

# The Analysis of Factors That Influence an Unreached Road Plan Life of Kepanjen-Pagak Road in Malang Distric

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**ABSTRACT:** Based on the contractions evaluation from Kepanjen – Pagak road that built by the estimate budget on 2019, there are indications that not accordance with the age of the road plan that has been determined. This can be seen from several locations of roads that have been damaged, both lightly damaged and moderately damaged. Therefore, this research was conducted to find out the factors that influence the failure to achieve the planned life of the Kepanjen - Pagak road in Malang Regency and to find the most dominant factors influencing it and to determine the strategy that must be implemented to overcome these problems. The data analysis methodology used are factor analysis and multiple linear regression analysis of the answers from the questionnaires distributed to 42 respondents from the contractor, owner and supervisory consultants. Based on the results of the study with the F test, it was found that together the environmental factors (X1), Materials (X2), Equipment (X3), Labor (X4), Work Implementation Methods (X5), Vehicles (X6), Soil conditions (X7) and finance (X8) have a simultaneous effect on the failure to achieve the planned life of the Kepanjen – Pagak road in Malang regency with a value of  $F_{count} = 62,171 > F_{table} = 2.235$ . However, based on the partial t test, the factors that significantly influence the failure to achieve the planned life of Kepanjen – Pagak road in Malang Regency are soil conditions (X7), with  $T_{count} 6.653 > T_{table} = 2,035$ , vehicles (X6) with  $T_{count} = 2.777 > T_{table} = 2.035$  and Environment (X1) with  $T_{count} = 2.681 > T_{table} = 2.035$ . The most dominant factor is indicated by the highest standardized  $\beta$  value, namely the Soil Condition factor (X7), with a  $\beta$  Coefficient value of 0.491. The strategy to overcome this is that before work begins, a soil investigation must be carried out with the aim of obtaining information about the condition of the subsoil and soil parameters. With adequate soil data, it is hoped that the design results will be optimal.

**KEYWORDS:** Life, Plan, Road

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## I. INTRODUCTION

As in the case of road infrastructure development carried out by the government or the private sector, in general it can be said as a series of activities that have an initial implementation and are completed within a certain time frame and cost and quality to achieve a goal. In this case the interpretation of the quality of a project will produce two conditions. The first is the success of a project precisely on its quality which means success and the second is the failure of a project because the quality does not match the plan

One of the regencies that are actively developing road infrastructure is Malang Regency, where Malang Regency is one of the regencies that has a very dynamic economic level so that every year the number of population growth has increased. The increase in population resulted in an increase in the volume of movement between regions, thereby increasing the volume of traffic on roads. This mostly occurs on several connecting roads between sub-districts, collector roads and even on several local roads. Incidents of increasing traffic jams mainly occur on almost all main roads in Malang Regency, especially on roads that connect between the district capital and the sub-district capital and roads that connect between the regency capital and the sub-district capital as well as connecting roads with community activity centers. The increase in the number of vehicle volumes also occurred in line with the increase in the location of tourist sites at several points spread throughout the

Malang Regency area. Currently, almost every district, even in villages, has tourist attractions, both for local and foreign visitors.

Along with the increasing economic growth and development of traffic, types of vehicles and vehicle tonnage as well as government policies in the field of land transportation, the need for road facilities and infrastructure has also increased, so that development in the field of road infrastructure must be able to support these conditions.

One of the objectives of the construction of road infrastructure in Malang Regency is to reduce stress or pressure due to vehicle wheel loads, so as to achieve a level of value that can be accepted by the soil that supports the road structure, vehicles in a stationary position or stopping on a hardened structure cause a direct load (static stress) on the pavement concentrated in the small contact area between the wheels and the pavement. When the vehicle is moving, additional dynamic stress arises due to the movement of the vehicle up and down due to pavement unevenness, wind loads and so on [2].

Vehicles that generate dynamic stress, this will cause an additional "blow" effect on the road surface when the vehicle moves or runs. Highway flexible pavements have been designed to last up to 20 years and the design life of flexible pavement overlays is 10 years. (PUPR. SE: 04//SE/Db/2017. 2017 Revised Pavement Design Manual). A quality road pavement if it "reaches the design life" according to the planning design with the planned number of vehicles passing, if the construction of the road pavement is carried out properly, and all materials comply with the standards required in the design specifications and are always used correctly [2].

To achieve road design life, project management is required to identify/quantify, analyze, respond and finally control. One of the approaches used in identifying is by cause and effect, namely by analyzing what will happen and the potential consequences that will be caused [6].

However, in reality not all road construction in Malang Regency can be completed according to the expected quality. As is the case with the Kepanjen - Pagak Road Section which was built in the 2019 fiscal year which is a 2-lane 2-way undivided road segment connecting the Kepanjen sub-district and Pagak sub-district which was originally planned for a 10-year design life, but from the evaluation results it appears that the road has been completed, there are indications that it is not in accordance with the planned age of the road that has been determined. This can be seen from several locations of roads that have been damaged, both lightly damaged and moderately damaged. It is estimated that the damage/non-achievement of the planned life of the road is caused by several factors, such as the Environment, Materials, Equipment, Labor, Work Implementation Methods, Vehicles, Land and Financial Conditions. Therefore, related parties such as the Owner, Contractor and Supervision Consultant must be able to identify the factors that have an impact on not achieving the road plan life and how to deal with existing factors, so that the quality of road construction can last for the life/service life of the road and development can be sustainable in accordance with the national development program.

Based on the above facts, this research was conducted to find out the Analysis of the Factors Influencing the Not Reaching the Planned Life of Kepanjen-Pagak Road in Malang Regency which was built in the 2019 fiscal year.

## **II. THEORITICAL BASIS**

### **Construction Project Management**

Project management is an effort or activity to plan, organize, lead, and control company resources to achieve predetermined short-term goals as efficiently and effectively as possible (Kerzner, 2006). The flow of activities in project management vertically and horizontally, using a systems approach. Thus, the concept of project management contains the following main points:

- a. Using the notion of management based on its function, namely planning, organizing, leading, and controlling the company's resources in the form of people, funds, and materials.
- b. Using a system approach (system approach to management).
- c. Has a horizontal hierarchy (flow of activities) in addition to a vertical hierarchy.
- d. Activities managed in the short term, with targets that have been specifically outlined. This requires special management techniques and methods, especially planning and control aspects.

The explanation above shows that project management does not intend to abolish the flow of vertical activities or make a total change to classical management, but wants to incorporate specific approaches, techniques and methods to respond to the demands and challenges faced, which are also specific in nature, namely project activities. Management as a unique process that drives the organization is very important because without effective management no business will be successful for a long time. Management is something related to efforts to achieve a certain goal by using existing resources in the best possible way.

### **Definition of Road**

According to law number 38 of 2004 concerning roads, roads are land transportation infrastructure which includes all parts of the road, including auxiliary buildings and equipment intended for traffic, which are at ground level, above ground level, below ground level, and or water, as well as on the surface of the water, except for railroads, lorry roads and cable roads [10]

### **Road Construction Project**

Road construction projects in various regions continue to be developed. In its implementation, it must go through planning that is adjusted to the level of road transportation development in the area, especially the compatibility between vehicle traffic load and density with the carrying capacity of the road, the road network in growth centers, production centers and those that connect production centers to marketing areas.

### **Road Construction**

Highway construction is a construction that is made in such a way that it can carry the load of traffic (vehicles) that pass over it without experiencing structural changes on the road surface. With the development of land transportation, especially motorized vehicles which include types, sizes and quantities, the problem of smooth traffic flow, safety, comfort and carrying capacity of road pavements must be a concern [1].

Roads are land transportation infrastructure that connects two or more locations. The road consists of several parts with specific purposes and functions that are formed in a construction. Road construction generally consists of layers of different materials, according to the properties used. Broadly speaking, there are three types of pavement construction, namely flexible, rigid and composite pavements.

Based on the binding material, road pavement construction can be divided into 3 (two) types, namely:

- a. Rigid pavement
- b. Flexible pavement
- c. Composite Pavement Construction (Composite Pavement)

### **Road Physical Quality**

The physical quality of the road is a kind of road surface condition in providing services. It is said that the physical quality of the road is good if the service provided is maximal for road users according to the development plan, namely in terms of comfort, safety and durability.

Basically, the physical road will experience a process of progressive deterioration since the road was first opened to traffic. But at least the condition of the existing road needs to be maintained so that it remains relatively good during the life of the plan. To overcome this, a method is needed to make road conditions stable in terms of quality and comfortable to use, through the preparation of a road maintenance program, both routine and periodic maintenance as needed [9].

### **Plan Age**

Planned Age (PA) is the specified time from when the road is opened or used until the road needs to be repaired (overlay). In road planning, generally the PA used is 10 years. Plan Age (PA) which will be used in traffic design according to the type or function of the road [4].

The design life can also be interpreted as the amount of time and years calculated from the time the road was opened until the time when serious repairs are needed or it is deemed necessary to be given a new surface layer. During the life of the plan, road pavement maintenance must still be carried out, such as non-structural coatings that function as wear and water-resistant layers. The design life for flexible pavements for new roads is generally 20 years and for road improvements 10 years. The design life of more than 20 years is no longer economical because the traffic development is too large and it is difficult to obtain sufficient accuracy. From this understanding, it can be concluded that the planned life of the road can be achieved if the road can function properly and there is no damage during the 10 years plan.

### **Population And Sample**

What is meant by population is a collection of all individuals with predetermined qualities, these qualities or characteristics are called variables. What is meant by a sample is a collection of sampling units drawn and is a sub of the population [7].

### **Statistic test**

Statistics is the science and art of developing and applying the most effective methods for the possibility of wrong conclusions and estimates that can be estimated based on mathematical probabilities [8].

### **Validity test**

Validity is a measure that shows the levels of validity and validity of an instrument. An instrument is said to be valid if it can reveal data from the variables studied correctly. The degree of validity of the instrument indicates the extent to which the collected data does not deviate from the description of the intended validity [3]. Whether an instrument is valid or not can be determined by comparing the Product Moment Person correlation index with a significant level of 0.05 (5%) as the critical value by comparing  $r_{count}$  with  $r_{table}$ , the validity of the instrument can be determined with the following criteria:

$$r_{count} > r_{table} : \text{Valid}, r_{count} < r_{table} : \text{Invalid}$$

### **Reliability Test**

Reliability is an index that shows the extent to which a measuring device can be trusted or relied on. In other words, reliability shows the consistency of a measuring device in measuring the same symptoms [5]. In this study the reliability test used the Alpha Cronbach approach. The instrument is said to be reliable if the Alpha Cronbach value is  $> 0.6$ .

### **Factor Analysis**

Factor analysis is an extension of principal component analysis. Factor analysis is used to reduce data and to describe the correlational relationships of several variables in a small number of factors. These variables are grouped into several factors where the variables in one factor will have a high correlation, while the correlation with the variables in other factors is relatively low.

Thus, factor analysis aims to find a way of summarizing the information contained in the original (initial) variables into a new set of dimensions or variates (factors). This is done by determining the structure through data summarization or through data reduction. Factor analysis identifies the structure of the relationship between variables or respondents by looking at the correlation between variables or the correlation between respondents

### **Multiple Linear Regression Analysis**

To test questions related to the factors that influence the failure to achieve the design life of the Kepanjen-Pagak road in Malang Regency, the analytical technique used is multiple linear regression test. This test is used to test or analyze the effect or relationship between the independent variables and one or more variables, in the analysis technique used annova test or f test, t test and find the magnitude of the coefficient of determination or  $R^2$  adjusted. This calculation will be carried out with the help of the SPSS program according to the linear equation multiple :

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8$$

Where :

Y = Failure to Achieve the Planned Life of the Road

X1 = Environment

X2 = Materials

X3 = Equipment

X4 = Labor

X5 = Work Implementation Method

X6 = Vehicle

X7 = Soil Condition

X8 = Finance

$b_0$  = Constant

$b_1, b_2, b_3, b_4, b_5, b_6, b_7, b_8$  = Regression Coefficient

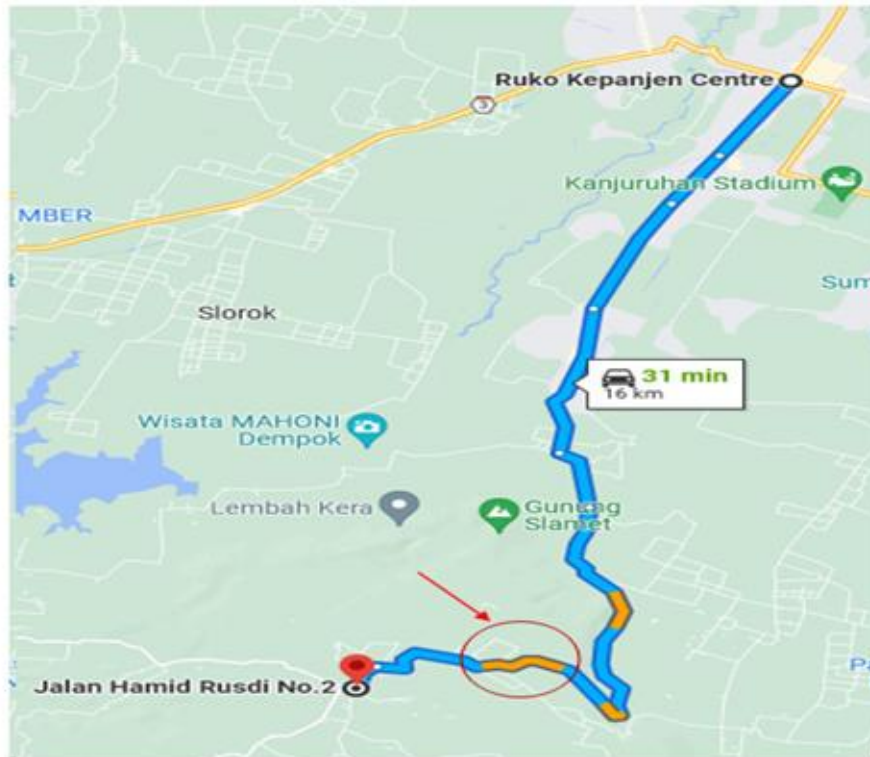
## **III. RESULTS OF RESEARCH AND DISCUSSION**

Research is a scientific way to solve a problem and to penetrate the limits of human ignorance. This research collects and processes existing facts so that these facts can be communicated by researchers and the results can be enjoyed and used for the benefit of humans. If viewed from the method, this research is descriptive research, namely to find out what factors influence the failure to reach the planned life of the Kepanjen-Pagak road in Malang Regency. Data collection method is by using the questionnaire method. The ultimate goal of this research is to find out what factors influence the failure to achieve the planned life of the Kepanjen-Pagak road in Malang Regency, so that it can determine what strategies and actions should be taken to overcome them.

This study uses a survey method by gathering opinions, experiences and attitudes of respondents regarding problems that have been experienced in the work on the Kepanjen-Pagak road project in Malang Regency, by taking primary data through questionnaires and secondary data from related institutions. Based on

the factors that influence the failure to achieve the planned life of Kepanjen-Pagak Road in Malang Regency, the factors are determined which are followed by the determining variables to be used as question items which will be measured in the form of a questionnaire.

The location of this research was carried out on the Kepanjen - Pagak Road Section development project with a length of 2 km which was built in the 2019 fiscal year. The research location can be seen clearly in Figure 1 Map of the research location as follows:



**Figure 1:** Research Location Map

### Research Variables

a. The independent variable (X) consists of:

1. Environment (X1)
2. Materials (X2)
3. Equipment (X3)
4. Labor (X4)
5. Work Implementation Method (X5)
6. Vehicle (X6)
7. Soil Condition (X7)
8. Finance (X8)

b. The dependent variable (Y) consists of:

Failure to achieve road plan age (Y)

### Data Collection

Data collection was carried out through a questionnaire with statement items related to the factors that influence the failure to achieve the planned life of the Kepanjen-Pagak road in Malang Regency and obtain the most dominant factor influencing it using a modified Likert scale with a range of 1 to 4 (very disagree-strongly agree). The items in the research variables are designed (designed) with questions that are negative, so that the number one is the code for a very positive response to one of the question items, while the number four is to give a very negative response.

### Processing and analysis of data

The data obtained from the results of the survey (questionnaire) will be processed to obtain information in tabular form. The results of the processed data are used to answer questions in the formulation of the problem.



Data processing should pay attention to the type of data collected by being oriented towards the goals to be achieved. The accuracy of the analytical technique greatly affects the accuracy of the research results. The data analysis technique used is factor analysis and multiple linear regression analysis. Questionnaire data with a range of 1 to 4 from each of these variables is then re-scored, so that each variable containing several indicators will produce only one score which is then analyzed using multiple linear regression analysis. Data processing is done with the help of the Statistical Package for Social Science (SPSS) for Windows program

#### **IV. ANALYSIS AND DISCUSSION RESULTS**

##### **Validity Test Results**

The results of the validity test can be explained that Environmental Factors (X1), Materials (X2), Equipment (X3), Labor (X4), Work Implementation Methods (X5), Vehicles (X6), Land Conditions (X7) and Finance (X8) and Unattainable Road Plan Age (Y) with a significance level ( $\alpha$ ) = 0.05 obtained a table critical value of 0.304 (appendix 3) having a correlation coefficient for each factor whose value is greater than table. In addition, the p-value of each factor is smaller than  $\alpha$  = 0.05. So it can be concluded that the item items in the instrument on Environmental Variables (X1), Materials (X2), Equipment (X3), Labor (X4), Work Implementation Methods (X5), Vehicles (X6), Land Conditions (X7) and Finance (X8) and Unreached Road Plan Age (Y) used in this study are valid.

##### **Reliability Test Results**

The reliability test results obtained Cronbach's Alpha coefficient for Environmental Variables (X1), Materials (X2), Equipment (X3), Labor (X4), Work Implementation Methods (X5), Vehicles (X6), Land Conditions (X7) and Finance (X8) and Unachieved Road Plan Age (Y) is greater than 0.6. So it can be concluded that the indicators used to measure these variables are reliable and reliable.

##### **Factor Analysis Results**

From the results of factor extraction followed by interpreting the factor loading of each item above, it can be seen that the latent variables are Environmental Variables (X1), Materials (X2), Equipment (X3), Labor (X4), Work Implementation Methods (X5), Vehicles (X6), Land Conditions (X7), and Finance (X8), can be formed by grouping manifest variables, which are summarized as follows:

1. Environmental Variables (X1), formed with manifest variables consisting of: Frequent rain (X1.1), Drainage Conditions (X1.2) and Drainage work that is not in accordance with road conditions (X1.3).
2. Material Variables (X2), formed with manifest variables consisting of: Material shortages (X2.1), Material damage and changes (X2.2), Poor material quality control (X2.3), Absence of material test in the Laboratory (X2.4) and Storage Use of materials from specifications (X2.5).
3. Equipment Variables (X3), formed with manifest variables consisting of: Inadequate operator power (X3.1), limited number of equipment (X3.2), Tool capabilities not suitable for serve the volume of work (X3.3), quality of equipment (X3.4) and equipment that is often damaged (X3.5).
4. Labor Variable (X4), formed with manifest variables consisting of: Availability of labor (X4.1), Labor cannot coordinate properly (X4.2), labor does not have great responsibility (X4.3), the workforce does not have good skills (X4.4), the behavior of the estimator is inexperienced (X4.5) and the productivity of the workforce is quite low (X4.6).
5. Work Implementation Method Variable (X5), formed with manifest variables consisting of: Work not carried out according to the sequence and stages of work (X5.1), Work implementation not according to specifications (X5.2), Work not carried out properly and true (X5.3)
6. Vehicle Variables (X6), formed with manifest variables consisting of: Many vehicles that exceed the tonnage (X6.1), Increased vehicle volume loads (X6.2) and Absence of weighbridges (X6.3).
7. Soil Condition Variables (X7), formed with manifest variables consisting of: No investigation of subgrade (X7.1), Expansive subgrade properties (X7.2), Soil compaction that is not in accordance with procedures (X7.3) and Inaccurate subgrade bearing capacity planning (X7.4).
8. Financial Variables (X8), formed with manifest variables consisting of: Late payments by contractors to workers (X8.1), Late payments by contractors to suppliers (X8.2), Late payments by owners to contractors (X8.3), Contractor's financial capability (X8.4) and Use of contract advances (X8.5).

##### **Results of Multiple Linear Regression Analysis**

Regression analysis was used to obtain the factors that influence the failure to achieve the planned life of Kepanjen-Pagak Road in Malang Regency. In processing the data using multiple linear regression analysis, several stages were carried out to find the relationship between the independent and dependent variables. Based on the results of data processing using SPSS 21 software, a summary is obtained as shown in Table 1 as follows.

Variable	Standardize Coefficient $\beta$	T <sub>count</sub>	p-value	Description
Environment (X1)	0.266	2.681	0.011	Significant
Materials (X2)	0.042	0.845	0.404	Not Significant
Equipment (X3)	0.032	0.687	0.497	Not Significant
Labor (X4)	0.100	0.555	0.583	Not Significant
Work Implementation Method (X5)	0.060	1.272	0.212	Not Significant
Vehicle (X6)	0.295	2.777	0.009	Significant
Soil Condition (X7)	0.491	6.653	0.000	Significant
Finance (X8)	-0.027	-0.150	0.882	Not Significant
$\alpha$	= 0.05			
R <sup>2</sup>	= 0.938			
R	= 0.968			
F-count	= 7.424			
F-table(0.05,8,33)	= 2.235			
p-value	= 0.000			
t-table(0.05,33)	= 2.035			

**Table 1:** Summary of Multiple Linear Regression Analysis Results

Based on the table above, it can be seen that not all independent variables have a significant value. Independent variables that have a significant value (significant effect on the failure to achieve the planned life of Kepanjen-Pagak Road in Malang Regency) are Environment (X1), Vehicles (X6) and Land Conditions (X7). While the variables that do not have a significant value (influence but not significant on the failure to achieve the planned life of the Kepanjen-Pagak Road in Malang Regency are Material (X2), Equipment (X3), Labor (X4), Work Implementation Method (X5), and Finance (X8).

The regression model obtained based on table 4.15 above is as follows:

$$Y = 0.266 X1 + 0.042 X2 + 0.032 X3 + 0.100 X4 + 0.060 X5 + 0.295 X6 + 0.491 X7 - 0.027 X8 + \epsilon$$

The R2 value is the coefficient of determination which basically measures how far the regression model's ability to explain the diversity of the dependent variable (Y) is equal to 0.938. This means that the variable regression model studied can explain 93.8% of the influence on not achieving the planned life of the road Kepanjen-Pagak in Malang Regency (Y). The R value is a correlation that explains the closeness of the relationship between the independent variable (X) and the dependent variable (Y) of 0.968.

Then, to determine the independent variable (factor) that has the most dominant influence on the failure to achieve the planned life of Kepanjen-Pagak Road in Malang Regency, it can be done by comparing the value of the standardized coefficient  $\beta$  of each independent variable (factor) to Y. The variable with the most dominant influence on the Failure to Achieve the Planned Life of Kepanjen-Pagak Road in Malang Regency is the variable that has a significant effect and has the largest standardized  $\beta$  Coefficient value.

Based on table 1, the Soil Condition Factor (X7) is the variable (factor) that has the highest standardized  $\beta$  coefficient value. It means that in this study the factor that has the most dominant influence on the failure to achieve the planned age of Kepanjen-Pagak Road in Malang Regency is the condition factor. Land (X7). This means that the failure to achieve the planned life of the Kepanjen-Pagak Road in Malang Regency is most influenced by the Soil Condition Factor (X7). A positive standardized  $\beta$  coefficient value indicates that the better the Soil Condition Factor (X7), the more likely it is that the planned life of the Kepanjen-Pagak road in Malang Regency will be achieved.

### Discussion of Strategies in Efforts to Overcome Delays in Work Implementation

Based on the results of the regression analysis, it was found that Environmental Factors, Vehicle Factors and Land Condition Factors were factors that had a significant effect according to (Table 1), while factors that had an insignificant effect were Material Factors, Equipment Factors, Labor Factors, Method Factors Job Implementation and Financial Factors.

The Summary of Strategies to Overcome So That the Kepanjen-Pagak Road Sections in Malang Regency That Have Been Built Can Reach the Planned Age as Predetermined can be seen in Table 2 as follows:

Factors	Problems	Strategies
Soil Condition	There is no investigation of the basic soil	Before work begins, a soil investigation must be carried out with the aim of obtaining information about the condition of the subsoil and soil parameters, with adequate soil data it is hoped that the design results will be optimal
	Expansive soil properties	Must replace soil material that is classified as expansive to a certain depth, carry out water management, membrane (covering) and carry out loading
	Soil compaction that is not in accordance with the procedure	The supervising consultant must carry out careful supervision, so that the soil compaction work can be carried out properly and in accordance with the specified procedures.
	Planning of subgrade bearing capacity is less precise	Before project planning begins, the planning consultant must conduct a soil test in the laboratory, so that the results of the soil planning can be carried out properly
Vehicles	Many vehicles exceed tonnage	By supervising heavy tonnage trucks and carrying out coaching/counseling activities regarding regulations or provisions related to the use of public roads for the type and nature of goods vehicles, control systems (monitoring posts and infrastructure facilities for cargo trucks), as well as determining track/route permits specifically, in accordance with the provisions stipulated in the Regional Regulations related to regulation of the use of public roads
	Increased load volume of vehicles	Limiting the volume of vehicles passing through the road, by diverting heavy vehicles to pass through other lanes such as main roads or highways and limiting the load/tonnage of goods transport vehicles
	No weight bridge	Build and activate weighbridges as well as possible, so that transport vehicles that pass through the road do not carry excess loads
Environment	It often rains	The contractor must increase the number of working hours (overtime) and make roof covering work on certain significant parts, so that when it rains it does not interfere with the implementation of the work
	Drainage conditions	Must improve road drainage conditions as well as possible, so drainage can function as it should.
	Drainage work that does not match road conditions	The contractor is expected to improve and at the same time use the road drainage construction workmanship system as required

**Table 2:** Strategy Summary

## V. CONCLUSION

Based on the results of the research and discussion described in the previous chapter, it can be concluded that:

1. From the F test it was found that environmental factors (X1), Materials (X2), Equipment (X3), Labor (X4), Work Implementation Methods (X5), Vehicles (X6), Land Conditions (X7) and Finance (X8) , has a simultaneous effect on the failure to achieve the planned life of Kepanjen-Pagak Road in Malang Regency with a value of  $F_{count} = 62,171 > F_{table} = 2,235$ . However, based on the partial t test, the factors that significantly influence the failure to achieve the planned life of Kepanjen-Pagak Road in Malang Regency are soil conditions (X7), with  $t_{count} = 6,653 > t_{table} = 2,035$ , vehicles (X6) with  $t_{count} = 2,777 > t_{table} = 2,035$  and Environment (X1) with  $t_{count} = 2,681 > t_{table} = 2,035$ .
2. The most dominant factor influencing the failure to achieve the planned life of Kepanjen-Pagak Road in Malang Regency is the Soil Condition factor (X7), with a  $\beta$  coefficient of 0.491.
3. The strategy for dealing with not achieving the planned age of the Kepanjen-Pagak Road in Malang Regency is



- a) Before work begins, a soil investigation must be carried out with the aim of obtaining information about the condition of the subsoil and soil parameters, with adequate soil data it is hoped that the design results will be optimal
- b) Must replace soil material that is classified as expansive to a certain depth, carry out water management, membrane (covering) and carry out loading
- c) The supervising consultant must carry out careful supervision, so that the soil compaction work can be carried out properly and in accordance with the specified procedures
- d) Before project planning begins, the planning consultant must conduct a soil test in the laboratory, so that the results of the soil planning can be carried out properly

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