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Comparative Analysis of The Implementation Of Conventional And Modular Methods On Walls And Floor Plates In Terms Of Cost And Time (Case Study: Construction Of Satpol PP Building)

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Abstract: Building construction requires selecting efficient construction methods to achieve the desired project objectives. This research aims to compare conventional and modular construction methods in the implementation of walls and floor plates, with a focus on cost and time analysis. The case study taken is the construction of the Satpol PP Building. This research method uses a quantitative approach by collecting primary and secondary data. Primary data was obtained through field observations and interviews with parties involved in the project, while secondary data was obtained from project documents, literature and other related references. Data analysis was carried out with comparing the total costs and time required for each construction method.

Keywords: Cost and Time, Satpol PP Building, Conxtruction Management

Introduction

Selection of replacement materials to be used in a job in the project can be done by comparing price, quality, and processing time. Many material solutions are more effective and efficient in price, quality, and processing time are even supported by innovations in environmentally friendly materials. There have been many implementations carried out with materials that support non-conventional methods that can be done is the modular construction method(Ramage, 2017; A. Rasheed, 2020; Xia, 2016)(R. A. Rasheed, 2020) .

Modular construction methods involve the use of pre-manufactured modules or components that are designed and built off-site(Al-Salem, 2017; Cabeza, 2014; Isangula, 2023; Zarfl, 2015; Zhou, 2016). These modules are then transported to the project site and assembled to form the overall structure. This approach differs from the conventional method which involves a phased construction process at the project site. According to

Tatum et al (1987), modular system is a method of construction implementation using fabricated materials or components that are made outside the project or within the project site but need to be reunited between components (erection) at the place of construction. Modular construction methods in Indonesia are also often referred to as prefabricated methods(Curtarolo, 2013; Kohonen, 2013). Modular construction methods have been applied in various types of projects, including the construction of office buildings, residences, and other commercial facilities. This approach can provide a fast, efficient, and economical solution in the construction industry. Based on the case of problems that occur in the wall and floor slab work of the Bantul Satpol PP Office Building construction project using conventional methods that take excessive costs and time, this research will discuss modular construction methods using precast concrete materials or sandwich panels can be applied as a solution to the existing problems. However, it still needs to be studied by comparing it with conventional methods that have been applied.

Methodology

One of the important components of scientific or research writing is the literature review section, which serves as a foundation to strengthen the analysis in the preparation of articles or scientific research works. The literature review is a useful tool for understanding the research context and related question. Through the literature review, we can explore research that has been done before, explore the literature relevant to similar but not identical research, and investigate problems similar to the focus of the current research (Leedy, et al. 2010). The following presents some literature reviews related to the topic of this research. conventional walls with precast plates and walls in terms of cost, time, and quality in the Bantul Satpol PP Office Building construction project. The analysis carried out on this project will produce conclusions on the use of plate and wall work methods that are more efficient in terms of construction time and costs without reducing the quality to be produced. The results of this research are intended as literacy material and reference for the selection of plate and wall work methods in future building construction projects. Similar previous research will be a reference for this research. The differences that exist are in the location and object of research and research conditions at this time.

Methods used in this study compare existing rab and s curves, compared with RAB and s curves that have used modular construction methods based on existing journals and direct interviews.

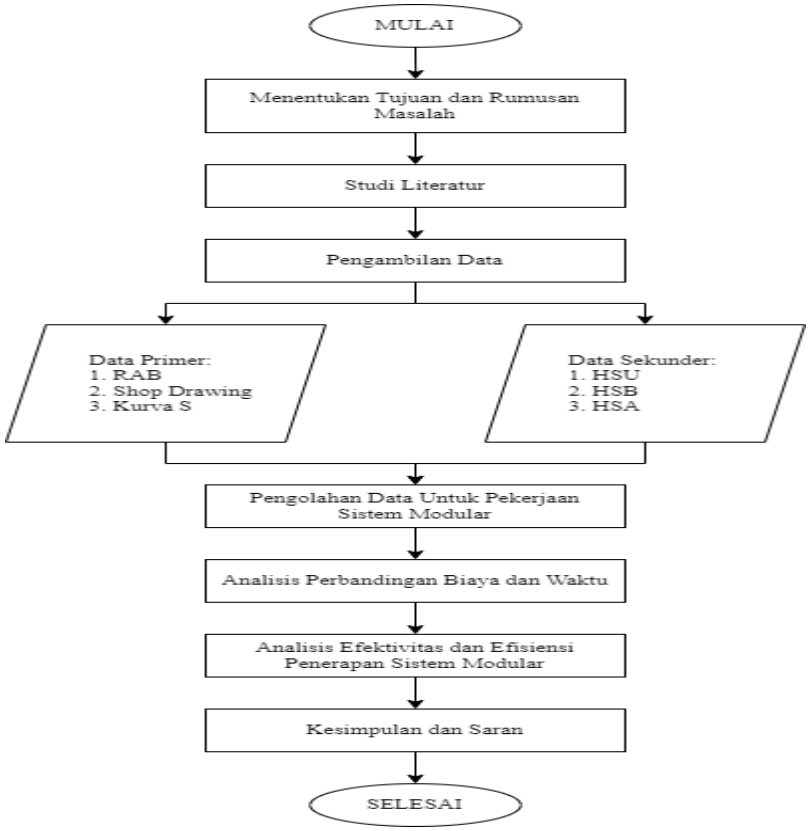

Figure 1.1 Research Flowcharts, Author (2024)

Result and Discussion

From the results of the analysis of cost budget calculations on different buildings with 2 different methods, the cost budget for the installation of each method can be seen in the following

Table 1.1 Total Cost, Author (2024)

Level	Methods	Total Cost
1	Conventional Floor Plate	Rp49,184,532
	Modular Floor Plate	Rp197,804,009
	Conventional Precast Concrete Walls	Rp158,012,530
	Precast Modular Concrete Wall	Rp127,963,693
2	Conventional Floor Plate	Rp330,693,713
	Modular Floor Plate	Rp359,833,739
	Conventional Precast Concrete Walls	Rp128,420,582
	Precast Modular Concrete Wall	Rp102,226,770
	Shipping Cost	Rp40,200,000

Table 1.2 Total Cost Budget of Each Method, Author (2024)

Methods	Total Cost
Conventional	Rp666,311,356
Modular	Rp828,028,209

Analysis of duration calculations on wall and floor plate work with 2 different types of methods that have been carried out, resulting in different durations for each method based on what is used. The following is a recapitulation of the duration of wall and floor plate work with conventional and modular methods presented in **Table 1.3**

Table 1.3 Duration of Work for Each Method, Author (2024)

Level	Type	Duration (days)	
		Conventional	Modular
1	Walls	42	14
	Floor Plate	7	10
2	Walls	49	13
	Floor Plate	77	14
Total		175	51

From the comparison of cost and time that has been calculated and analysed the most effective and efficient construction method can be taken. The selection of the method is done by weighting each method based on the cost and time generated. The weight given to each variable consists of 2 and 1, With a scale of 2 being the most profitable scale. Furthermore, each method weight will be summed up to see which method is more profitable. The following is the weighting method presented in **Table 1.4**

Table 1.4 Ratio of Duration and Cost of Work for Each Method, Author (2024)

	Conventional	Modular
Cost	2	1
Time	1	2
Total	3	3

Conclusion

Based on the results of the cost and time comparison that has been obtained, an alternative method can be made in terms of cost and time that is more effective and efficient. Both methods have different advantages. Conventional construction methods

have cheaper costs, but for the duration of the work has a longer time. For modular construction methods have a more expensive cost but for efficient time faster than conventional construction methods.

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