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## ANALYSIS OF ROAD CONDITION VALUE ON THE NATIONAL ROAD TEUKU UMAR TUBAN USING BINA MARGA METHOD

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### **Abstrak**

Jalan merupakan aspek terpenting dari bidang distribusi, sosial, dan ekonomi, namun seiring berjalannya waktu dan perubahan cuaca seringkali menjadi penyebab kerusakan jalan. Oleh karena itu, perlu dilakukan peninjauan untuk dapat menentukan jenis kerusakan dan tingkat kerusakan yang terjadi. Pengamatan akan dilakukan pada Ruas Jalan Teuku Umar Tuban dengan mengacu pada Metode Bina Marga. Pengamatan akan dilakukan secara visual dan hanya dianalisis di permukaan saja, selain menghitung volume kendaraan harian. Dari proses pengamatan didapatkan jenis kerusakan yaitu patholes, cracking, patchng, depresi dan rutting. Berdasarkan jenis kerusakannya, perbaikan akan dilakukan pada jenis kerusakan yang paling banyak dan mendasar adalah dengan menggunakan metode crack fill, hal ini dilakukan karena jalan ini memiliki retak sebesar 55%.

Kata kunci: Kerusakan Jalan, Bina Marga, Tuban

### *Abstract*

Roads are the most important aspects of distribution, social, and economic fields, but over time and changing weather is often the cause of road damage. Therefore, it is necessary to have a review carried out to be able to determine the type of damage and the degree of damage that occurs. Observations will be made on the Teuku Umar Tuban Road Section by referring to the Bina Marga Method. Observations will be carried out visually and only analyzed only on the surface, in addition to calculating the daily vehicle volume. From the observation process, types of damage were obtained, namely patholes, cracking, patchng, depression and rutting. Based on the type of damage, repairs will be carried out on the most numerous and fundamental type of damage is to use the crack fill method, this is done because this road has a crack of 55%.

*Keywords:* Road Damage, Bina Marga, Tuban

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## INTRODUCTION

Roads are a very useful aspect in the field of distribution, social and economic. One example is the Teuku Umar Tuban road, where this road supports a large enough load and volume of vehicles. Therefore, there is a need for supervision and maintenance so that the road does not experience damage which can later 'interfere with the functioning of the road so that it can cause accidents for users. The purpose of this study is to determine the types of damage that occur on the Teuku Umar Tuban road and calculate the value of the dredging condition based on the Bina

Marga method which will later determine the best handling pattern. Here are the factors that can cause road damage: 1. Traffic, increased vehicle load. 2. Water, can come from rainwater, groundwater, or poor drainage systems. 3. Road construction materials, where road damage can occur due to natural factors in the material that makes up the road or due to improper material selection. 4. Climate. 5. Unstable bottom soil (Sukirman, 1999). Classification of road according construction divided by National road, Provincial road, Regency road, City road, Village road (“UU No. 38 Tahun 2004 Tentang Jalan,” 2004). In this case, it is necessary to have a good plan so that the road can reach the life of the road plan where in general the road is designed for a period of between 10-20 years, so that the road is expected not to be damaged in the first 5 years. (Hardiyatmo, 2015)

## METHOD

### Object of Research

The object of the study was carried out on the Teuku Umar Tuban National Road where it had been damaged on several sides. This research will be carried out on the Teuku Umar Tuban road using the Bina Marga method and only analyze damage only on the surface. The research area will be divided into several segments with a size of 100 meters in length with a width of 11 meters.



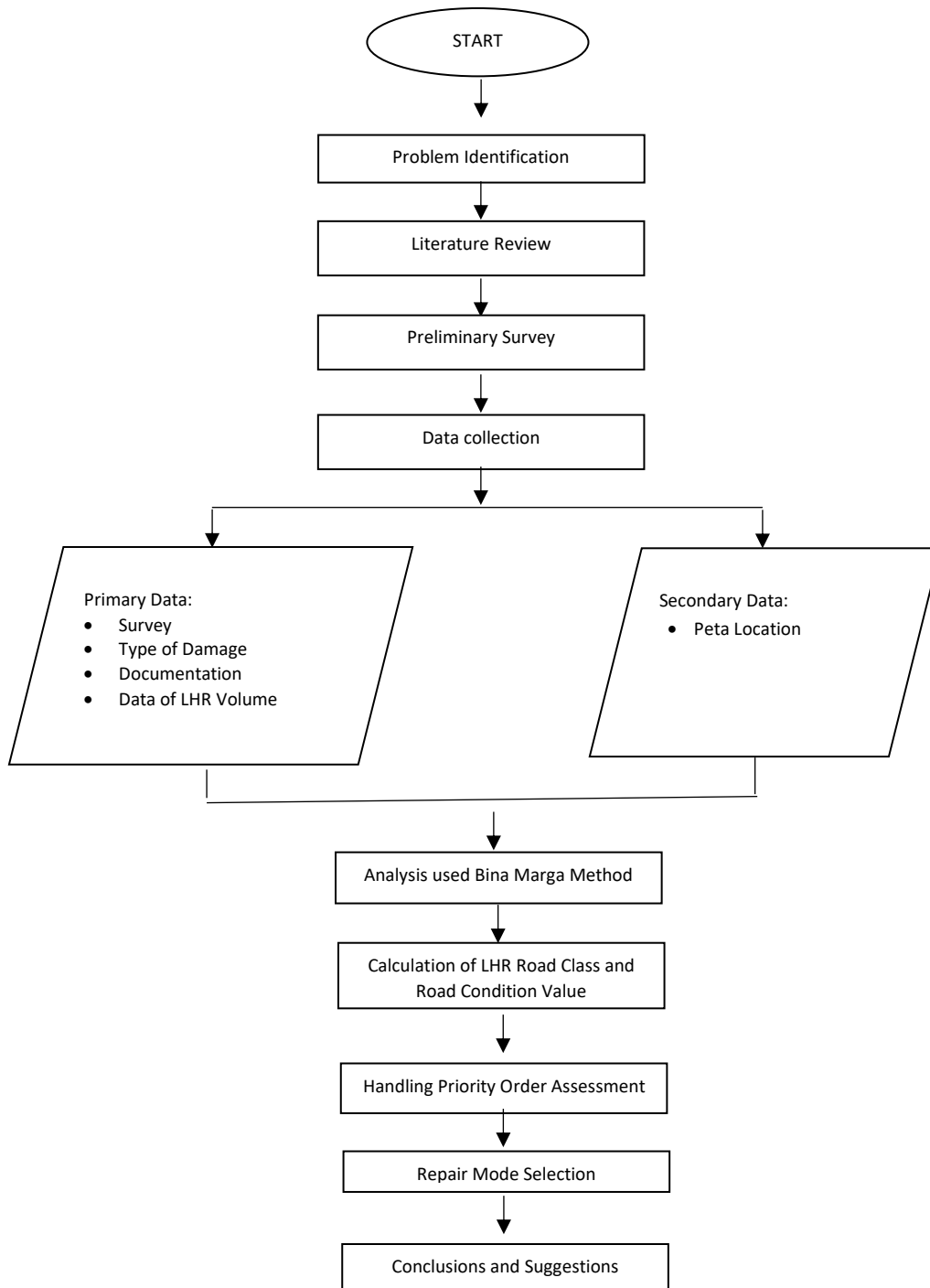
Figure 1 Object of Research  
Source : Google Maps

### Collecting Data

The collection of this research data was obtained by a direct survey in the research area, namely on the Teuku Umar Tuban National road. Where in this study used two data, namely primary data and secondary data. The result of collecting this

data is that it can be known if the type of damage that occurs the most is the type of crack damage where this type of damage has a percentage of damage of 16.35%.

To further clarify the steps in this study, here is the flowchart of this study :



## **Data Processing**

The data processing used in this study is by processing data using the Bina Marga method, where the management of survey results can be divided into several steps, including:

1. The first stage is to identify the types of damage that occur, after the type of damage is known, the type of damage is measured in area and severity which will later be used as a calculation of the total extent of damage.
2. The second stage is to calculate the volume of vehicles passing on the highest average where the highest will be used as a determination of the road class which will later be used to calculate the value of road conditions.
3. The third stage is to calculate the extent of damage and the percentage of damage that occurs in each segment that will be carried out research.
4. The fourth stage is to calculate the road condition value where the calculation of the road condition value refers to several aspects including the value of the type of damage that occurs, the value of the depth of damage that occurs, the value of the area of damage that is there refers to the procedures for preparing the city road maintenance program.
5. The fifth stage is to determine the handling assessment priority which refers to the Bina Marga method, where the Teuku Umar Tuban National road is damaged by the medium category.

## **RESULT AND DISSCUCCION**

### **Data Presentation**

The presentation of data in Chapter IV is an analysis carried out by researchers that refers to data obtained from direct observation in the object of study. The calculation uses primary data where the primary data is the type and extent of road damage on Teuku Umar road Tuban, where the data is obtained from direct observation in the field so that calculations can be made to determine the severity of road damage and can be obtained repair methods that are in accordance with the damage that occurs.

#### **1. Highway Survey Data**

From the results of a traffic survey conducted for 5 days where the survey was carried out at crowded hours of vehicle density, the following results were obtained :

**Tabel 1 LHR**

No.	Vehicle Type	EKR	Road Vehicle/Hour	Volume Data SMP/Hour
1	Light Vehicle	1.0	315	315
2	Medium Heavy Vehicle	1.3	143	185.9
3	Bug Bus	1.5	16	24
4	Big Truck	2.5	188	470
5	Motorcycle	0.6	1188	712.8
		Total	1850	1707.7

## 2. Road Damage Survey Data

The following is a table of damage caused to the Teuku Umar Tuban National road

**Tabel 2.** Types and Area of Road Damage (Richo, 2022)

No.	Type of Damage	Area (m <sup>2</sup> )	Percentage %
1	Cracking	179.92	16.35
2	Patholes	0.009	0.0008
3	Patching	86.99	7.90
4	Revelling	0.049	0.004
5	Grade Depression	0.7	0.063

From the table above, it can be seen that the highest damage rate is cracking at 179.92 m<sup>2</sup> (16.35%), Patching at 86.99 m<sup>2</sup> (7.90%), Revelling at 0.049 m<sup>2</sup> (0.04%), Depression Grade at 0.7 m<sup>2</sup> (0.063%), and Patholes at 0.009 m<sup>2</sup> (0.0008%).



**Figure 2.** Aligator Cracking

Source : Reseacher Data



**Figure 3.** Patholes  
Source : Reseachar Data

From the type of damage above, the next step is to determine the number of damage, here is a table of the number of damage that occurs :

**Table 3.** Road Condition Value Segment 1 (Richo,2022)

Type of Damage	Value of Type of Damage	Didth Value	Value of Damage Area	Vaalue of Depth	Value for Grade Depression	Damage Value
Aligator Cracking	5	3	3			12
Random Cracking	4	3	1			8
Revelling	3					3
Grade Depression	0					0
Total Damage Value						23
Road Condition Value						8

Do calculations as in Table 3 for all existing segments, the results of which will be used as a reference for determining the handling assessment or the order of priority handling, where the formula from  $UP = 17 - (\text{Class of LHR} + \text{Road Condition Value})$

- Priority Order 0 – 3, indicates that the road needs to be included in the upgrade program.
  - Priority Order 4 – 6, indicates that the road needs to be included in the periodic maintenance program
  - Priority Order > 7, indicates that the road is included in a routine maintenance program.
- (Tata Cara Penyusunan Program Pemeliharaan Jalan Kota, 1990)

Here is a table of recapitulation of the calculation results of each existing segment.

**Tabel 4.** Recapitulation Results On each segment of Teuku Umar Road Tuban (Richo,2022)

No	Segment	UP	Priority Order	Category of Damage	Handling Assessment
1.	0+100	17 – (5+8)	4	Medium	Periodic maintenance program
2.	0+200	17 – (5+8)	4	Medium	Periodic maintenance program
3.	0+300	17 – (5+9)	3	High	Upgrade program
4	0+400	17 – (5+5)	7	Low	Routine maintenance program
5	0+500	17 – (5+9)	3	High	Upgrade program
6	0+600	17 – (5+8)	4	Medium	Periodic maintenance program
7	0+700	17 – (5+7)	5	Medium	Periodic maintenance program
8	0+800	17 – (5+7)	5	Medium	Periodic maintenance program
9	0+900	17 – (5+7)	5	Medium	Periodic maintenance program
10	0+1000	17 – (5+7)	5	Medium	Periodic maintenance program
11	0+1100	17 – (5+8)	4	Medium	Periodic maintenance program
12	0+1200	17 – (5+8)	4	Medium	Periodic maintenance program

## CLOSING

### Conclusion

Based on research and analysis of data obtained several conclusions including :

1. The types of damage that occurred on the Teuku Umar include :
  - a. Cracking 55.3 %
  - b. Patholes 0.013 %
  - c. Patching 37.19%
  - d. Raveling 6.36%
  - e. Grade Depression 1 %
  - f. And ruts 0.10%
2. The result of calculating the value of road conditions can be known that the Teuku Umar Tuban National road segment has a medium damage category.
3. From the calculation data obtained, it can be known that the Teuku Umar Tuban National Road has a category of medium damage needs to be carried out periodic maintenance by means of cracking filling (Marga 1995) so it is expected that there will be no heavy damage, so that people do not have to worry when using the road.

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