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OPERATIONAL RISK MANAGEMENT IN BANGUANAN WATERLAND METLAND CIBITUNG TOWARDS INVESTMENT COSTS

Patrick Sudiarto[1], Fitri Suryani[2], Arman Jayady[3]
[1]Student of Master of Civil Engineering Study Program, Persada University of Indonesia
[2]Supervisors 1 Master of Civil Engineering Study Program, Persada University of Indonesia
[3]Supervisors of 2 Masters in Civil Engineering Study Program, Persada University of Indonesia
Email : patricksudiarto@gmail.com, fitrisuryani@gmail.com, ajayady@yahoo.co.id

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ABSTRACT

Developer policy in this case PT. Metropolitan land, Tbk for the availability of entertainment facilities in the region is the right choice to increase profits in addition to selling home products. This strategy is considered appropriate because of the lack of entertainment in the area around housing which is seen from the rapid population from year to year. Service providers bear a large risk burden at the operational stage, To avoid cost overrun, in the calculation of the operating cost budget it is necessary to include costs due to risks. Risk costs are allocated to the identified risks. This study aims to identify the dominant risk factors that affect operational investment costs from the point of view of other long-running operational management. The research used qualitative methods when conducting studies on previous research which then obtained 48 risk factors that affect investment costs. Validation of the 48 risk factors was carried out by 3 (three) experts and produced 30 risk variables which then became questionnaires that would be distributed to respondents. Quantitative methods are used to assess probability and impact using a rating scale. The probability and impact values are converted into values in the probability-impact matrix, after the risk value is calculated and sorted from the highest value, 4 dominant risk factors are obtained, namely, Leaking on the walls and floor of the pool, Damage to playgrounds, Damaged plumbing systems, and Pumping machines are off or damaged.

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INTRODUCTION

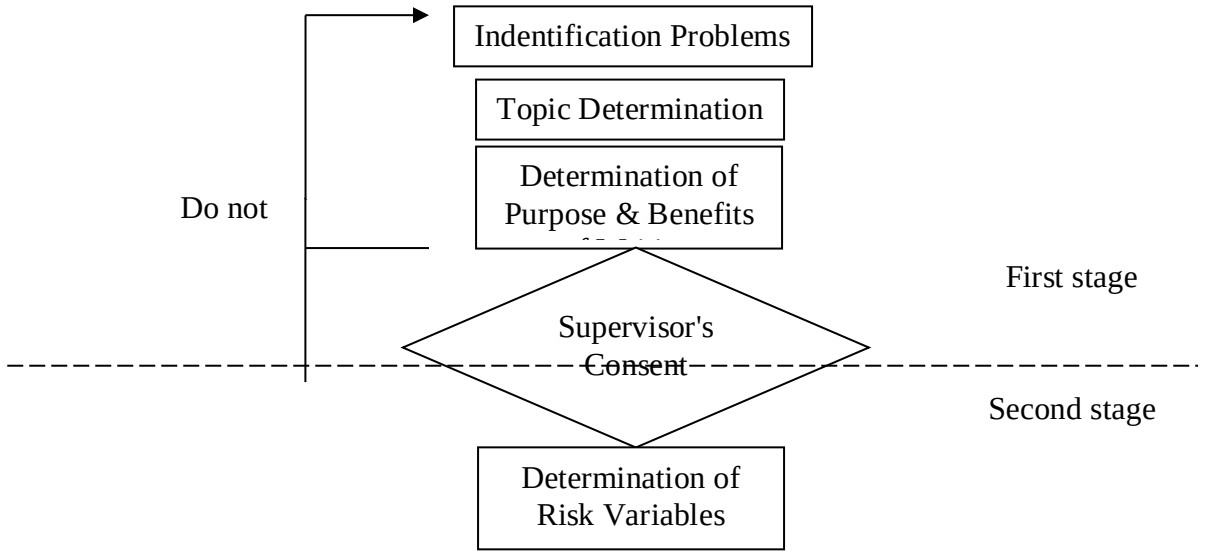
Waterland Metland Cibitung water ride is a project to build a metaland cibitung housing facility developed by PT. Metropolitan Land, Tbk in the cibitung area and as a west cikarang area. This ride will be built on an area of 1.8 hectares. Waterland Metland Cibitung is integrated with the commercial area of Metland Cibitung which occupies an area of approximately 24 hectares. The location of this waterland recreational ride with the Metland Telaga Murni KRL Commuter Line Station is only approximately 100 meters away.

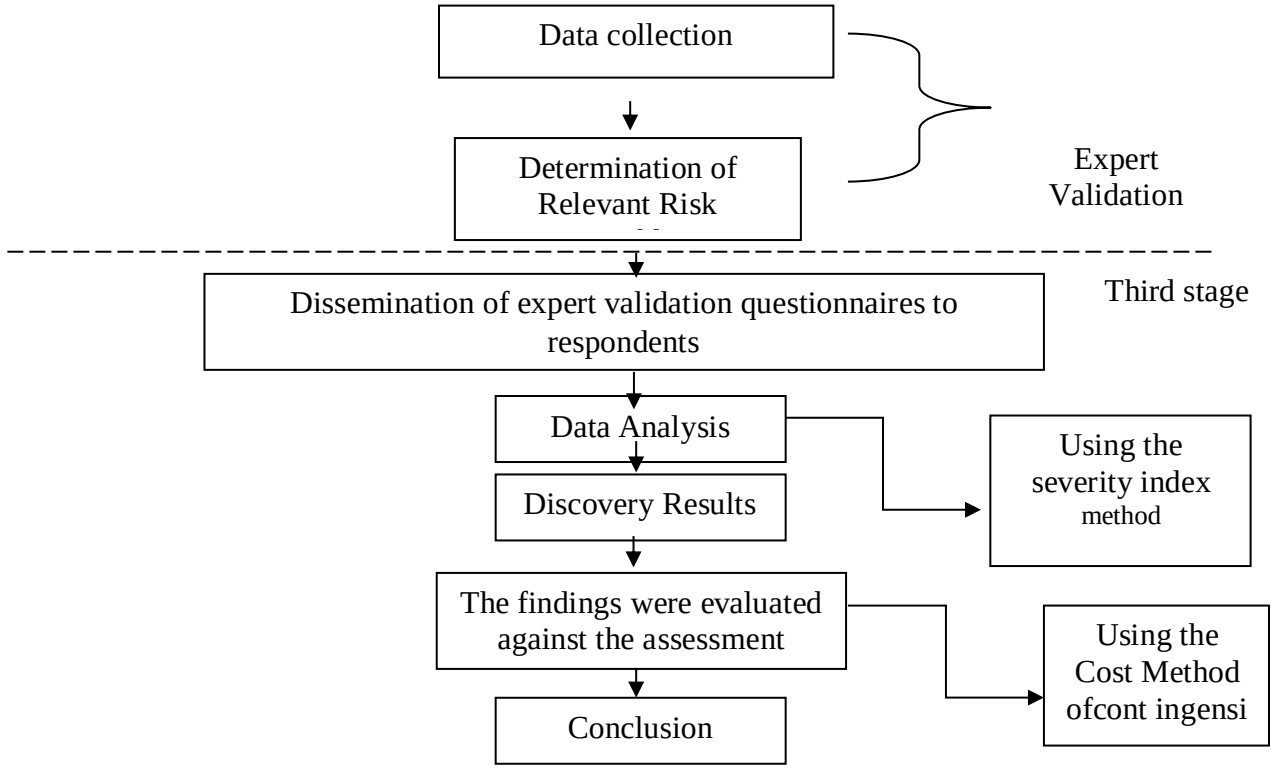
The need for entertainment venues or family recreation places in the Cibitung area is very minimal, with the presence of this waterland ride being a good thing for the local community, so that residents around Metland Cibitung and their own housing residents can fill their vacation time near their homes, without having to travel far from their homes.

Therefore, the research on the construction of the Waterland Metland Cibutung water park is the right choice for developers to invest in the Cibitung area, whose population growth rate is very fast followed by the growth of industry, tourism, infrastructure and housing. However, the large number of business competitors in the tourism sector makes business people have to be sensitive to all the risks they face. The importance of this greatly affects the smoothness and difficulty of the business can last until the life of the business plan to operate.

Based on the background above, it appears that so many problems occur during the operational phase which are motivated by various factors. However, until now it is not known exactly the dominant risk and response planning that will be taken on the risks that occur in the Operational phase of the Cibitung Waterland building. Furthermore, this study also aims to determine the amount of presentation of reserve costs or content costs prepared to maintain if that risk will occur during the operational life.

METHOD





RESULT AND DISCUSSION

In this study, the process of collecting primary data was carried out by means of direct interviews to fill out questionnaires to experts and respondents. The questionnaire for experts aims to find out the relevance of risk factors, probabilities and impacts of risks. The criteria for the expert in question are people who have more than 10 years of experience in the field of construction or in the field of operation of water playgrounds such as waterlands, waterparks, waterbooms and ordinary swimming pools. The questionnaire for respondents aims only at knowing the probability and impact of risks. The respondents referred to in this study are people who have experience in the operational world of water playgrounds. Respondents can act as Managers, maintanance staff, house keeping staff and life guards.

Risk Identification

Risk identification is the first stage of risk analysis. Data collection begins with the preparation of risk factors obtained from the results of literature studies into a questionnaire format for subsequent surveys to experts. Risk factors consist of 48 risks divided into six risk categories. The risk identification survey only asks about the relevance of a risk factor to occur in water playgrounds and affect its investment. The survey was conducted to three experts.

Table 1. Expert Profile

No	Expert	Ride name	Company name	Education	Position	Experience
P1	Expert 1	Gowet waterpark	PT. Mahaka Visual Indonesia	S1	Chief maintenance	17 Year
P2	Expert 2	Waterland Transyogi	PT kembang Griya Cahaya	S1	Operations Coordinator	16 Years
P3	Expert 3	Waterland Ujung Menteng	PT. Metropolitan Land	S1	Operations Manager	12 Year

The data from the expert's content is then processed and reduced using descriptive statistics. The risk factors used for subsequent research are risk factors that have an average value above the mean value, which is a risk factor that is declared relevant by two or more experts. The results of risk identification by experts can be seen in the following table:

Table 2. Risk Identification Results

No	Code	Types of Risks	Relevance						Conclusion	New Code
			Member 1		Member 2		Member 3			
			Already	Do not	Already	Do not	Already	Do not		
	A	**Resource Risk**								
1	A1	Worker disputes	√		√		√		Relevant	**X1**
2	A2	Guarantee of occupational safety and health	√		√		√		Relevant	**X2**
3	A3	Less effective employee development strategies	√			√		√	Irrelevant	
4	A4	Absence of Management Innovation	√		√		√		Relevant	**X3**
5	A5	Employee satisfaction (reward and punishment) is not balanced	√		√		√		Relevant	**X4**
6	A6	Bad Management Practices	√		√		√		Relevant	**X5**

7	A7	Depend on key employees		√	√			√	Irrelevant	
8	A8	Miscellaneous (filled by experts)								
	B	**Facility Risk**								
9	B1	Insufficient parking space		√	√		√		Relevant	**X6**
10	B2	No Prayer Room provided		√	√			√	Irrelevant	
11	B3	Tidak disediakan Polyclinic	√		√		√		Irrelevant	
12	B4	No space is provided for tenants		√	√			√	Irrelevant	
13	B5	No place is provided for the canteen		√	√		√		Relevant	**X7**
14	B6	No Information Center and pool supervisors are provided		√	√			√	Irrelevant	
15	B7	No lockers provided		√		√		√	Irrelevant	
16	B8	No security post		√		√	√		Irrelevant	
17	B9	Miscellaneous (filled by experts)								
		Lack of CCTV area monitoring							Relevant	**X8**
	C	**Promotion Risks**								
18	C1	Non-promotional		√	√		√		Irrelevant	
19	C2	Not doing marketing strategy		√	√		√		Relevant	**X9**
20	C3	Less strategic location		√		√		√	Irrelevant	
21	C4	Pool design is less attractive		√	√			√	Irrelevant	
22	C5	The design of the playground is less attractive		√	√		√		Relevant	**X10**
23	C6	Expensive Ticket Selling Price	√		√		√		Relevant	**X11**
24	C7	The same business competition around	√			√	√		Relevant	**X12**
25	C8	Miscellaneous (filled by experts)							Irrelevant	

	C8a	lack of analysis of market needs							Relevant	**X13**
	C8b	Not making gimmicks and cooperation with the nearest school							Relevant	**X14**
	D	**Maintanance Risk**								
26	D1	Dirty or smelly pool		√	√			√	Irrelevant	
27	D2	slippery floor		√	√		√		Relevant	**X15**
28	D3	mossy floor		√	√		√		Relevant	**X16**
29	D4	Leaks on the walls and floor of the pool	√		√		√		Relevant	**X17**
30	D5	Damage to playgrounds	√		√		√		Relevant	**X18**
31	D6	Unkempt garden area	√		√		√		Relevant	**X19**
32	D7	Wastewater to the environment		√	√			√	Irrelevant	
33	D8	Plumbing System is broken	√		√		√		Relevant	**X20**
34	D9	Pump Engine is dead or damaged	√		√		√		Relevant	**X21**
35	D10	Tap damage to the rinse chamber	√			√	√		Relevant	**X22**
36	D11	Lack of water capacity in the rinse room		√	√		√		Relevant	**X23**
37	D12	The Effect of Chlorine on the rinse chamber		√		√		√	Relevant	
38	D13	Miscellaneous (filled by experts)								
	D13a	Rupture of pool cramps							Relevant	**X24**
	D13b	Not keeping the pool clean before operation							Relevant	**X25**
	And	**Risk K3**								
39	E1	Lack of preparedness and preparedness of pool supervisors		√	√		√		Relevant	**X26**
40	E2	K3 equipment is not complete		√	√		√		Relevant	**X27**
41	E3	No medical personnel available		√		√		√	Irrelevant	

42	E4	The effect of chlorine on the eyes		√		√		√	Irrelevant	
43	E5	Visitor capacity does not match the capacity of the swimming pool		√		√		√	Irrelevant	
44	E6	Miscellaneous (filled by experts)								
	E6a	Lack of workers for pool supervisors (lifeguards)							Relevant	**X28**
	E6b	No cooperation with insurance parties regarding end-of-end safety							Relevant	**X29**
	F	**External Risk**								
45	F1	Natural disasters	√			√	√		Relevant	**X30**
46	F2	Demonstration			√	√		√	Irrelevant	
47	F3	Security intrusions			√	√		√	Irrelevant	
48	F4	Miscellaneous (filled by experts)								

From the table above obtained 23 risk factors that are declared relevant by the expert and plus 7 additional risk variables that become relevant . So a total of 30 risk variables for further research.

Risk Evaluation

Risk evaluation aims to determine the level of risk (risk level). The data used for risk evaluation are data on the impact and probability of the results of the expert and respondent fields on the risk questionnaire. There were three experts and 20 respondents who were able to answer the probability and impact questionnaire.

Probability is the probability or probability of a risk factor occurring in the operational phase of the waterland. Probability is based on data on the frequency of events over the past ten years. Meanwhile, the impact is the result of an event. Risk factors that may occur in the operational phase will have an impact that can affect operational costs. Probability and impact fills use the following scale:

Opeasional Risk Measurement

According to Hanafi 2006 : 208 one of the techniques for measuring operational risks using classification:

1) Frequency or probability of occurrence of risk

2) The degree of seriousness of the loss or impact of the risk

Table 3. Probability and Impact Scale

No	Description	Probality Scale in 1 Year	Impact scale
1	Very Small	very rare	Does not affect operational scheduling
2	Small	Rare	Less affects operational scheduling
3	Keep	Maybe it will happen	Moderately affects operational scheduling
4	Big	Will Happen	Affects operational scheduling
5	Very Large	Very likely to happen	Resulting in system failures and affecting operational scheduling

The risk evaluation method used is the Severity Index (SI) method which is useful for making risk classification easier. Severity Index can be indicated by the following equation (Al Hammad, 2014):

$$SI = \frac{\sum_{i0}^{4} a_i x_i}{4\sum_{i0}^{4} x_i}(100\ \%)$$

where:
SI = Severity Index
n = number of ratings
m = largest rating weight
ai = rating weight
fi = frequency of respondents

Table 4. Rating *Weights* for *Severity Index*

No.	Rating		
(i)	Number	Designations	Bobot (a)
1	1	Very Small	1
2	2	Small	2
3	3	Keep	3
4	4	Big	4
5	5	Very Large	5

After obtaining the SI results in the form of percentages, it is necessary to conduct a descriptive assessment based on these percentages, as follows (Davis and Cosenza, 1988 in Al Hammad, 2014):

SI < 20% = Very Low (SR)
20% SI ≤ < 40% = Low (R)
40% SI ≤ < 60% = Medium (S)
60% SI ≤ < 80% = Height (T)
80% SI ≤ ≤ 100% = Very High (ST)

The results of the risk probability analysis in Table 3.5 and the impact of risk in Table 3.6 are then entered into the matrix to determine the level of each risk. The matrix used is the one sourced from *PMBOK Guide 5th Edition, 2013, p. 2013. 331.* The results of the risk evaluation are contained in Table 5.

Table 5. Results of Risk Probability Analysis

Code	Risk Variables	Probalitas							
		1	2	3	4	5	Total	Yes	Description
X1	Occurrence of worker disputes	10	10	1	0	2	23	25%	Low
X2	Guarantee of occupational safety and health	1	3	6	8	5	23	55%	Keep
X3	Absence of Management Innovation	0	2	15	3	3	23	50%	Keep
X4	Employee satisfaction (reward and punishment) is not balanced	0	3	14	4	2	23	49%	Keep
X5	Bad Management Practices	2	10	8	0	3	23	39%	Low
X6	Insufficient parking space	5	12	6	0	0	23	28%	Low
X7	No canteen space is provided	11	9	2	1	0	23	22%	Low
X8	Lack of CCTV area monitoring	1	3	8	7	4	23	53%	Keep
X9	Not doing marketing strategy	2	16	5	0	0	23	29%	Low
X10	The design of the playground is less attractive	1	2	16	2	2	23	47%	Keep
X11	Expensive Ticket Selling Price	0	9	12	1	1	23	40%	Keep
X12	The same business competition around	0	4	6	10	3	23	54%	Keep
X13	lack of analysis of market needs	0	2	19	2	0	23	45%	Keep

X14	Not making gimmicks and cooperation with the nearest school	2	19	0	1	1	23	29%	Low
X15	slippery floor	1	10	10	2	0	23	37%	Low
X16	mossy floor	4	12	3	1	3	23	35%	Low
X17	Leaks on the walls and floor of the pool	0	1	12	8	2	23	54%	Keep
X18	Damage to playgrounds	0	1	4	15	3	23	61%	Tall
X19	Unkempt garden area	0	6	13	1	3	23	46%	Keep
X20	Plumbing System is broken	0	4	6	9	4	23	55%	Keep
X21	Pump Engine is dead or damaged	0	3	2	13	5	23	61%	Tall
X22	Tap damage to the rinse chamber	0	1	5	13	4	23	61%	Tall
X23	Lack of water capacity in the rinse room	1	1	17	3	1	23	47%	Keep
X24	Broken ceramic pool	0	3	2	13	5	23	61%	Tall
X25	Not keeping the pool clean before operation	3	15	2	2	1	23	32%	Low
X26	Lack of preparedness and preparedness of the pool supervisor (lifeguard)	0	3	17	3	0	23	45%	Keep
X27	K3 equipment is not complete	0	10	12	0	1	23	39%	Low
X28	Lack of workers for pool supervisors (lifeguards)	0	1	15	6	1	23	50%	Keep
X29	No cooperation with insurance parties regarding end-of-end safety	5	14	3	0	1	23	28%	Low
X30	Natural disasters	15	3	3	1	1	23	22%	Low

Table 6. Results of the Risk Impact Analysis

Code	Risk Variables	Impact							
		1	2	3	4	5	Total	Yes	Description
X1	Occurrence of worker disputes	1	6	12	2	2	23	58%	Keep
X2	Guarantee of occupational safety and health	3	13	2	5	0	23	48%	Keep
X3	Absence of Management Innovation	2	10	7	3	1	23	52%	Keep

X4	Employee satisfaction (reward and punishment) is not balanced	2	13	3	2	3	23	52%	Keep
X5	Bad Management Practices	1	0	14	3	5	23	70%	Tall
X6	Insufficient parking space	2	15	5	1	0	23	44%	Keep
X7	No canteen space is provided	2	2	13	6	0	23	60%	Tall
X8	Lack of CCTV area monitoring	4	12	2	4	1	23	48%	Keep
X9	Not doing marketing strategy	2	3	13	4	1	23	59%	Keep
X10	The design of the playground is less attractive	2	10	10	1	0	23	49%	Keep
X11	Expensive Ticket Selling Price	1	1	13	7	1	23	65%	Tall
X12	The same business competition around	0	7	12	3	1	23	58%	Keep
X13	lack of analysis of market needs	0	5	13	3	2	23	62%	Tall
X14	Not making gimmicks and working together with the school	1	3	14	5	0	23	60%	Tall
X15	slippery floor	1	1	7	11	3	23	72%	Tall
X16	mossy floor	0	2	4	14	3	23	76%	Tall
X17	Leaks on the walls and floor of the pool	0	1	2	16	4	23	80%	Very High
X18	Damage to playgrounds	0	1	1	10	11	23	87%	Very High
X19	Unkempt garden area	0	12	8	2	1	23	53%	Keep
X20	Plumbing System is broken	0	0	2	6	15	23	91%	Very High
X21	Pump Engine is dead or damaged	0	0	1	2	20	23	97%	Very High
X22	Tap damage to the rinse chamber	0	12	4	5	2	23	57%	Keep
X23	Lack of water capacity in the rinse room	1	7	8	4	3	23	61%	Tall
X24	Rupture of pool cramps	0	2	11	7	3	23	70%	Tall
X25	Not keeping the pool clean before operation	0	4	10	7	2	23	66%	Tall
X26	Lack of preparedness and preparedness of pool supervisors	1	11	2	7	2	23	58%	Keep
X27	K3 equipment is not complete	2	13	2	4	2	23	52%	Keep
X28	Lack of workers for pool supervisors (lifeguards)	1	12	4	2	4	23	57%	Keep
X29	No cooperation with insurance parties regarding end-of-end safety	1	6	13	0	3	23	58%	Keep

X30	Natural disasters	1	0	4	15	3	23	77%	Tall

After a risk assessment is carried out, it is to make it easier to find out the risks that are the most priority to be handled is to include each occurance and severity values of each risk where the x-axis is the severity of a risk (severity) and the y-axis is the degree of probability or probability of occurrence of a risk (occurance). The results of the risk matrix of risks that may occur in this water playground can be seen in table 6 below.

Table 7. Matrix Of Probality and Impact

Probalitas						
	Very High					
	Tall			X22,	X24	X18, X21
	Keep			X2,X3,X4,X8,X10,X12, X19,X26,X28	X11, X13,X17,X23	X20
	Low			X1,X6,X9,X27,X29	X5,X7,X14,X15,x 16,X25,X30	
	Very Low					
		Very Low	Low	Keep	Tall	Very High

Impact

Information:

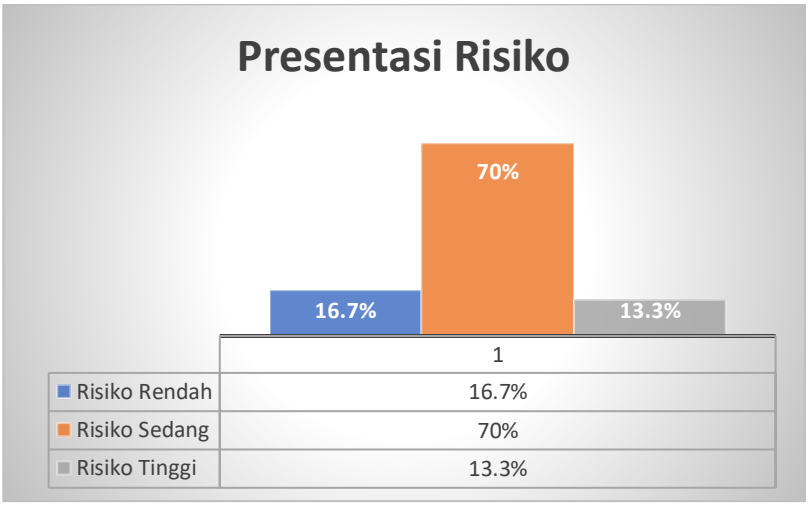
= Low

= Medium/*Moderate*

= *High*

So from the matrix table above, we can see that for low risk there are 5 variables, risk with a medium level there are 21 risk variables, risk with a high level of 4 risk variables

Figure 1. risk level in presentation



Based on the purpose of this writing, namely determining the dominant risk or very high risk, 4 variables are obtained which are the next discussion according to the purpose of writing, namely:

1. Variable risk Of Damage to playgrounds (X18)
2. Variable risk of damaged plumbing system (X20)
3. Variable risk of pump engine failure or damage (X21)
4. Variable risk of pool rupture (X24)

Contingency Cost Estimation

Contingency Costs are a certain amount of funds provided in reserve to deal with uncertainties related to financing estimates. The percentage of contingency costs in the operational phase of cibitung waterland metland can be calculated based on the high risk obtained from this research. The percentage of contingency costs can be calculated by the following equation:

%BC=L x I

where:

%BC= Percentage of Contingency Costs

L = Frequency Probability

I = Magnitude of Impact

By using frequency probability data and impact level values from the results previously found, results are obtained as in the following table:

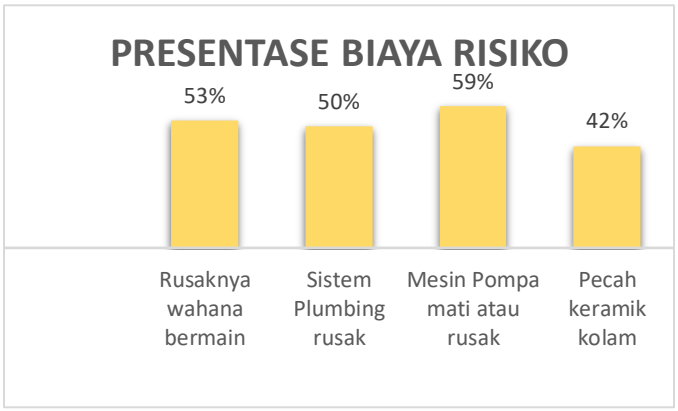
Table 8. Percentage of Cost Increases Due to Operational Risks

No	Code	Risk Component	L	I	%BC	Affected Cost Components
Operational Phase						
1	X18	Damage to playgrounds	0,61	0,87	53%	Maintanance Costs
2	X20	Plumbing System is broken	0,55	0,91	50%	Maintanance Costs
3	X21	Pump Engine is dead or damaged	0,61	0,97	59%	Maintanance Costs
4	X24	Broken ceramic pool	0,61	0,70	42%	Maintanance Costs
	The amount of presentation of Maintenance Risk:				**51%**	

Source : Processed products

If depicted on the graph the percentage of the amount of risk costs in each risk component at the preconstruction stage, it can be seen in the figure below

Figure 2. Percentage of Risk Costs in the Operational Phase



By using frequency probability data and impact level values from the results found earlier, results are obtained as in the following table.

After obtaining the results of the probability value of frequency and impact, an estimate of the increase in contingency costs based on risk can be obtained using the equation %BC= L x I. Results from the equation. multiplied by the amount of cost per component based on the existing operational budget plan data, it will be obtained what percentage of the component contingency costs are related to the risks obtained.

Table 9. Cost Revenue Data for 2023

Cost of Revenue 2023		
	Sum	Weight
Electricity	IDR 510,000,000	17,92%
Water (PAM)	IDR 120,000,000	4,22%
Gas	Rp -	0,00%
Porporasi	IDR 688,500,000	24,19%
Direct Labor (Daily Salary & THR)	IDR 780,000,000	27,40%
Uniform	Rp -	0,00%
Maintenance	IDR 115,000,000	**4,04%**
Chemical	IDR 536,863,636	18,86%
Landscape	IDR 36,000,000	1,26%
Engineering	IDR 60,000,000	2,11%
Total	IDR 2,846,363,636	100,00%

The costs that are influenced by the results of high-risk research are maintenance costs.

Amount of Risk Costs in the first year: Amount of Cost in the first year x Percentage of Contingency Costs

Amount of Risk Cost in the first year: IDR 115,000,000 X 51%

IDR 58,607,608.70

So the amount of co-operation costs or reserve costs in the first year of operation is IDR 58,607,608.70 or with a presentation of 51% of the estimated maintanance costs which will be estimated annually during the operational life. Or 2.06% of the budgeted operating costs every year

CONCLUSION

Based on the results of the literature review, there are 42 variables that can affect the operation of water playgrounds. The next stage is to verify, clarify and validate the three experts to determine the variables that greatly affect the operation of waterparks, waterlands, waterbooms and ordinary swimming pools. Based on the results of expert validation, 30 variables were obtained that were very influential, these variables were

used for the distribution of questionnaires to similar water playground operations consisting of operational managers, maintanance staff, life guards, housekeeping and other staff who are experienced in water playground operations. Of the 30 risks assessed as relevant, those with a "*High*" risk level are the risk variables of damage to playgrounds (X18), variables of risk of damaged plumbing systems (X20), variables of risk of pump machines dying or damaged (X21), variable risk of rupture of pond cramps (X24), As well as 21 risks with a "*Medium*" level and 5 risks with a "*Low*"level. From the results of the presentation of the amount of risk (high risk) affecting operational costs, namely in the maintanance cost item with an additional biya reserve per year of 51%. Or 2.06% of operational costs.

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