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Financial Feasibility Analysis By Utilizing Float Time On Profitability In High-Rise Building Construction Projects

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ABSTRACT

Construction projects have risks in the form of time risk and cost risk. Time risk is in the form of project delays, which result in cost overruns, which are contractor losses. Cost risk is in the form of cash flow bottlenecks that cause delays in the availability of costs during the project. Project success is measured in terms of physical and financial aspects. In this context, cash flow analysis is crucial to ensure that the project's financial management is carried out effectively, thus having an impact on project profitability. The purpose of this study is to obtain the most optimal profit comparison without a down payment and with a 20% down payment on scheduling conditions by utilizing 0%, 25%, 50%, 75%, and 100% float based on feasibility analysis using NPV, BCR and ROI parameters. Data analysis was carried out with the help of Microsoft Project 2021. critical path and float time duration were carried out using the PDM method. Furthermore, float variations so that different weights for each week are obtained and analyzed for financial feasibility. In evaluating the feasibility of the project, the financial aspect can be seen from the cash flow analysis, which combines the cost and time of the project. From the financial feasibility analysis, it is found that the most optimal cash flow planning without down payment with an NPV value of IDR 2,121,722,719, BCR of 1.0698 and ROI of 6.98% under scheduling conditions with 50% float utilization, compared to the most optimal cash flow planning with an advance from the owner under scheduling conditions with 25% float utilization with an NPV value of IDR 1,998,159,242, BCR of 1.0568 and ROI of 5.68%.

1. Introduction

Construction projects have their risks in the form of time risk and cost risk. Time risk is in the form of project delays that result in cost overruns from the initial plan, which is a loss for the contractor[1] Cost risk in the form of cash flow congestion is caused by the contractor not managing the flow of funds effectively and efficiently, causing delays in the availability of costs during the project.

The success of a project is measured not only by its physical aspects but also by the financial aspects that support the smooth running and sustainability of the project. In this context, cash flow analysis becomes crucial to ensure that the project's financial management is carried out effectively, which will ultimately have a positive impact on the project's profitability.

Financial analysis aims to maximize the wealth of the company as measured by the increase in share value [2]. By conducting a financial feasibility analysis on a project and considering the utilization of float time, the contractor can more easily decide the sustainability and profitability of the project. Based on the analysis, financial feasibility can reduce financial risks in the project and increase the overall success of the project so as to obtain optimal profitability.

Achieving substantial profits is a major goal for contractors. However, limited financial resources can be an obstacle. Contractors need to realize that in a situation of limited funds, optimal cash flow planning is required in order to achieve the greatest possible profit. Effective project management is the key to avoiding problems or minimizing cost escalation and time delays [3].

Contractors compile monthly cash flow statements as a measure to ensure efficient cash flow management during their projects. This is so that they can carefully track their expenses each month and monitor their profits. Based on this explanation, to maintain a strong and sustainable working relationship, they must be efficient in making payments to each related party. The sustainability of a contractor's business is highly dependent on effective cash flow management practices [4]

2. Literature review

2.1 Construction Projects

A construction project is a project related to the construction of buildings and infrastructure [5] A construction project begins with the planning of the development, followed by surveying until the construction phase is completed, allowing it to operate according to its functional purpose.

2.2 Type of payment

The method of payment for work performance to service providers can generally be divided into three methods, namely [6]:

1. Monthly payment;
2. Payment based on stage achievement (Stage Payment);
3. Payment for the entire work after the work is 100% complete (Contractor's Full Prefinanced).

The drawback of the monthly payment system lies in the possibility of payments that are outside the plan, while the drawback in the Terminated system is that the contractor will only receive payment if the progress of the work has reached the specified stage. [7]

2.3 Project Funding Sources

In general, there are three sources of funding for construction projects owned by contractors[2], that is:

1. Owner's equity
2. Source From Bank
3. Project Source

2.4 Construction Costs

Project construction cost management is a crucial aspect that must be managed carefully to avoid potential losses that can cause the project to experience delays or even stop due to a lack of financial resources for material purchases, tool rental, labor wages, and other operational costs.[8]

2.5 Project Scheduling

Project scheduling results from the planning process information about the planned schedule and project progress.

A. Network Planning
   Three types of network diagrams can be used, namely[8]
   1. CPM (Critical Path Method)
   2. PERT (Programme Evaluation and Review Technique)
   3. PDM (Precedence Diagram Method)

B. Critical Path
   A critical trajectory is a series of activities that have the longest duration and can be identified when each activity in it has a Total Float (TF) equal to 0 [8]

C. Float Time
   Float is the time lag that non-critical activities have to be able to start at the beginning, end, or somewhere in between.
   Float consists of 2 types, namely[8]:
   1. Total Float is the period allowed to delay an activity without disrupting the overall project schedule. This amount of time is equivalent to the time available if all subsequent activities start at the latest time.
   2. Free Float occurs when all activities on a particular path start as soon as possible. The amount of Free Float for an activity is equal to the period during which the completion of that activity can be delayed without affecting the earliest start time of the next activity.

2.6 Cash Flow

The goal of construction services is to achieve optimal profits. One strategy that contractors can use to accomplish this goal is to create a project cash flow, which helps them understand the financial condition of the project at any given period. By monitoring the cash flow, contractors can optimize profits and take the necessary steps to maintain the project's financial balance. [9]

2.7 Guarantee

There are several types of guarantees, including:

1. Performance bond
   Performance Bond is a guarantee that the contractor will complete the work in accordance with the requirements set out in the Construction Work Contract. The Performance Bond is valid from the signing of the contract until the first handover of work (Provisional Hand Over (PHO)). [10]
2. Advance payment guarantee
   An advance Payment Bond is a Bank Guarantee to ensure that the party implementing the project will carry out its duties or obligations after receiving an advance payment from the project owner. The purpose is to prevent the loss of advances if the winning party fails to fulfill its promises. [11]
3. Maintenance Guarantee (Retention)
   Retention is generally 5%, which will then be returned to the contractor after the project is completed or the maintenance period is completed in accordance with the agreed contract.

2.8 Financial Feasibility Study

In the process of analyzing the feasibility of a project from a financial aspect, a common approach is to estimate the incoming and outgoing cash flows during the project and then analyze the investment with the concept of the Time Value of Money [8]. The decision to proceed, postpone, or terminate a project is based on the results of the feasibility analysis that has been conducted [12]

The financial feasibility analysis parameters used are as follows.

A. NPV Method (Net Present Value)

This NPV method is done by calculating the present value of investment with the value of future net cash receipts. So, the relevant interest rate is needed to calculate the present value[13]

$NPV = \sum_{t=1}^{t=n}(\frac{B_t - C_t}{(1+i)^t})$

The decision criteria that will be taken based on the results of the NPV calculation consist of:

3. NPV is positive (NPV> 0), the proposed project is acceptable or can be said to be feasible; the higher the NPV value, the better.
4. NPV is negative (NPV $<$ 0), the proposed project cannot be accepted or can be said to be unfeasible..

B. BCR Method (Benefit Cost Ratio)

The BCR method emphasizes the value comparison between the benefits that will be obtained and the costs that will be borne as a result of the investment [13]

$BCR = \frac{PWOB}{PWOC}$

The decision criteria based on the BCR calculation results are as follows:

1. If the results of the BCR calculation ≥ 1, it is concluded that the benefits of the investment spent are greater than the costs required so that the investment plan can be accepted or declared feasible.
2. If the result of the BCR calculation ≤ 1, it is concluded that the benefits of the investment spent are smaller than the costs required, so the investment plan cannot be accepted or declared not feasible.

C. ROI Method (Return on Investment)

ROI is a tool to measure the extent to which the company benefits from the investment it has made in achieving operating profit [14]

The formula used to calculate Return on Investment (ROI) [15] :

$$ROI = \frac{Revenues\ after\ investment - Amount\ invested}{Amount\ invested}\ x\ 100\%$$

3. Research methods

3.1 Data Study

The data used in this research comes from the ITS Visual Communication Design (DKV) Building construction project. In this study using primary and secondary data in the form of:

A. Primary data

Data is collected by direct observation or involves direct interaction with respondents. This is done by conducting interviews, which can be done face-to-face or online. Based on the results of interviews with contractors, it was found that:

1. Contractor profit is 10% of the project contract value.
2. Retention money or withholding by the owner of 5%.
3. Stage Payment on the project is 30%, 50%, 70%, 90% and 100%.

B. Secondary Data

Data obtained directly from the ITS Visual Communication Design (DKV) Building construction project, including:

1. Time Schedule (S Curve).
2. Cost Budget Plan.
3. Plan Drawing

3.2 Data analysis

The initial stages of this research involved a review of the literature, data collection, and preparation of the concept of cash flow modeling and analysis of the financial feasibility of each cash flow modeling. After obtaining primary and secondary data, a scheduling plan is designed using PDM, and the critical path and float are recognized by utilizing Microsoft Project application software. Cash flow planning by utilizing float time is done by shifting the start time of each task within the float time limit on each task. The float utilization used is 0%, 25%, 50%, 75%, and 100%; then, each variation will be made a bar chart to find out the shift of work done so that the weight per week will be obtained for each float variation. This planning is carried out by comparing two conditions, namely payment without a down payment with the Stage Payment payment system and payment with a 20% down payment with the Stage Payment payment system.

Furthermore, a financial feasibility analysis was conducted. This is done with NPV, BCR, and ROI parameters. All alternatives are calculated, and tables are made based on these parameters to make it easier to analyze the maximum profitability. Furthermore, the most optimum cash flow value analysis obtained is the cash flow that has the maximum profit from several existing alternatives.

Table 3.1 Alternative Research Form

Scheduling Conditions	Variation	
	Without Down Payment	With 20% Down Payment
Float 0 %	Alternative 1	Alternative 6
Float 25 %	Alternative 2	Alternative 7
Float 50%	Alternative 3	Alternative 8
Float 75%	Alternative 4	Alternative 9
Float 100%	Alternative 5	Alternative 10

Source: Data Processing, 2024

4. Results and Discussion

4.1 Scheduling

In identifying project scheduling, the steps taken are Rescheduling activities in the schedule according to the logical relationships and dependencies between activities. The goal is to organize the sequence of interrelated activities. After obtaining all predecessors and constraints based on the project schedule data that has been received, a PDM network diagram can be made.

Table 4.1 List of Work Items, Duration, Predecessors and Total Float

No	Name of activity	Duration	Predecessors	Total Float
1	**Construction of the ITS Visual Communication Design Building (DKV).**	**180 days**		**0 days**
2	**Preparatory work**	**46 days**		**0 days**
3	Site Clearance	46 days		0 days
4	Sirtu Fill	9 days	3SS+23 days	0 days
5	Bouwplank	4 days	4FS+9 days	0 days
6	**Structural Work**	**136 days**		**0 days**
7	**Earthworks**	**19 days**		**0 days**
8	Solid Sirtu Backfill With Tools	8 days	4	0 days
9	Earthworks	6 days	5	0 days
10	**Foundation**	**23 days**		**0 days**
11	Piling Work	11 days	8FS-2 days	0 days
12	Casting of Stake Head Stake	6 days	11FS-2 days	0 days
13	River Stone Foundation Pair 1pc:3ps	11 days	11;9FS-2 days	0 days

No	Name of activity	Duration	Predecessors	Total Float
14	Pile Cap Concrete Casting	8 days	12	0 days
15	**Floor Elevation - 0.050**	**19 days**		**0 days**
16	Column Concrete Casting	6 days	14SS+3 days	0 days
17	Casting Concrete Blocks	8 days	16SS+3 days;13FS-1 day	0 days
18	Concrete Plate Casting	5 days	17SS+3 days	0 days
19	Practical Column 10 x 10 cm	6 days	18SS+7 days	22 days
20	**Floor Elevation +4,450**	**21 days**		**0 days**
21	Column Concrete Casting	6 days	18FS-1 day	0 days
22	Casting Concrete Blocks	8 days	21FS-1 day	7 days
23	Concrete Plate Casting	5 days	22SS+3 days	7 days
24	Practical Column 10 x 10 cm	6 days	23SS+7 days	22 days
25	**Floor Elevation +7,950**	**21 days**		**7 days**
26	Column Concrete Casting	6 days	23FS-1 day	7 days
27	Casting Concrete Blocks	8 days	26FS-1 day	7 days
28	Concrete Plate Casting	5 days	27SS+3 days	7 days
29	Practical Column 10 x 10 cm	6 days	28SS+7 days	24 days
30	**Floor Elevation +13,450**	**22 days**		**7 days**
31	Column Concrete Casting	7 days	28FS-1 day	7 days
32	Casting Concrete Blocks	8 days	31FS-1 day	7 days
33	Concrete Plate Casting	5 days	32SS+3 days	7 days
34	Practical Column 10 x 10 cm	6 days	33SS+7 days	25 days
35	**Floor Elevation +17,950**	**24 days**		**7 days**
36	Column Concrete Casting	9 days	33FS-3 days	7 days
37	Casting Concrete Blocks	8 days	36FS-1 day	7 days
38	Concrete Plate Casting	5 days	37SS+3 days	26 days
39	Practical Column 10 x 10 cm	6 days	38SS+7 days	26 days
40	**Floor Elevation +21,000**	**9 days**		**7 days**
41	Casting Concrete Blocks	9 days	37SS+4 days	7 days
42	Concrete Plate Casting	6 days	41SS+3 days	7 days
43	**Roof truss**	**69 days**		**7 days**
44	Fabrication	22 days	26SS+21 days	8 days
45	Erections	30 days	42;44	7 days
46	Install the roof and plank	16 days	45	7 days
47	**Stair Structure**	**41 days**	**27SS**	7 days
48	**GWT (Ground Water Tank) Structure**	**19 days**	**17SS**	3 days
49	**STP (Sewage Treatment Plant) Structure**	**15 days**	**48SS**	3 days
50	**Architectural Jobs**	**83 days**		**7 days**
51	**1st floor**	**36 days**		**7 days**
52	Wall work	21 days	31SS;19;47SS+7 days	7 days
53	Door and window work	6 days	56	27 days
54	Floor finishing work	19 days	55SS+7 days	30 days
55	Ceiling Work	19 days	52SS+8 days	27 days
56	Painting Work	15 days	55SS+7 days	27 days
57	Sanitary Work	19 days	52SS+7 days	24 days
58	Stair Railing Work	10 days	54SS+5 days	30 days
59	**2nd Floor**	**40 days**		**7 days**
60	Wall work	21 days	52SS+12 days;24	7 days

No	Name of activity	Duration	Predecessors	Total Float
61	Door and window work	8 days	64FS+2 days;53	19 days
62	Floor finishing work	19 days	63SS+7 days	28 days
63	Ceiling Work	19 days	60SS+8 days	19 days
64	Painting Work	15 days	63SS+7 days	19 days
65	Sanitary Work	19 days	60SS+7 days;57FS-7 days	24 days
66	Stair Railing Work	10 days	62SS+5 days;58	28 days
67	**3rd floor**	**40 days**		**7 days**
68	Wall work	21 days	60SS+14 days;29	7 days
69	Door and window work	8 days	72FS+2 days;61	13 days
70	Floor finishing work	19 days	71SS+7 days	24 days
71	Ceiling Work	19 days	68SS+8 days	13 days
72	Painting Work	15 days	71SS+7 days	13 days
73	Sanitary Work	19 days	68SS+7 days;65FS-5 days	24 days
74	Stair Railing Work	10 days	70SS+5 days;66	24 days
75	**4th floor**	**40 days**		**7 days**
76	Wall work	21 days	68SS+14 days;34	7 days
77	Door and window work	8 days	80FS+2 days;69	7 days
78	Floor finishing work	19 days	79SS+7 days	16 days
79	Ceiling Work	19 days	76SS+8 days	7 days
80	Painting Work	15 days	79SS+7 days	7 days
81	Sanitary Work	19 days	76SS+7 days;73FS-5 days	24 days
82	Stair Railing Work	10 days	78SS+5 days;74	20 days
83	**5th floor**	**29 days**		**7 days**
84	Wall work	15 days	76SS+14 days;39;47	7 days
85	Door and window work	3 days	86FS-3 days;77;46FS+2 days	7 days
86	Floor finishing work	15 days	84FS-1 day	7 days
87	Painting Work	15 days	84FS-1 day	7 days
88	**MEP Jobs**	**118 days**		**0 days**
89	**MEP Standard**	**113 days**		**3 days**
90	Electrical Work	89 days	21SS+18 days	0 days
91	Plumbing Work	113 days	18SS;48SS+3 days;49SS+3 days	3 days
92	**Non-Standard MEP**	**63 days**		**0 days**
93	Pack. Electric Power and Lightning Protection	33 days	90SS+33 days	0 days
94	Electronics Jobs	61 days	93SS	0 days
95	Mechanical Work	56 days	94SS+7 days;91FS-54 days	0 days

Source: Data Processing, 2024

4.2 Job Weights Based on Float Variations

Based on the Ms. Project that has been made, the total float has been obtained, and then from these results, several float variations are made, such as 0%, 25%, 50%, 75%, and 100% float. Float variations are used to determine the beginning of activities that are not critical paths in a project. Based on this, a different weight per week is obtained from several planned float variations so that the load per week on the project will be different.

Table 4.2 Job Weights Based on Float Variation Scheduling

Week-	Scheduling				
	Float 0%	Float 25%	Float 50%	Float 75%	Float 100%
1	0.07%	0.07%	0.07%	0.07%	0.07%
2	0.07%	0.07%	0.07%	0.07%	0.07%
3	0.07%	0.07%	0.07%	0.07%	0.07%
4	0.62%	0.62%	0.62%	0.62%	0.62%
5	0.72%	0.72%	0.72%	0.72%	0.72%
6	2.19%	2.19%	2.19%	2.19%	2.19%
7	3.29%	3.29%	3.29%	3.29%	3.29%
8	1.01%	1.01%	1.01%	1.01%	1.01%
9	5.61%	5.56%	5.53%	5.50%	5.50%
10	5.46%	5.41%	5.40%	5.39%	5.39%
11	5.07%	3.07%	1.66%	0.89%	0.89%
12	4.27%	5.20%	6.00%	5.11%	4.17%
13	6.66%	5.40%	3.87%	4.15%	4.45%
14	4.08%	4.85%	6.25%	6.49%	6.74%
15	8.41%	7.85%	5.56%	4.30%	3.89%
16	6.35%	5.38%	6.79%	7.95%	8.12%
17	7.96%	7.35%	5.88%	5.39%	5.05%
18	6.52%	6.89%	6.80%	5.95%	5.96%
19	5.37%	6.76%	6.38%	5.59%	4.87%
20	6.24%	5.90%	7.52%	6.89%	6.02%
21	5.25%	6.08%	5.70%	7.37%	6.83%
22	4.92%	5.07%	5.80%	5.85%	6.95%
23	3.62%	4.33%	4.86%	5.56%	5.71%
24	3.38%	3.61%	3.88%	4.53%	5.16%
25	2.02%	2.47%	3.18%	3.88%	4.45%
26	0.77%	0.78%	0.89%	1.17%	1.83%

Source: Data Processing, 2024

Cash Flow Analysis

In the evaluation of project feasibility, the financial aspect can be seen from the cash flow analysis, which combines the cost and time of the project. Cash flow reflects the expenditure required during project implementation and estimates the future financial state of the project. Optimal cash flow refers to the estimation to achieve maximum profit.

A. Cash Flow Without Down Payment

Based on the cash in and cash out that has been made, a cash flow can be made to see the project finances more clearly. The cash flow diagram can be seen in the following figure.

Example of cash flow diagram Float 50% without a down payment

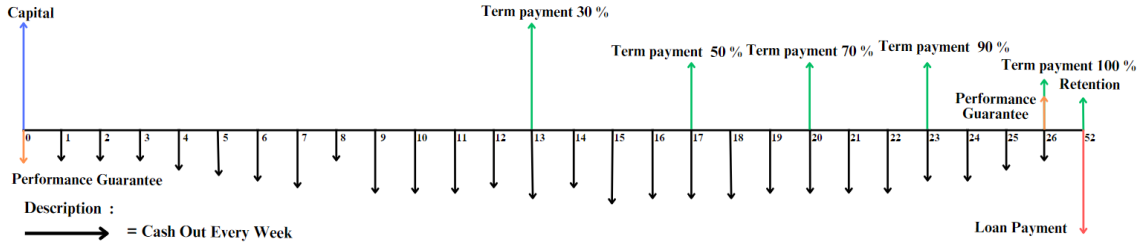

Figure 4.1 50% Cash Flow Float Diagram Without Down Payment

Source: Data Processing, 2024

Cash out, cash in, additional capital and loan payment schemes are calculated as follows:

1. **Cash Out**

Performance bond = 5% × RAB
= 0.05 × IDR 24,567,000,000
= IDR 1,228,350,000

Budget Plan for Implementation of Each Float
RAB = RAP + Profit
RAP = RAB – (10% × RAB)
RAP = 0.9 × RAB

Table 4.3 Implementation Budget Plan Without Down Payment

Week-	Implementation Budget Plan				
	Float 0%	Float 25%	Float 50%	Float 75%	Float 100%
1	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117
2	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117
3	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117
4	IDR 136,428,851	IDR 136,428,851	IDR 136,428,851	IDR 136,428,851	IDR 136,428,851
5	IDR 160,026,414	IDR 160,026,414	IDR 160,026,414	IDR 160,026,414	IDR 160,026,414
6	IDR 483,216,260	IDR 483,216,260	IDR 483,216,260	IDR 483,216,260	IDR 483,216,260
7	IDR 727,738,540	IDR 727,738,540	IDR 727,738,540	IDR 727,738,540	IDR 727,738,540
8	IDR 223,574,696	IDR 223,574,696	IDR 223,574,696	IDR 223,574,696	IDR 223,574,696
9	IDR 1,240,665,854	IDR 1,229,969,445	IDR 1,222,564,459	IDR 1,215,159,474	IDR 1,215,159,474
10	IDR 1,207,417,909	IDR 1,197,271,769	IDR 1,193,980,345	IDR 1,190,688,922	IDR 1,190,688,922
11	IDR 1,121,932,580	IDR 678,561,892	IDR 367,034,200	IDR 197,495,643	IDR 197,495,643
12	IDR 944,135,620	IDR 1,149,540,591	IDR 1,325,560,206	IDR 1,130,583,558	IDR 921,868,711
13	IDR 1,473,002,658	IDR 1,193,904,081	IDR 856,288,831	IDR 916,546,458	IDR 984,620,818
14	IDR 902,253,993	IDR 1,072,216,501	IDR 1,381,471,979	IDR 1,435,889,155	IDR 1,490,893,225
15	IDR 1,858,560,654	IDR 1,736,300,686	IDR 1,230,402,604	IDR 950,796,918	IDR 859,015,654
16	IDR 1,404,361,754	IDR 1,190,486,544	IDR 1,502,339,509	IDR 1,758,716,794	IDR 1,795,163,325
17	IDR 1,759,867,179	IDR 1,624,852,160	IDR 1,299,828,948	IDR 1,190,890,905	IDR 1,116,082,144
18	IDR 1,440,911,588	IDR 1,523,380,199	IDR 1,502,562,052	IDR 1,314,771,438	IDR 1,317,978,528
19	IDR 1,187,069,437	IDR 1,493,571,895	IDR 1,410,355,878	IDR 1,235,171,315	IDR 1,075,887,536
20	IDR 1,380,632,430	IDR 1,305,035,000	IDR 1,663,706,611	IDR 1,524,348,672	IDR 1,330,553,635
21	IDR 1,161,139,191	IDR 1,344,312,125	IDR 1,260,055,047	IDR 1,629,768,700	IDR 1,510,671,180
22	IDR 1,088,508,770	IDR 1,120,187,483	IDR 1,283,410,253	IDR 1,293,814,133	IDR 1,537,391,839
23	IDR 799,347,846	IDR 957,698,634	IDR 1,075,273,700	IDR 1,228,349,456	IDR 1,262,976,836
24	IDR 748,158,962	IDR 797,281,434	IDR 858,879,421	IDR 1,002,607,760	IDR 1,139,899,918
25	IDR 446,156,170	IDR 546,260,732	IDR 702,903,057	IDR 858,301,312	IDR 983,403,411
26	IDR 169,319,293	IDR 172,610,716	IDR 196,824,789	IDR 259,541,274	IDR 403,691,091

Source: Data Processing, 2024

2. **Cash In**

Return of Performance Guarantee = 5% × RAB
= 0.05 × IDR 24,567,000,000
= IDR 1,228,350,000

Term Payment :

Table 4.4 Term Payments Without Down Payment

Term Acceptance	Weight of Each Term	Payment (Weight x Total RAB)	Retention (5%*payment)	Payment - Retention
Term 30%	30.00%	IDR 7,370,100,000	IDR 368,505,000	IDR 7,001,595,000
Term 50%	20.00%	IDR 4,913,400,000	IDR 245,670,000	IDR 4,667,730,000
Term 70%	20.00%	IDR 4,913,400,000	IDR 245,670,000	IDR 4,667,730,000
Term 90%	20.00%	IDR 4,913,400,000	IDR 245,670,000	IDR 4,667,730,000
Term 100%	10.00%	IDR 2,456,700,000	IDR 122,835,000	IDR 2,333,865,000
Retention			IDR 1,228,350,000	IDR 1,228,350,000
		Total		IDR 24,567,000,000

Source: Data Processing, 2024

3. Capital additions and payments

Based on the cash flow, it can be seen that additional capital is needed to finance the project until the first term.

Table 4.5 Additional Capital and Loan Payments Without Down Payment

Information	Scheduling				
	Float 0%	Float 25%	Float 50%	Float 75%	Float 100%
Capital Increase	IDR 8,992,362,733	IDR 8,454,455,890	IDR 7,970,636,153	IDR 9,091,571,322	IDR 9,005,934,905
DR = 12.67%	1.1267	1.1267	1.1267	1.1267	1.1267
Loan Repayment	IDR 10,131,695,092	IDR 9,525,635,451	IDR 8,980,515,754	IDR 10,243,473,409	IDR 10,146,986,857

Source: Data Processing, 2024

B. Cash Flow With 20% Down Payment

Based on the cash in and cash out that has been made, a cash flow can be made to see the project finances more clearly. The cash flow diagram can be seen in the following figure.

Example of Float 25% cash flow diagram with 20% down payment:

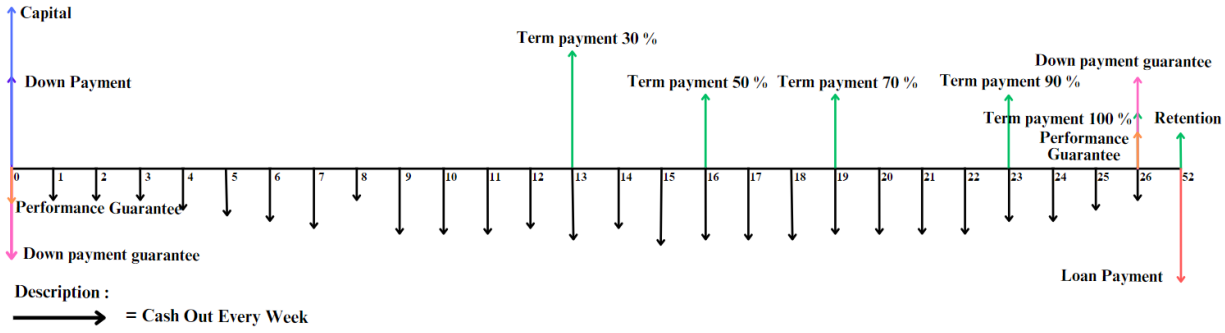

Figure 4.1 25% Cash Flow Float Diagram with 20% Down Payment

Source: Data Processing, 2024

Cash out, cash in, additional capital and loan payment schemes are calculated as follows:

1. Cash Out

Performance bond = 5% × RAB
= 0.05 × IDR 24,567,000,000
= IDR 1,228,350,000

Advance payment guarantee =20% × RAB
= 0.20 × IDR 24,567,000,000
=IDR 4,913,400,000

Budget Plan for Implementation of Each Float
RAB = RAP + Profit
RAP = RAB – (10% × RAB)
RAP = 0.9 × RAB

Table 4.6 Implementation Budget Plan With 20% Down Payment

Week-	Implementation Budget Plan				
	Float 0%	Float 25%	Float 50%	Float 75%	Float 100%
1	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117
2	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117
3	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117	IDR 15,291,117
4	IDR 136,428,851	IDR 136,428,851	IDR 136,428,851	IDR 136,428,851	IDR 136,428,851
5	IDR 160,026,414	IDR 160,026,414	IDR 160,026,414	IDR 160,026,414	IDR 160,026,414
6	IDR 483,216,260	IDR 483,216,260	IDR 483,216,260	IDR 483,216,260	IDR 483,216,260
7	IDR 727,738,540	IDR 727,738,540	IDR 727,738,540	IDR 727,738,540	IDR 727,738,540
8	IDR 223,574,696	IDR 223,574,696	IDR 223,574,696	IDR 223,574,696	IDR 223,574,696
9	IDR 1,240,665,854	IDR 1,229,969,445	IDR 1,222,564,459	IDR 1,215,159,474	IDR 1,215,159,474
10	IDR 1,207,417,909	IDR 1,197,271,769	IDR 1,193,980,345	IDR 1,190,688,922	IDR 1,190,688,922
11	IDR 1,121,932,580	IDR 678,561,892	IDR 367,034,200	IDR 197,495,643	IDR 197,495,643
12	IDR 944,135,620	IDR 1,149,540,591	IDR 1,325,560,206	IDR 1,130,583,558	IDR 921,868,711
13	IDR 1,473,002,658	IDR 1,193,904,081	IDR 856,288,831	IDR 916,546,458	IDR 984,620,818
14	IDR 902,253,993	IDR 1,072,216,501	IDR 1,381,471,979	IDR 1,435,889,155	IDR 1,490,893,225
15	IDR 1,858,560,654	IDR 1,736,300,686	IDR 1,230,402,604	IDR 950,796,918	IDR 859,015,654
16	IDR 1,404,361,754	IDR 1,190,486,544	IDR 1,502,339,509	IDR 1,758,716,794	IDR 1,795,163,325
17	IDR 1,759,867,179	IDR 1,624,852,160	IDR 1,299,828,948	IDR 1,190,890,905	IDR 1,116,082,144
18	IDR 1,440,911,588	IDR 1,523,380,199	IDR 1,502,562,052	IDR 1,314,771,438	IDR 1,317,978,528
19	IDR 1,187,069,437	IDR 1,493,571,895	IDR 1,410,355,878	IDR 1,235,171,315	IDR 1,075,887,536
20	IDR 1,380,632,430	IDR 1,305,035,000	IDR 1,663,706,611	IDR 1,524,348,672	IDR 1,330,553,635
21	IDR 1,161,139,191	IDR 1,344,312,125	IDR 1,260,055,047	IDR 1,629,768,700	IDR 1,510,671,180
22	IDR 1,088,508,770	IDR 1,120,187,483	IDR 1,283,410,253	IDR 1,293,814,133	IDR 1,537,391,839
23	IDR 799,347,846	IDR 957,698,634	IDR 1,075,273,700	IDR 1,228,349,456	IDR 1,262,976,836
24	IDR 748,158,962	IDR 797,281,434	IDR 858,879,421	IDR 1,002,607,760	IDR 1,139,899,918
25	IDR 446,156,170	IDR 546,260,732	IDR 702,903,057	IDR 858,301,312	IDR 983,403,411
26	IDR 169,319,293	IDR 172,610,716	IDR 196,824,789	IDR 259,541,274	IDR 403,691,091

Source :Data Processing, 2024

2. Cash In

Return of Performance Guarantee = 5% × RAB
= 0.05 × IDR 24,567,000,000
= IDR 1,228,350,000

Advanced money refund = 20% × RAB
= 0,20 × IDR 24,567,000,000
=IDR 4,913,400,000

Term Payment :

Table 4.7 Term Payment With 20% Down Payment

Term Acceptance	Weight of Each Term	Payment (Weight x Total RAB)	Retention (5%*payment)	Payment Payments - Retention – Advances
Down payment				IDR 4,913,400,000
Term 30%	30%	IDR 7,370,100,000	IDR 368,505,000	IDR 2,088,195,000
Term 50%	20%	IDR 4,913,400,000	IDR 245,670,000	IDR 4,667,730,000
Term 70%	20%	IDR 4,913,400,000	IDR 245,670,000	IDR 4,667,730,000
Term 90%	20%	IDR 4,913,400,000	IDR 245,670,000	IDR 4,667,730,000
Term 100%	10%	IDR 2,456,700,000	IDR 122,835,000	IDR 2,333,865,000
Retention			IDR 1,228,350,000	IDR 1,228,350,000
		Total		IDR 24,567,000,000

Source: Data Processing, 2024

3. Capital additions and payments

Based on the cash flow, it can be seen that additional capital is needed to finance the project until the second term.

Table 4.8 Additional Capital and Loan Payments with 20% Down Payment

Information	Scheduling				
	Float 0%	Float 25%	Float 50%	Float 75%	Float 100%
Capital Increase	IDR 11,069,344,134	IDR 10,365,264,621	IDR 11,296,484,194	IDR 10,903,780,938	IDR 10,688,001,027
DR = 12.67%	1.1267	1.1267	1.1267	1.1267	1.1267
Loan Repayment	IDR 12,471,830,036	IDR 11,678,543,649	IDR 12,727,748,741	IDR 12,285,289,983	IDR 12,042,170,757

4.3 Financial Feasibility Analysis

The financial feasibility analysis was conducted using the NPV, BCR, and ROI parameters. All alternatives are calculated, and a table is made based on these parameters to make it easier to analyze the maximum profitability. Furthermore, the most optimum cash flow value analysis obtained is the cash flow that has the maximum profit from several existing alternatives.

A. Cash Flow Without Down Payment

Table 4.9 NPV, BCR and ROI Values Without Down Payment

INFORMATION	Without Down Payment		
	NPV	BCR	ROI
Float 0%	IDR 2,132,444,839	1.0678	6.78%
Float 25%	IDR 2,132,595,130	1.0690	6.90%
Float 50%	IDR 2,121,722,719	1.0698	6.98%
Float 75%	IDR 2,127,940,230	1.0676	6.76%
Float 100%	IDR 2,115,206,989	1.0674	6.74%

Source: Data Processing, 2024

B. Cash Flow With 20% Down Payment

Table 4.10 NPV, BCR and ROI Values With 20% Down Payment

INFORMATION	With 20% Down Payment		
	NPV	BCR	ROI
Float 0%	IDR 1,999,209,823	1.0558	5.58%
Float 25%	IDR 1,998,159,242	1.0568	5.68%

Float 50%	IDR 1,997,512,826	1.0554	5.54%
Float 75%	IDR 1,982,828,125	1.0557	5.57%
Float 100%	IDR 1,990,688,739	1.0562	5.62%

Source: Data Processing, 2024

5. Conclusions and Suggestions

5.1 Conclusion

From the results and discussion, it can be concluded that:

1. The most optimal cash flow planning without a down payment from the owner in scheduling conditions with 50% float utilization has an NPV value of IDR 2,121,722,719, BCR of 1.0698, and ROI of 6.98%.
2. The most optimal cash flow planning with a down payment from the owner in scheduling conditions with 25% float utilization has an NPV value of IDR 1,998,159,242, BCR of 1.0568, and ROI of 5.68%.
3. Based on the comparison of planning without a down payment with 50% utilization and with a 20% down payment with 25% float utilization, the most optimal alternative results with the highest profitability, namely planning without a down payment with 50% float utilization has an NPV value of IDR 2,121,722,719, BCR of 1.0698 and ROI of 6.98%.

5.2 Suggestion

Based on the research that has been done, several suggestions need to be given:

1. Further research is needed to analyze the feasibility of construction development profitability by considering the escalation of the dollar crus.
2. Further research is needed to analyze the feasibility of construction development profitability by considering the comparison of the use of materials that have a greater percentage of TKDN.

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