

# Comparison the Price of a Unit of Work Pavement of a Freeway Construction Concrete with the Payment System Contractor Full Pre Financing and Monthly Certificate

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## ABSTRACT

This study purpose to know the number of repayment for the work of pavement freeway concrete construction with the monthly, certificate the payment of a price unit work pavement freeway concrete construction with the contractor full pre financing and compare it Research is divided into three 3 (three), stage the first phase is introduction consisting of the literature study and preliminary survey. The second phase is the gathering primary and secondary data. As for primary data gathered is interviews with the contractor, consultants and the owner, project while secondary data collected is a picture, construction the list price of a unit, work price analysis unit and the volume of work to ply. concrete pavement The third stage is data analysis and conclusions Research findings are the price of work on the construction of a motorway cisumdawu, phase iii certifica monthly payment system.

**Keywords:** Price Comparison, Monthly Certificate and Full Pre Financing Contractor, Unit Price Concrete Pavement.

## INTRODUCTION

The development of infrastructure in Indonesia today, especially the road network is very rapid, the government prioritizes infrastructure development to improve national competitiveness and equitable

development. Equitable distribution is realized through the construction of road infrastructure, one of which is the road connecting one region with other regions. Road construction in the last 4 years has been massive, especially in undeveloped areas, such as the border region and Eastern Indonesia. Thus the government budget through the State Budget is focused on building border areas, Eastern Indonesia and maintaining the stability of national road conditions. For the development of regionally developed roads, financing is encouraged through collaboration with business entities through the investment of freeway.

The cost of constructing a new expressway construction is very large, it will be very heavy if it is entirely borne by the state budget, with a large amount of costs for implementing the construction of the expressway. The government has prepared a scheme to finance expressways in various parts of Indonesia. A number of schemes are used, namely utilizing the State Budget for Development and Expenditure, investing in State-Owned Enterprises, utilizing the Guarantor Institution to collaborating with the Government Business Entity.

The high cost of construction for the construction of new highways, in this study will formulate the problem of financing schemes and the construction of the toll road construction work contract system related to payment systems that can benefit various parties. This research focuses on the unit price of concrete construction freeway pavement work, with different payment systems according to the Monthly Certificate method with the Full Pre Financing Contractor.

## **LITERATURE REVIEW**

Cost is all the sacrifices needed in order to achieve a goal measured by the value of money. <sup>[1]</sup> Cost is the sum of all efforts and expenses that are done in developing, producing and application of products. <sup>[2]</sup> Product producers always think of the consequences of costs for quality, reliability and maintainability because this will affect the cost for the user. Before the construction of the project is complete and ready for operation, a large amount of costs or capital is grouped into fixed capital and working capital, or in other words, project costs = fixed capital + working capital. This grouping is useful when assessing economic and funding aspects. <sup>[3]</sup>

The contract is an agreement between the Service User and the Service Provider to make a transaction in the form of the ability between the Service Provider to do something for the Service User, with a sum of money in return formed from the results of negotiations and negotiations between the two parties. In this case the contract must have two main aspects, namely mutual agreement and there is an offer and acceptance. <sup>[4]</sup>

Another difference with other procurement contracts is that the construction contract promises something that does not yet exist, which must be completed by the contractor in return for payment for each work carried out by the contractor as long as the quality and quantity are in accordance with the specifications agreed in the contract. <sup>[5]</sup>

Cash Flow or cash flow is described as an estimate of the income of money (Inflow) and expenditure (Outflow) that occur in an investment within a certain period. Cash flow is formed from the first estimated cost, working capital, and production costs (1997).

The main element of Cash Flow is revenue, because of the existing revenue or revenue plan, there will be expenditure activities. For construction projects, the realization of revenue is largely determined by the method of payment specified in the agreement or construction contract. The reception schedule must be arranged precisely and accurately, meaning that the number of receipts is correct and the liquid time is right. <sup>[6]</sup>

The basic guideline for spending is a work activity plan, which has a direct effect. For example, if activities expand, spending also increases, but the linear relationship depends on its financing policy (Cash or Credit). It could be that the activity increases but the expenditure increases not too large (Lots of Credit) or conversely the activity increases not too large, but the expenditure increases quite large (Lots of Cash) (2015).

Initial cash is the amount of money that must be provided at the beginning of project activities, which later this money must be returned from receipt at the end of the project (2006). In Cash Flow, initial cash is the amount of funds that must be available at the beginning of each month. Thus the final cash in month  $n$  is the initial cash in month  $n + 1$ .

Financial is a decision about finance to overcome and adjust the condition of cash after initial cash. <sup>[7]</sup> If the cash condition after the initial cash is deficit, then it must be overcome by entering loan funds and if the cash condition after the initial cash surplus is large enough can be used to repay / repay the loan (if there is still a loan), for the purpose of reducing loan interest.

Final cash is the cash condition at the end of the month which is the sum of

cash after initial cash and total financial. Usually the final cash amount is determined at a minimum value, which is used as a guide in financial policy (2003).

Retention of 5% of the contract value will be returned after the project is completed (after maintenance). Guna Retention is: <sup>[8]</sup> To ensure that the contractor will complete the project in the agreed conditions. As real evidence to face the contractor if the work standards are not met or a failure occurs. Providing funds if another contractor is needed to complete the work and Trust Owner will be stronger if using a money guarantee.

## **MATERIALS & METHODS**

This research is divided into 3 (three) stages, the first stage is an introduction which consists of a literature study and an initial survey. The second stage is primary and secondary data collection. The primary data collected is the result of interviews with contractors, consultants and project owners, while secondary data collected are construction drawings, unit price lists, unit price analysis, heavy equipment analysis, volume of work for concrete foundation layers and aggregate foundation layers. The third stage is data analysis and conclusions.

Unit price calculation uses unit price analysis for public works. This unit price analysis determines a unit price calculation for wages, labor and materials, as well as jobs that are technically detailed in detail based on a work method and assumptions that are consistent with those described in a technical specification, design drawings and unit price components, both for rehabilitation / maintenance activities and infrastructure improvements.

Unit price of work consists of direct costs and indirect costs. The direct cost component consists of wages, materials and tools, while the indirect cost component consists of general costs or overhead and profits.

The basis of the Full Pre Financing Contractor payment system is the principal

calculation of the Monthly Certificate payment system which is added to the interest on the loan, because the Full Pre Financing Contractor payment system is a loan to the Work Owner of the Contractor in the form of a completed building then submitted to the project owner.

## **RESULT AND DISCUSSION**

### **According to interviews with sources**

Sources research is directly players who carried out the project free obstacles. To obtain information regarding projects the payment system monthly certificate interviews were conducted to project manager engineering and project manager in the construction of a freeway cisumdawu phase iii located in Bandung district, west java, the of the project late 2018 until the end of the year 2020, with a project value IDR 2.237279.489.421,90. And information regarding projects the payment system contractor full pre financing interviews were conducted project to project manager a freeway kunciran – Serpong package II: segments Parigi – Serpong, south Tangerang, Banten, the implementation of the late 2017 until early 2019, with a project value IDR. 543.302.114.142,11. While an interview to obtain information to both the payment system monthly certificate and contractor full pre financing.

From the interview results obtained a lot of information related to things that need to be considered in the price consideration for bidding so that the price is reliable, during the implementation period, evaluation and control. The results of the comparison of the two unit prices of the freeway pavement work with the concrete construction of the two projects are more expensive, the Full Pre Financing Contractor payment system but not significant, but the Full Pre Financing Contractor payment system has a greater risk for the contractor because the cost of money is very influential. One of the considerations to get a project with a Full Pre Financing Contractor payment system because the sales target that has been

determined by the company with not too many competitors. But there are some positive things in the implementation of the project with the Full Pre Financing Contractor system, one of which is to speed up the time of work implementation, because the cost of money is very influential, so the faster the implementation the smaller the bank interest is borne, as well as the longer the work the greater the

bank interest that must be borne, which impacts the increasing price of the work.

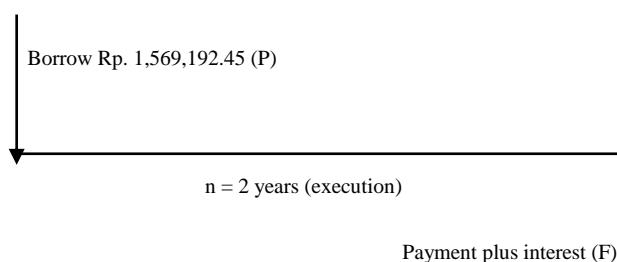
### Calculation of the Payment System Monthly Certificate According Resource

Calculation of unit price of concrete road construction Certificate Monthly payment system refers to the calculation of Highways Development Project Phase III Cisumdawu, as follows:

**Table I : Unit Price Analysis Works Monthly Certificate**

No.	Commentary	Unit	Coefficient	Unit Cost (Rp.)	Total Price (Rp.)
<b>A</b>	<b>Power</b>				<b>64,435.00</b>
1	worker	hour	3.422	12,500	42,777.78
2	Skilled workers	hour	1.244	16,200	20,160.00
3	Foreman	hour	0.078	19 250	1,497.22
<b>B</b>	<b>Material</b>				<b>1,335,471.66</b>
1	Readymix Concrete Class P	m3	1,030	1.04174 million	1,072,992.20
2	iron Dowel	kg	17,000	10,700	181,900
3	Iron screw	kg	5,000	11,000	55,000
4	iron Angkur	kg	0.203	10,310	2,087.78
5	Plastic sheet	sheet	1,050	3,720	3,906
6	Filler anticorrosive	kg	0,032	79 730	2,551.36
7	geotextile	m2	0,028	45 180	1,242.45
8	curing Compound	kg	0,105	31 890	3,348.51
9	joint Sealant	kg	0.226	47 840	10,819.34
10	Circular Saw Blade	unit	0.0002	5.8465 million	1.624.03
<b>C</b>	<b>Equipment</b>				<b>26,631.93</b>
1	concrete Paver	hour	0,026	672,000	17,422.22
2	Asphalt Concrete Cutter	hour	0.052	15,000	777.78
3	Water Tank Truck	hour	0,026	231 850	6,010.93
4	Device	Ls	1	2.421.00	2,421
<b>D</b>	<b>Total Price (A + B + C)</b>				<b>1,426,538.59</b>
E	Over Head (7% * D)				99,857.70
F	Profit (3% * D)				42,796.16
<b>G</b>	<b>GRAND TOTAL</b>				<b>1,569,192.45 / m3</b>

If the project is carried out with a payment system Contractor Full Pre Financing the implementation period of 2 years, or can be described by someone borrowed money amounting to IDR. 1,569,192.45 for a period of 2 years and a nominal interest rate at the time of implementation (2017) assumption of 4.75%.



**Figure II: System Contractor Full Pre Financing**

$$\begin{aligned}
 F &= P * (1 + i)^n && \text{IDR. 1,721,806.22 /m3 or 9.7256% more} \\
 &= 1.569.192,45 * (1 + 4.75\%)^2 && \text{expensive.} \\
 &= \text{Rp. 1721806, 22}
 \end{aligned}$$

So when this project is paid with CPF system of unit price of concrete pavement to

### Calculation of the Payment System Contractor Full Pre Financing According Resource

Calculation of unit price of concrete road construction payment system Contractor Full Pre Financing refers to the calculation

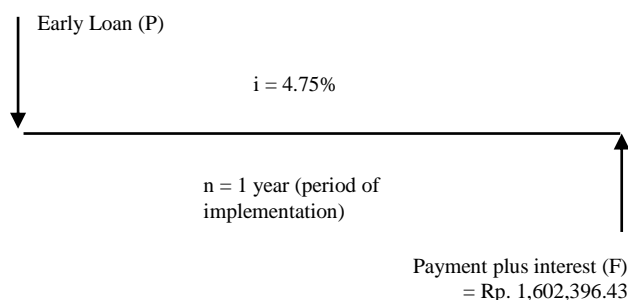
of the project Freeway Kunciran - Serpong Package II: Segment Parigi - Serpong, calculation of concrete road pavement work in this project is calculated per unit of work square meter (m<sup>2</sup>) with 28cm pavement thickness, as follows:

**Table II: Works Unit Price Analysis Contractor Full Pre Financing**

No.	Commentary	Unit	Coefficient	Unit Cost (IDR.)	Total Price (IDR.)
<b>A</b>	<b>Power</b>				<b>52,778.88</b>
1	worker	hour	1.6800	12,320	20,697.6
2	handyman	hour	1.6800	15,400	25,872.0
3	Foreman	hour	.3360	18,480	6,209.28
<b>B</b>	<b>Material</b>				<b>293,965.56</b>
1	Readymix Concrete Class P	m <sup>3</sup>	0.2940	775,500	227,997
2	iron Dowel	kg	3.9200	6,850	26,852
3	Iron screw	kg	3.9200	6,850	26,852
6	joint Filler	m <sup>2</sup>	0.0364	200,000	7,280
9	joint Sealant	m	2.4080	2,070	4,984.56
<b>C</b>	<b>Equipment</b>				<b>61,139</b>
1	concrete Paver	hour	.0467	1,200,000	56,000
2	Water Tank Truck	hour	.0233	220,243	5,139
D	Total Price (A + B + C)				407,883.44
E	Over Head & Profit (10% * D)				40,788.34
F	Grand Total				448,671.79
<b>G</b>	<b>Unit price</b>				<b>448,671.00 / m<sup>2</sup></b>

So the unit price of concrete pavement per cubic meter (m<sup>3</sup>) Rp. 448 671 / 0.28 = Rp. 1,602,396.43 / m<sup>3</sup>. With the implementation of the 1-year period, or will be paid one year ahead.

For a unit price of concrete pavement work on the project if the payment system with a Certificate Monthly interest rate (interest) 2017 = 4.75%, to:



**Figure I: Monthly System Certificate**

$$\begin{aligned}
 P &= F / (1 + i)^n \\
 &= 1.602.396,43 / (1 + 4.75\%)^1 \\
 &= \text{Rp. } 152973406
 \end{aligned}$$

The unit price of concrete work on the project range Freeway Kunciran - Serpong Package II: Segment Parigi - Serpong Rp. 1,529,734.06 / m<sup>3</sup> if the payment system using the Monthly Certificate.

### Differences in Work Unit Price Concrete Construction Concrete Pavement with

### Payment System Monthly Certificate and Contractor Full Pre Financing.

Based on the above calculation with the respective conditions of the payment system on freeway projects Cisumdawu Rp. 1,569,192.45 / m<sup>3</sup> paid by the system under the Contract Monthly Certificate project, if paid by the payment system Contractor Full Pre Financing unit price obtained by Rp. 1,721,806.22 / m<sup>3</sup>.

On Freeway project Kunciran - Serpong Package II: Segment Parigi -

Serpong concrete road work unit price of Rp. 448 671 /m<sup>2</sup> with a thickness of 28cm pavement, so that the unit price per m<sup>3</sup> IDR.  $448\ 671 / 0.28\ m = \text{IDR. } 1,602,396.43 / m^3$  with payment system Contractor Full Pre Financing in accordance with the contract's payment system project. If the project Motorway Kunciran - Serpong Package II: Segment Parigi - Serpong with reference to prevailing bank rate at the time of unit price to IDR. 1,529,734.06 / m<sup>3</sup>.

Comparison unit price of contracted work on both projects above which is the same type of work, when the execution time is almost equal to the different conditions of the payment system, the price of the payment system with the system Contractor Full Pre Financing more expensive IDR. 33203.98 / m<sup>3</sup> or the prime rate (interset), with a time of project implementation Freeway Kunciran - Serpong Package II: Segment Parigi - Serpong for 1 year, amounting to:

$$\begin{aligned} F &= P * (1 + i)^n \\ (1 + i)^n &= F / P \\ &= 1602396, 43 / 1569192.49 \\ &= 1, 0211 \end{aligned}$$

With n = 1 year, then i or interest rate used:

$$\begin{aligned} i &= \sqrt[1]{(1 \& 1,0211 - 1)} \\ &= 0, 0211 = 2,116\% \end{aligned}$$

References calculation of flower banks by 2.116% or less than bank interest (BI rate) prevailing at that time (4.75%) or 44.547% of the BI rate. This is done in the Project Implementation Contractor has special facilities to Banks and considering the value of a great project and a strategy to implement the project work more quickly than planned execution time. This strategy needs to be done to win the tender because of the tight project at this time.

## CONCLUSION

The results of research there are differences of unit price on Highways Development Project Phase III Cisumdawu, Certificate Monthly payment system with Freeway project Kunciran - Serpong

Package II: Segment Parigi - Serpong, payment system Contractor Full Pre Financing amounting to 2.116%. The project with a payment system Contractor Full Pre Financing more expensive than Certificate Monthly payment system project. Necessary in a proper consideration in the selection of a contractor to implement the project with a payment system Contractor Full Pre Financing, select a contractor who has a strong resources especially from the financial side. As the owner of a construction project more suitable financial business oriented projects with system Contractor Full Pre Financing.

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How to cite this article: Budilaksono OP, Widyaningsih N, Bintoro BP. Comparison the price of a unit of work pavement of a freeway construction concrete with the payment system contractor full pre financing and monthly certificate. International Journal of Research and Review. 2020; 7(3): 175-181.

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