran 200 mm x 200 mm (b)	9 Des'24	15 Des'24	24 Des'24	30 Des,24

Source : Jejangkit Bridge Project

examplefin Reinforcement Steel-BJTS 420B jobs. Here's how to input overtime hours :

a) Determine the date for overtime work, for the Fin Reinforcement Steel-BJTS 420B work the overtime start date is November 1, 2024 to December 20.
b) Click the "Project" menu > "Change Work Time" > Create New Calendar. The following display will appear
c) Click on the “Work Weeks” option then “Details”

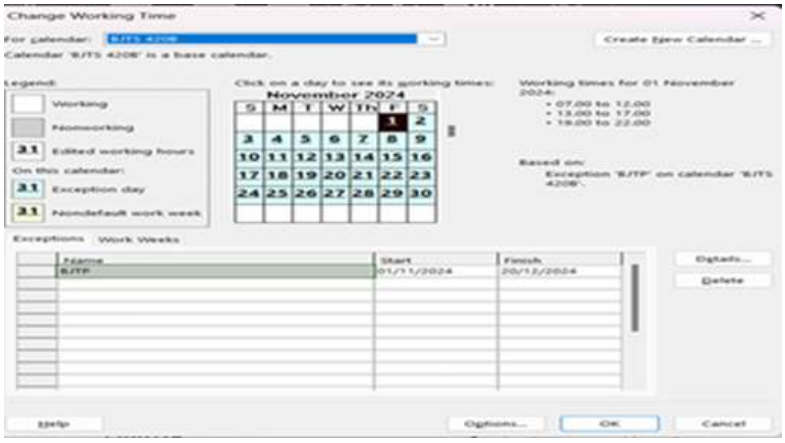

Figure 4. Display Change Work Time

Then Detail for (Default) will appear then block Sunday-Saturday select "Set day(s) to these specific working times": Next set the overtime hours needed. In the BJTS 420B job, working hours start at 07:00-12:00, 13:00-17:00 and 19:00-22:00. Then click OK. The total overtime hours in the BJTS 420 job are 200 hours.

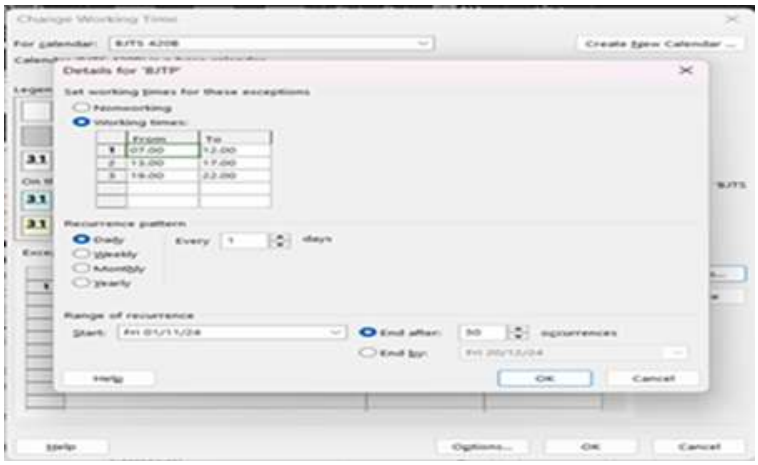

Figure 5. Display Details for BJTS 420B

d) Then go to the Exception menu, Details

In the set working times for these exceptions, select Working Time, then the overtime hours will automatically change. In the Range Of Recurrence, set the start of the overtime work. In the Fin Reinforcement Steel-BJTS 420B work, it starts Fri 01/11/24 with End after 50 ending Fri 20/12/24. Then OK and Ok.

e) Block the Job that you added working hours to, then right click, then click information.

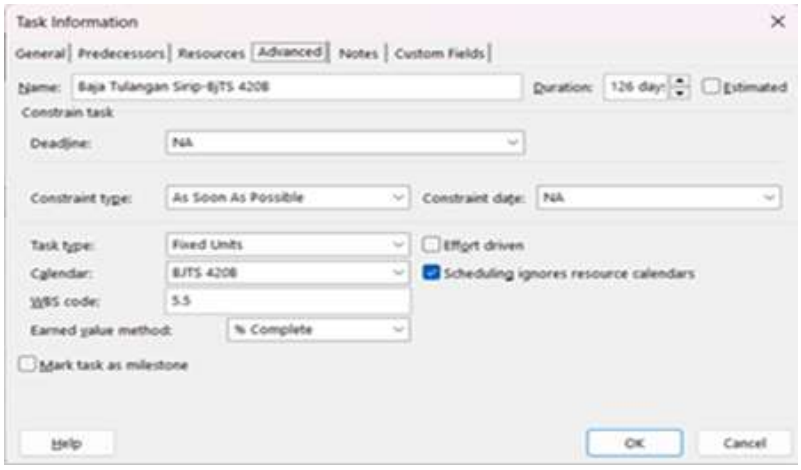

Figure 6. Advenced Display

Select Advanced then in the calendar option select BJTS 420B and check Scheduling ignores resource calendars, then press OK. Then it will appear on Ganchatt as follows:

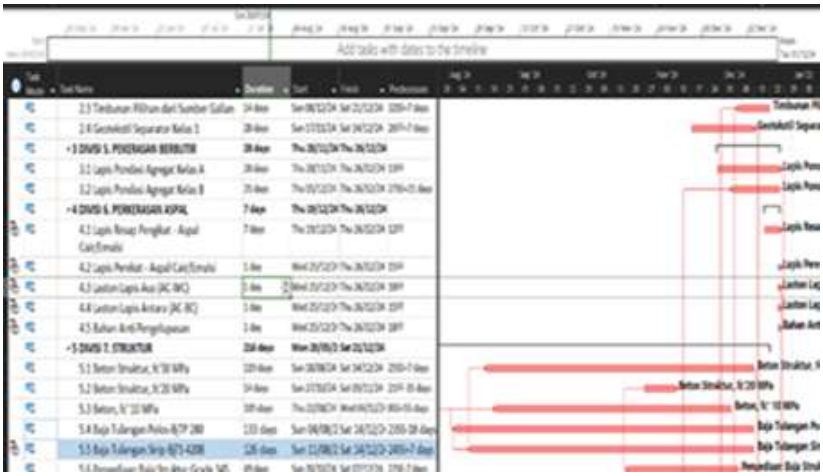

Figure 7. BJTS 420B Ganchartt Display

After the addition of working hours or overtime on the Fin Reinforcement Steel-BJTS 420B work, the total duration of the project is reduced. Do this to the work that is late or the work that is affected by the delay.

CONCLUSIONS AND RECOMMENDATIONS

The conclusion from the results of the application using the PDM (Precedence Diagram Method) method on the Jejangkit Bridge Construction Project is that:

1. In the calculation of Microsoft Project, it is planned that there are 30 critical work items that are critical trajectories. The following are critical jobs :
   a. Division 1: Temporary Bridge Construction, Drilling, including SPT and Report.

b. Division 3 : Ordinary Dig, Structure Dig Depth 0-2 meters, Selected Pile from Gallian Source, Class 1 Separator Geotextile.
c. Division 5 : Class A Aggregate Foundation Layer and Class B Aggregate Foundation Layer
d. Division 6 : Binder Absorbent Layer - Liquid Asphalt/Emulsion, Laston Layer Aus (AC-WC), Laston Intermediate Layer (AC-BC)
e. Division 7 : Structural Concrete, fc'30 MPa, Structural Concrete, fc'20 MPa, Concrete, Concrete, fc' 10 MPa, Plain Reinforcing Steel-BjTP 280, Fin Reinforcing Steel-BjTS 420B, Provision of Structural Steel Grade 345 (Sten Strength 345 MPa), Installation of Structural Steel, Steel Walls, Provision and Staking, Provision of Precast Prestressed Concrete Piles size 200 mm x 200 mm (b), Provision of Prestressed Concrete Piles size 500 mm, Installation of Precast Reinforced Concrete Piles size 200 mm x 200 mm (a), Installation of Precast Reinforced Concrete Piles size 200 mm (b), Preparation of Prestressed Concrete Piles size 500 mm, Testing Dynamic Type PDLT (Pile Dynamic Load Testing) (a), Dynamic Load Testing Type PDLT (Pile Dynamic Load Testing) (b), Asphaltic Plug Type, Fixed, Wooden Bridge Floor Dismantling, Single Road Sign with Engineering Grade Reflecting Surface, and Steering Stake

2. The total duration of the plan in Microsoft Project is 225 days without any constraints and the total duration of realization in Microsoft Project is 240 days by simulating constraints in the field.
3. Due to the delay of the project, the working hours are increased or overtime in the Microsoft Solution project. The duration of the solution remains as planned, which is 225 days with the addition of overtime working hours. Here are the overtime working hours of each job :
   a. Plain Steel Reinforcing Work Solution- BJTP 280 working hours increased for 200 hours worked from November 1, 2024 to December 20, 2024.
   b. Solution for Steel Reinforcing-BJTS 420B increased working hours for 200 hours from November 1, 2024 to December 20, 2024
   c. Solution for the Installation of Precast Reinforced Concrete Piles size 200 mm x 200 mm (b) working hours are increased for 10 hours from December 25, 2024 to December 29, 2024
   d. Prestressed Concrete Pile Piling Work Solution size 500 mm working hours increased for 80 hours from October 1, 2024 to November 9, 2024
   e. Work solution for Precast Reinforced Concrete Pile Piling Work size 200 mm x 200 mm (a) working hours increased for 80 hours from July 15, 2024 to August 23, 2024

FURTHER STUDY

This research still has several limitations, especially in terms of data validation and detailed comparison with other project management methods such as CPM, PERT, or PDM variations. Therefore, future studies are recommended to expand the scope of analysis by involving a larger sample of bridge construction projects, applying different project management tools, and integrating risk management aspects to obtain more comprehensive results.

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REFERENCES

Albar, F. (2023). Evaluasi Kinerja Manajemen Konstruksi Proyek Pembangunan Kantor Dinas Kesehatan. [Artikel].

Asnudin, S. (2018). Penerapan Manajemen Konstruksi Pada tahap Controling Proyek. [Artikel]

Danny, M. (2015). Pengendalian Biaya dan waktu dengan Metode Analisis Nilai dan Hasil dengan Microsoft Project 2010. [Skripsi]

Emanuel, A. W. (2009). *Panduan lengkap Mengelola Proyek dengan Microsoft Project Profesional* . Yogyakarta: Andi.

Hayati, N. I. (2014). Analisis Biaya Konstruksi pada Proyek Jalan di Kota Bogor. [Skripsi]

Hidayat, A. (2021). Analisa Penerapan Manajemen Waktu Pada Proyek Pembangunan Jembatan Gantung Lubuk Metode CPM. [Artikel]

Irawan Agustiar, R. H. (2018). Evaluasi Penjadwalan Proyek Menggunakan Metode CPM dan Kurva S . [Skripsi]

Lutfi, A. (2018). Analisis Manajemen Konstruksi Proyek Pembangunan Jembatan UB Kali Sumantri STA 441 . *Jurnal Konstruksi*, 12.

Nadhirin, U. (2020). Manajemen Waktu Pembelajaran Daring di masa pandemi Covid-19 pada TK Dharma Wanita. [Artikel]

Nurhidayati, D. (2016). Peningkatan Pemahaman manajemen waktu melaluiBimbingan Kelompok dengan Teknik Problem Solving pada Siswa. [Artikel]

Rani, H. A. (2016). *Manajemen Proyek Konstruksi*. *Edisi I*.[Buku]

Rofiudin, M. (2017). Manajemen Metode Pelaksanaan pada Konstruksi Baja Mode " SPACE FRAME" Proyek Terminal 3 Bandar Soekarno Hatta . *Jurnal Reka Buana* , 10.

Saputra, G. N. (2011). Penjadwalan Proyek dengan Precedence Diagram Method dan Ranked Position Weight Method . *Jurnal Ilmiah Teknik Sipil*, 11

Siregar, E. (2018). Faktor-faktor yang mempengaruhi Manajemen Pendidikan dan Pelatihan Diklat dalam Upaya pengembangan sumber daya manusia . [Artikel]

Syelviani, M. (2020). Pentingnya Manajemen Waktu dalam Mencapai Efektivitas Bagi Mahasiswa (Studi Kasus Mahasiswa Prodi Manajemen Unisi). *Manajemen Waktu*, 10