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Risk Management Analysis of Road Improvement Projects on Disaster High-Risk Areas Funded by Special Allocated Funds

(The Improvement Study of Kahanjak Road Dak Regular in Tasik Payawan District, Katingan Regency)

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Abstract:-This research was intended to identify the risk factor that had major impact on roads improvement projects which funds are sourced from Special Allocation Funds (DAK) in Tasik Payawan district which located on disaster high risk areas and to know recommendations of any risk mitigation that should be taken to mitigate the risk effects that are occurring. This research uses the Godfrey risk analysis method. In the early stages of this study, studies were carried out by early literature and data gathering that relate to objects research, then identified risk factors and risk variables that are adjusted to the research object. Risklevels of impact and risk response levels are conducted as a basis in the creation of a risk management model that will be intended to mitigate the risks that will impact the implementation of the project. Basedon the research results, there are 35 identified risks that affect the project, 11 risks (31.43%) originating from planning factors, 9 risks (25.71%) originating from tools and materials factors, 5 risks (14.29%) which are sourced from policy factors and 10 risks (28.57%) sourced from implementation factors. The distribution of risk acceptance that has an impact on costs is 5risks (14%) classified as unacceptable, 25 risks (72%) classified as undesirable, 5 risks (14%) classified as acceptable. The distribution of riskacceptance that has an impact on time is 8 risks (23%) classified as unacceptable, 26 risks (74%) classified as undesirable, 1 risk (3%) classified as acceptable. Risk mitigation targets are carried out for dominant risks, namely risks with the categories of unacceptable risk and undesirable risk. The recommendation for mitigation risk is done by making SOP (standard operating procedure) handling of construction work set by the head of the region and bureaucracy that gives the ease to the C mining clearance.

Keywords:-*Project, Risk, Disaster, Risk response, Risk mitigation.*

I. INTRODUCTION

In 2021 at TasikPayawan district, there were 5 (five) work packages carried out through public work service, the layout of space and linkage of katingan regency, where all of these work packages were done on a contract value addendum and were delivered out of a job at 100 %. There were two packages of road construction, which were heavily affected by the flood disaster, the construction work TumbangPanggo-Hampalit-Petak-Bahandangroad with a final contract value following the restructuring of Rp.561,422,900 (five hundred and sixty-one million.) With the latest work progress of 67.61 % (fig. 1).

Fig. 1: The location of Tumbang Panggo-Hampalit-Petak Bahandang Road Development Project in Tasik Payawan District for the 2021 Fiscal Year that was flooded

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The construction work of road to the village of Talingke was carried out with a final contract value following the reductions of Rp. 425,815,153.68 (four hundred twenty-five million eight hundred and fifteen thousand one hundred fifty-eight cents), with the latest work progress of 51.49 % (fig. 2).

Fig. 2: The location of the Construction project road to Talingke Village in TasikPayawan District which was flooded

Another damaged road affected by flood is in the improvement work package for Kahanjak Road in TasikPayawanDistrict (fig. 3), and the First Handover (PHO) of December 27, 2021, with the latest work progress of 87.17 % (as per initial contract ended in November 27, 2021 and 100% job completion target).

Fig. 3: The location of the Kahanjak Road Improvement Project (DAK-Regular) in TasikPayawan District in 2021 is flooded

Based on above description, it shows the location of TasikPayawan, Katingan Regency which included the disaster-prone area, especially flood disaster. Each year, the Government of Katingan regency allocates funds for the construction of facilities and infrastructure in the area, whether this is facilityof houses, worship, health, education and other public infrastructures including roads and bridges. In implementation, it often occurs problems and obstacles in its implementation mainly caused by flood disaster.

The Project of Kahanjak Road Improvement (DAK-Regular) in TasikPayawan district in 2021 is located in relatively flat topography, with an altitude is between 19 and 35 meters above the sea level. The complexity of work is quite high considering the magnitude of the available ceremony (contract value of Rp.31,808,000, 000) and must be completed in a year of Budget and the location of the work is in the Flood disaster area. In 2021,flood disaster occurred 3 times (three) in the Katingan Regency which affected to the implementation of this road improvement project that affected the time, cost and quality of work. Another problem is the physical doc-distribution must be done gradually (3 stages), so although the payment system in the contract used the Monthly Certificate/ MC type, but the payment process according to the monthly employment progress could not be done on a monthly schedule, because the funds were often not available. This has an effect on the performance of the contractor including materials purchasing, equipment operating and salaries of workers. Pandemic Covid-19 was also very influential on project performance, where when there was a confirmed worker affected by covid-19, then it was required maintenance and time isolation that was quite long. The impact of these risks was very detrimental to an organization, including stakeholders, owners, contractors, and grass-root as the end user of a construction project. Based on this, it is necessary to perform the risk management analysis project road improvement in disaster prone areas financed by special allocation funds (DAK) on the project of road improvement of KahanjakRoad DAK-Regular in TasikPayawanDistrict, Katingan Regency.

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II. LITERATURE REVIEW

(PMBOK 5th, 2013), defines a project as a temporary endeavour undertaken to create a unique product, service or result. The temporary nature of the project indicates that the project has a definite beginning and end. End is reached when the project objectives have been achieved or when the project is terminated because the objectives will not or cannot be met, or when the need for the project no longer exists.**(Kerzner, 2003)**, a project can be defined as a series of activities and tasks that: have specific objectives to be completed within certain specifications, have defined start and end dates, have funding restrictions (if applicable), consume human and non-human resources (i.e., money, people, equipment) and whether it is multifunctional (i.e., intersects some functional lines).According to Larsson (2013), a project is a temporary organization, with clear goals and unique tasks, with a definite start and end, as well as its own budget.**(Widiasanti et al, 2013)**, in achieving the objectives of a project, there are limitations that must be met, namely the amount of costs (budget) allocated, the schedule and quality that must be met. The three important parameters for project organizers are often associated as project objectives. Those three mentioned above are called the three constraints (triple constraint).**(Godfrey et al, 1996)**, quote of**Sir Michael Latham**, ″no construction project is risk free. Risk can be managed, minimized, shared, transferred, or accepted. It cannot be ignored″. **(PMBOK 7th, 2021),** also definesrisk as an event or condition that is not certainty, which, if it occurs, could have a positive or negative effect on one or more objectives. **(Subagyo et al, 2020)**, risk is always associated with the possibility of something unexpected/unwanted harm happening. So, it is an uncertainty or the possibility of something happening, which if it happens will result in a loss. **(Vaughan, 2008)**, risk can be defined in various ways: Risk is the chance of loss, Risk is the possibility of loss (risk is the possibility of loss), Risk is uncertainty (risk is uncertainty), Risk is the dispersion of actual from expected results (risk is the actual dispersion of expected results), Risk is the probability of any outcome different from the one expected. **(Joint Australian New Zealand International Standard AS/NZS ISO 31000:2009,2009)**, risk management is "coordinated activities to direct and to control an organization with regard risk". Previously, there are several studies that raised the topic on project risk management, both risks at the planning stage up to the project implementation stage. Among other studies: **(Qonita, 2019),**said that the research project is an environmental road project with safety risk factors that are a major focus of research reveals that security risks urgently need attention in project risk management. Based on the results of the study, 16 risks factor security, as many as 8 (50%) are listed as equal, 1 (6.25%) risk is assesss.2 (12.5 percent) risk is listed as acceptable and 5 (31.25%) risk is classified as negligible. Moreover**(Putra, 2020)**, research is conducted at a risk to build a regional construction project funded with a special allocation fund (study of poverty river road of hope, growth of the earth, district of the sea), with a project value of Rp. 6,325,831,000. That research had obtained a risk-yield of 8 unacceptable risks, 1 undesirable risk, 2 acceptable risks and 1 negligible risk.

From all theabove research, it has not been specifically researching the risks on district road improvement projects that is financially funded from the Special Allocation Fund (DAK) with a large contract value (Rp 31,808 million.00) which is implemented at 1 (one) budget year located in disaster prone locations and occurred at the time of Covid-19 pandemic. The risk identification is performed for all possible sources of risk and is not limited to certain risk sources. This study aims to determine the level of risk, the dominant risk (unacceptable risk and undesirable risk) and to formulate risk mitigation strategies to be done. The object of the research is the improvement road project of the Kahanjak (DAK-regular) in TasikPayawan District in the year of 2021. This study will only discuss about the risks that impact on time and cost.

III. RESEARCH METHODOLOGY

In the early stages of this study, a study of literature and data collections are associated with research objects. Initial risk identification is made through literature studies and interviews with Commitment Officials (CMO) and field observations. The needed data include primary and secondary data. Primary data is obtained through initial interviews with Commitment Officials (CMO) and field observations. Whereas secondary data are obtained through contract data along with addendum, the supervisory consultant reports and events including those for literature studies payment. The primary and secondary data above are used for analyzing and compiling initial risk identification, which will then be used as material/input in the compilation of statement in the questionnaire, including selecting the Respondents to be the target of the questionnaire.

After obtaining initial risk identification, then the primary data collection through questionnaires is done to get feedback from the respondents on the varying scale and impact scale. From the questionnaire it will be analyzed to get a degree of risk on the Kahanjak road improvement project (DAK - regular) in 2021. This primary data will then be a guide in analyzing risk acquisition levels and dominant risk factors. The respondents answer to the frequency scale/likeLihood and the scale of the impact which is divided into 5 (five) scale levels such as Table 1. and Table 2.

Table 1: Level and scale of frequency (Likelihood) (Godfrey, 1996)

Frequency level	Scale
Very often	5
Often	4
Sometimes	3
Rarely	2
Very rare	1

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Table 2 Levels and scale of impact (Consequence) (Godfrey, 1996)

Impact level	Scale
Very high	5
High	4
Medium	3
Low	2
Very low	1

After the questionnaire data obtained, the validity of the statement items of the questionnaire using the Spearman correlation coefficient test is conducted, in this study used SPSS application for Windows Ver.25. If the result of validity test has a valid quantity of statement, the questionnaire is not included in the next validity test. The validity test is carried out until all values of the questionnaire statistics are valid. After the valid quartzine questionment then the test is relucted to question the reference to the Alpha Cronbach test, in this study used SPSS application for Windows Ver.25. The value of the alpha Cronbach coefficient is like in Table 3.

Table 3: Alpha Cronbach Value

Alpha Score			Reliability level
0.00	-	0.20	less reliable
0.21	-	0.40	a bit reliable
0.41	-	0.60	quite reliable
0.61	-	0.80	reliable
0.81	-	1.00	very Reliable

The respondent item questioner statement should be tested its receiveness and reliability, the next result is determined by the respondents' mode for each item of questionnaire statement. The respondents' mode is done by identifying the tendency of their answers to the/frequency/applied/appearance/ consequence, and also by determining the mode of the answer of each question from each respondent by using the SPSS for Windows VER app. 25.

The risk analysis method used is the Godfrey method, by measuring the amount of risk value that is a multiplication of the frequency (the likelihood) with the impact of the identified risk. The risk value determines the level risk (Pic. 1) and the risk acceptability (Pic. 2).

Likelihood					
5	5 (high)	10 (high)	15 (ekstreme)	20 (ekstreme)	25 (ekstreme)
4	4 (medium)	8 (high)	12 (high)	16 (ekstreme)	20 (ekstreme)
3	3 (medium)	6 (high)	9 (high)	12 (high)	15 (ekstreme)
2	2 (low)	4 (medium)	6 (high)	8 (high)	10 (high)
1	1 (low)	2 (low)	3 (medium)	4 (medium)	5 (high)
	1	2	3	4	5
			Consequence		

Pic. 1: Qualitative Risk Assessment Matrix (Godfrey, 1996)

In the 5x5 matrixs, there are 4 parts or regions that describe the severity of a risk. It usually usesgreycolor for scale risk of 1-2 (low risk level), green color for scale level risk of 3-4 (medium risk level), yellow color for scale level risk of 5-12 (high risk level) and red color for scale risk scale of 15-25 (extreme risk level).

	Unacceptable	15	-	25
	Undesirable	5	-	12
	Acceptable	3	-	4
	Negligible	1	-	2

Pic. 2: Risk-level Matrix (Godfrey, 1996)

Based on the pic. 2, the risk acceptance levels are divided into 4 (four) levels that can be explained as follows:

- Unacceptable risk, usually represented in red, is an unacceptable risk and must be eliminated or if possible, transferred to another party.
- Undesirable risk, described in yellow, is a risk that requires risk handling to an acceptable level.
- Acceptance Risk, described in green, is an acceptable risk of having no major impact and within acceptable limits.
- Negligible Risk, represented in gray, is a risk with a very small effect so that can be ignored.

In this study, the types of risk mitigation targets belong to unacceptable risk and undesirable risk, with the following steps:

- Assessing the highest risk rating of each risk source and creating the risk register, which will be a priority target for risk mitigation.
- Determining risk owners. (Ownership of risk).
- Deciding what to do about the risks being targeted for risk mitigation.
- Final validation of risk mitigation by conducting interviews with experts.

IV. RESULTS AND DISCUSSION

From literature studies, observation and interviews are acquired by as much as 40 (forty) risk factors that are then composing of a questionnaire which are named for each risk factor by the source of the risk. Risk identification results can be seen on table 4.

Table 4: Risk Identification

Risk sources		Changes and Uncertainties
1. Planning factors	A1	The company's lack of experience in road planning in high-risk areas
	A2	There is no risk expert on the project
	A3	Preliminary survey is not detailed
	A4	There is no consideration of constructability and disaster risk in planning
	A5	There is no disruption risk consideration in planning
	A6	Budget is arranged regardless of disaster risk
	A7	Schedule of implementation is composed of regardless of disaster risk
	A8	The planning of tools and materials is organized without regarding or concerning the risk of disaster
	A9	Planning experts in contracts are different from the one in the field
	A10	Management planning up to physical tender without considering the risk of disaster
	A11	The company's lack of experience in road planning in high-risk areas
2. Tools and material factors	B1	Mobilization of heavy equipment and materials difficulties
	B2	No spare equipment
	B3	Mismatches of the equipment used
	B4	Less experienced heavy-duty operator
	B5	Low equipment productivity
	B6	Materials damage due to the disaster
	B7	Limited materials (the location of the mine with the official c-clearance)
	B8	Catastrophic loss of materials
	B9	Heavy equipment malfunction catastrophic
	B10	Engineers and mechanics are incompetent heavy machinery
	B11	Rising materials price
3. Policy factors	C1	Is overdue for Juknis DAK from the federal government
	C2	Regulations about DAK are fickle
	C3	Slow flow to the local government
	C4	Financing system gradual (not at all transferred to the region)
	C5	Implementation is not waiting for the APBD to change
	C6	Complicated exchange of funds
	C7	The amount of down payment of DAK funds based on the DAK juknis issued by the Minister of finance (not perpetrator of 12 years 2021 on Procurement of Government Goods and Services)
	C8	The percentage of the net profit is not made per package work, but it is taken into account for the total assets of the regency
	D1	Creating a work schedule without regarding the disaster risk
	D2	Work methods designed without regarding the disaster risk
	D3	Less responsive to disaster risk mitigation
	D4	Lack of coordination between those involved in the disaster
	D5	Negligence in action
	D6	Workers do not use a complete selfsafetytools
	D7	Occupational Health and Safety Planis not executed in the field

4.	Implementation factors	D8	Plagues that affect job performance (e.g., the covid-19 pandemic and post flood)
		D9	Damage of completed and checked work
		D10	Halted the field work in response to a flood disaster
		D11	An incompetent supervisory consultant

In this study, the respondents are amount to 28 people. The respondents consist of 20 employees from the Public WorkOffice of Setup and Space Regulation of Katingan, 5 personnel of Implementing Contractor from PT. Multi Karya Primas Mandiri and 3 personnel of consultant supervisor from CV. Antang Sakti. The respondents'profileis delivered in Table 5.

Table 5: Respondents Profile

No.	Name	Position	Gender	Age (Year)	Education	Experience (Year)
Public Works Office of Setup and Space Regulation of Katingan:						
1	Respondent 1	Head of Departement	Man	54	Bachelor Degree 3	29
2	Respondent 2	CMO/PPK	Woman	47	Bachelor Degree 2	13
3	Respondent 3	PPTK	Man	45	Bachelor Degree	20
4	Respondent 4	Field Supervisor	Man	41	Bachelor Degree	13
5	Respondent 5	Field Supervisor	Man	41	Bachelor Degree	12
6	Respondent 6	Field Supervisor	Man	40	Bachelor Degree 2	12
7	Respondent 7	Field Supervisor	Man	40	Bachelor Degree	10
8	Respondent 8	Field Supervisor	Man	38	Bachelor Degree	16
9	Respondent 9	Field Supervisor	Man	38	Bachelor Degree	8
10	Respondent 10	Field Supervisor	Man	31	Bachelor Degree	7
11	Respondent 11	Field Supervisor	Man	51	Senior high school	24
12	Respondent 12	Field Supervisor	Man	48	Senior high school	22
13	Respondent 13	Field Supervisor	Man	47	Senior high school	20
14	Respondent 14	Field Supervisor	Man	51	Senior high school	15
15	Respondent 15	Field Supervisor	Man	45	Senior high school	20
16	Respondent 16	Field Supervisor	Man	45	Senior high school	7
17	Respondent 17	Field Supervisor	Woman	26	Bachelor Degree	2
18	Respondent 18	Field Supervisor	Man	33	Bachelor Degree	1
19	Respondent 19	Field Supervisor	Man	24	Bachelor Degree	1
20	Respondent 20	Field Supervisor	Woman	24	Bachelor Degree	2

Table 6: Contractor of PT. Multi Karya Primas Mandiri

No.	Name	Position	Gender	Age (Year)	Education	Experience (Year)
Contractor of PT. Multi Karya Primas Mandiri:						
1	Respondent 21	President Director	Man	29	Bachelor Degree	5
2	Respondent 22	Project Manager	Man	34	Bachelor Degree	9
3	Respondent 23	Engineering Manager	Man	43	Bachelor Degree	8
4	Respondent 24	OHS	Man	29	Bachelor Degree	6
5	Respondent 25	Financial Manager	Woman	36	Bachelor Degree	8
Consultant Supervision of CV. Antang Sakti:						
1	Respondent 26	Site Engineer	Man	43	Bachelor Degree	10
2	Respondent 27	Quality/Quantity	Man	41	Bachelor Degree	16
3	Respondent 28	Inspector	Man	44	Bachelor Degree	8

The questionnaires who aretotally 28 people have been tested the validity of using Spearman's Rank Correlation with 95% confidence degree and RHO table 0.375 (n = 28). The validity test is carried out on the scale of tendency/likelihood, the scale of impact on cost and scale of impact on time. The validity test is done by using the SPSS for Windows Ver.25 application. In the validity test, 1-valid instrument of the questionnaire obtains C6 and CHI statement item (the scale of tendency/likelihood and the impact scale of the cost). Then, the test of 2-validity obtains 3 invalid items i.e., B8 statement items (impact scale on cost), statement item c5 (the impact scale of time) and D5 statement items (tendency/ likelihood scale). In the 3rd validitytest, there are 35 statement items of the questionnaire of the tested questionnaires. The 3rd validity test results are either to scale the tendency/likelihood, the scale of impact

on costs and the scale of impact on the time of all values of valid questionnaires statements as in Table 6.

Table 7: Validity Test Results

Statement Item	*Rho's count*			Description
	Likelihood	Cost impact	Time impact	
A1	0.526	0.648	0.635	valid
A2	0.543	0.537	0.617	valid
A3	0.421	0.626	0.551	valid
A4	0.658	0.724	0.533	valid
A5	0.472	0.458	0.481	valid
A6	0.626	0.445	0.478	valid
A7	0.566	0.657	0.610	valid
A8	0.586	0.442	0.748	valid
A9	0.681	0.510	0.605	valid
A10	0.764	0.526	0.604	valid
A11	0.655	0.517	0.664	valid
B1	0.485	0.476	0.436	valid
B2	0.725	0.606	0.670	valid
B3	0.679	0.470	0.748	valid
B4	0.647	0.589	0.558	valid
B5	0.572	0.717	0.701	valid
B6	0.485	0.499	0.419	valid
B7	0.470	0.517	0.456	valid
B9	0.460	0.531	0.683	valid
B10	0.458	0.579	0.474	valid
C1	0.481	0.459	0.761	valid
C2	0.428	0.454	0.693	valid
C3	0.431	0.392	0.624	valid
C4	0.455	0.611	0.503	valid
C7	0.455	0.477	0.490	valid
D1	0.509	0.465	0.457	valid
D2	0.496	0.383	0.416	valid
D3	0.438	0.425	0.444	valid
D4	0.495	0.598	0.552	valid
D6	0.382	0.528	0.556	valid
D7	0.436	0.633	0.456	valid
D8	0.377	0.524	0.465	valid
D9	0.375	0.464	0.621	valid
D10	0.414	0.513	0.475	valid
D11	0.501	0.706	0.424	valid

Valid questionnaires include 35 items (statement items A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, B1, B2, B3, B4, B5, B6, B7, B9, B10, C1, C2, C3, C4, C7, D1, D2, D3, D4, D6, D7, D8, D9, D10, D11) that will follow up on the cost/application scale and the impact scale on time. Reliability test is made with the alfa cronbach technique using SPSS for Windows ver. 25. Results of such reliability tests are on Table 8.

Table 8: Results of Reliability Testing

	Cronbach Alpha's value	Description
Likelihood	0.928	very reliable
Impact of cost	0.930	very reliable
Impact of time	0.946	very reliable

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Before a risk analysis is conducted, it first determines a person's response toward both the diagnosis and the impact by looking for the mode of each questionnaire's answer. The orientation of answers is based on both valid and reliable questionnaires. Calculating process is using a SPSS for Windows ver. 25.The level of risk to costs is obtained through frequency multiplication on cost/impact and the degree of risk to time is obtained through frequency multiplication on the consequences/impact on time.

The level of risk of each risk factor would determine the risk acceptability rate based on the risk matrix according to the pic. 1 and pic 2.

Table 9: Risk Assessment Impact on Cost and Time

Statement Item	Respondent Answer Mode			Risk Value of Cost	Risk Value of Time
	Likelihood	Cost Impact	Time Impact		
A1	2	4	4	8	8
A2	3	3	3	8	9
A3	3	3	3	9	9
A4	2	3	3	6	6
A5	2	4	4	8	8
A6	4	3	3	12	12
A7	4	3	3	12	12
A8	4	3	4	12	16
A9	3	2	3	6	9
A10	2	2	4	4	8
A11	2	3	3	6	6
B1	3	3	4	9	12
B2	3	3	4	9	12
B3	2	3	3	6	6
B4	2	3	3	6	6
B5	2	2	4	6	6
B6	4	4	4	16	16
B7	5	4	4	20	20
B9	2	2	3	4	6
B10	3	4	3	12	9
C1	3	2	2	6	6
C2	2	2	3	4	6
C3	3	3	3	9	9
C4	4	2	2	8	8
C7	2	2	2	4	4
D1	4	3	4	12	16
D2	4	3	4	12	16
D3	3	3	4	9	12
D4	2	4	3	8	6
D6	4	2	2	8	8
D7	3	2	2	6	6
D8	4	4	4	16	16
D9	4	4	4	16	16
D10	5	4	5	20	25
D11	2	3	3	6	6

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Based on the cost impact value of the Table 9 above, there are as many as 5 (five) risk falls in the risk category, 25 (twenty-five) risks added to the undesirablerisk and 5 (five) risks added to the unacceptable risk. The risk management will be undertaken to the dominant risk with the category of unacceptable risk and undesirable risk. The percentage rate of risk acquisition impact on cost is in fig. 4.

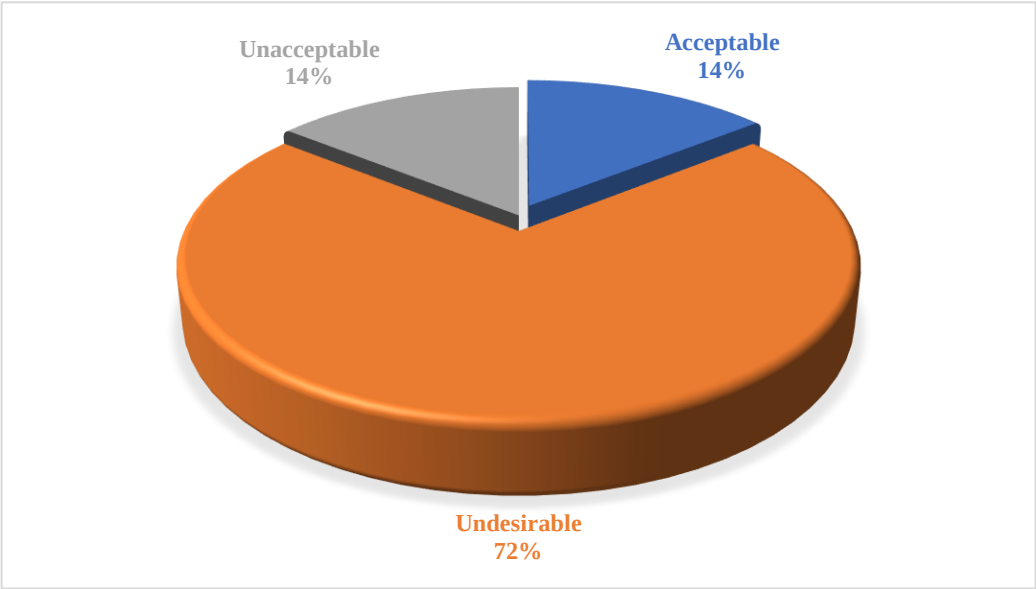

Fig. 4: Level of Acceptance of Impact Risk to Cost

Based on the risk value of impact time of Table 9 there is 1 (one) risk that includes the acceptable category of risk, 26 (twentysix) risks that include the undesirable risk category and 8 (eight) the risks that include the unacceptable risk. The percentage of acceptance levels of impact risk to cost is according to fig. 5.

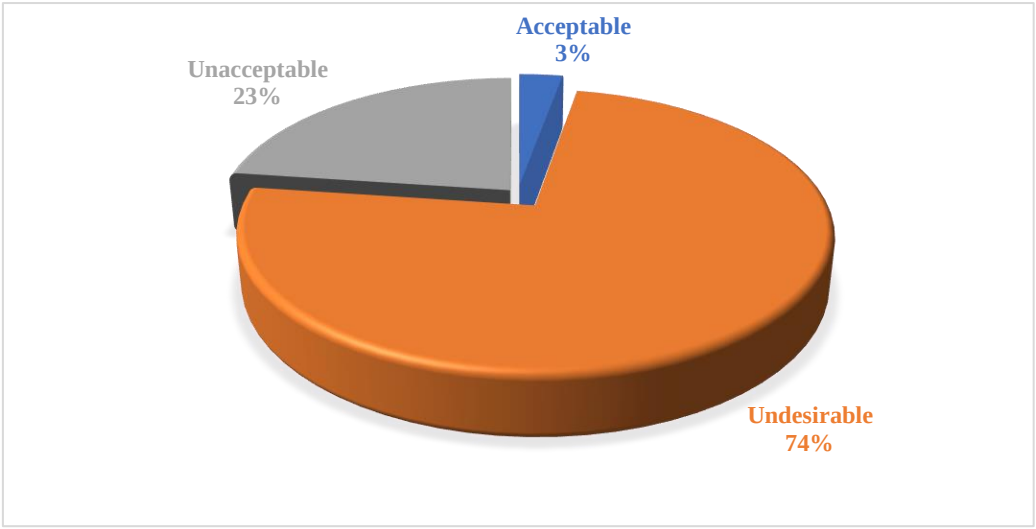

Fig. 5: Level of Acceptance of Impact Risk to Time

The next step is to develop a risk mitigation strategy. The risk that mitigation action will be taken is dominant risk, which is included in the unacceptable risk and undesirable risk whether it is a risk factor that impacts the cost and impact on time. In this study, it will only be taken 3 risk factors for each risk source that has the highest risk value,for the acceptance of the entry risk of the unacceptable risk and undersirable risk whether it is for the risk that impacts on cost (Table 10) and impact on time (Table 11).

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Table 10: Target Risk Mitigation Impact on Costs

Risk sources		Risk Identification
1. Planning factor	A6	Budget is arranged regardless of disaster risk
	A7	Schedule of implementation is composed of regardless of disaster risk
	A8	The planning of tools and materials is organized without regarding the risk of disaster
2. Tools and material factors	B7	The planning of tools and materials is organized without concerning the risk of disaster
	B6	Materials damage due to the disaster
	B10	Engineers and mechanics are incompetent heavy machinery
3. Policy factors	C3	Slow flow to the local government
	C4	Financing system gradual (not at all transferred to the region)
	C1	Is overdue for Juknis DAK from the federal government
4.Implementation factors	D10	Halted the field work in response to a flood disaster
	D8	Plagues that affect job performance (e.g., the covid-19 pandemic and post flood)
	D9	Damage of completed and checked work

Based on Table 10, there are 12 risk factors that need to be handled, 5 risk factors to be considered unacceptable risk factors and 7 risk factors to be considered undesirable risk. Mitigation recommendations are adapted to the responsible/owner of the risk.The source of risk factors will also be a reference in the determination of risk mitigation strategies to be made.

Table 11: Target Risk Mitigation Impact on Time

	Risk sources		Risk Identification
1.	Planning factor	A8	The planning of tools and materials is organized without concerning the risk of disaster
		A6	Budget is arranged regardless of disaster risk
		A7	Schedule of implementation is composed of regardless of disaster risk
2.	Tools and material factors	B7	The planning of tools and materials is organized without regard for the risk of disaster
		B6	Materials damage due to the disaster
		B1	Mobilization of heavy equipment and materials difficulties
3.	Policy factors	C3	Slow flow to the local government
		C4	Financing system gradual (not at all transferred to the region)
		C1	Is overdue for Juknis DAK from the federal government
4.	Implementation factors	D10	Halted the field work in response to a flood disaster
		D1	Creating a work schedule without regard for disaster risk
		D2	Work methods designed without regarding the disaster risk

Based on Table 11,there are 12 risk factors that need to be addressed, 4 risk factors that include the unacceptable risk category and 8 risk factors including the undesirable risk category. Mitigation recomendationsare adapted to the responsible/owner of the risk. The source of risk factors will also be a reference in the determination of risk mitigation strategies to be made.

Based on the target of risk factors to mitigation in Table 10 and Table 11, itis subsequently conducted interviews with experts, illegal commitment officials (CMO), so that the risk of risk mitigation is good for the risk that impacts the cost and impact on time. Mitigation recommendations will adjust to risk from the owners/responsible risk. Mitigation recommendations for each risk that become risk mitigation targets are grouped based on the risk sources. There is a mitigation strategy that can permit some risk factors at once so that can be grouped based on risk factors targets that will be a mitigation target. The type of mitigation strategy will be mitigated code to make it easier in the implementation of risk mitigation according to Table 12.

Table 12: Risk Mitigation Strategy

	Mitigation Strategy	Point	Mitigation code
1.	CMO/PPK is allocated based on the reserve budget	A6	MT-1
2.	Tenders are done before December of the year	A7, D1	MT-2
3.	CMO/PPK determines the type of equipment and materials and work methods according to the project's location	A8, B1, D2	MT-3
4.	SOP (standard operating procedure) must be done for disaster handling construction work	D6, D8, D9, D10	MT-4
5.	Coordination between the District Goverment and the Provincial Goverment related to the C dig mine permits	B7	MT-5
6.	The requirements/qualifications of technicians and mechanical devices are according to technical specifications or Termof Reference (TOR)	B10	MT-6
7.	The implementation of work refers to contract	C1	MT-7
8.	The contractor must maximize advance and provide working capital on its own	C3, C4	MT-8

Risk factors caused by disaster and risk factors derived from the DAK fund source are interconnected and affected one with another. Forexample, when funding is too late, the progress of work is also too late and will certainly be very likely the time of the implementation to increase, so that the risk of work affected disaster will be greater. Table 4 above is a recommendation of misconceptions of combined risk of impact due to disaster and funding sources (DAK). The above risk mitigation recommendations should be implemented and evaluated and monitoring on a continuous owner by risk owners.

In practice of the construction project has many risk factors in a job contract, where after risk analysis may be obtained several risk factors that include the unacceptable category, although as a theory that the risk should be eliminated/not taken, but in fact the project remains taken with consideration of the benefit of profit/profit to be obviously greater than the value of the loss to be caused by the risk factors including the category of unacceptable risk. The reception of risks including uncceptable risk and undesirable risk is heavily dependent on who the risk receiver is. For instance, a contractor with a specialization of work as a structural contractor that workson the Sheet Pile's work includes undesirable risk, while for the contractor B which specializes in the field of a simple building may be the work including to theunacceptable risk category.

V. CONCLUSIONS

Based on the results of analysis and discussion that has been done, it gives several conclusions based on the results of the research with the Title of the Risk Management Analysis Project Improvement on the Disaster Procedure Funds financed by Special Allocation Fund (The Improvement Study of Kahanjak Road DAK Regular inTasikPayawan District, Katingan Regency), that are:

- The risk level that impacts the cost of moderate risk is 3%, high risk level is 74% and extreme risk level is by 23%. The risk level that impacts the time is a 14 percent risk level, high risk level is 72% and extreme risk level is 14%.
- The dominant risk factors that impact to the cost are amount to 30 risks. There are 5 of the risk of unacceptable categories and 25 risks of underbirable categories while dominant risk factors that impact the time are amount of 34 risks, there are 8 uncacceptable risks and 26 undesirable risks.
- The recommended strategy is the tender must be done from December of the previous year with the backup budget allocation, the CMO/PPK determines the type of equipment and materials as well as working methods with the proof of the project location, and set the requirements/qualification of technician and mechanical heavy equipment based on the technical specifications/Term of Reference (TOR). The contractor must maximize the advantages of advance and provide its own working capital and the work implementation refers to the contract, SOP (standard operating procedure) or operational procedures for the construction of construction work that affected disaster must be done. It is needed for coordination between the Regency and Pemrov Related to the C Mine permission.
- The risk mitigation recomendation at the third conclusion above is interrelated between risk factors caused by the disaster and risk factors caused by the DAK fund source. So, when a mitigation strategy is implemented, it can simultaneously reduce the risk effects caused by both a flood disaster and an infusion of funds. All such mitigation strategies must be implemented and implemented by each risk owner and carried out continual evaluations.

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