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ANALYSIS TYPE OF ROAD DAMAGE IN THE NATIONAL ROAD TEUKU UMAR TUBAN

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Abstract: The road is an object that can help humans in their lives. One example is that roads can be a link between one place and another, no wonder there are often road damages due to excessive vehicle loads. To overcome it all, it is necessary to have an accurate maintenance to make the road can be used according to the age of the plan. One of the roads that suffered damage wasTeuku Umar Road Tuban, where on this road there were several damages at several points so that the driver had to be more careful to cross this road.

1. INTRODUCTION

Asphalt roads are roads that are often used on Indonesian roads, asphalt roads have the advantage of fast work so that they do not cause disruption of road operations for a long time. However, it is necessary to have several important aspects so that the road can last until the life of the predetermined plan, these aspects include the selection of good materials, good drainage, and also good compaction of the basic soil. Road damage can be divided into 2 types, namely structural damage and functional damage [1]. As for the cause of road damage is 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 [2].

2. DATA AND METHOD

2.1 Object of Research

The object of this study is the Teuku Umar Tuban National road, which has a road width of 11 meters and will be analyzed the type of road damage based on the Bina Marga method.

2.2 COLLECTING DATA

Data collection in this study is carried out by means of a survey directly at the research location. The data needed for this study include the types of damage that occur, the extent and category of damage that occurs, and also LHR data which is used as a calculation for determining the level of damage that occurs.

2.3 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:

- The first step is to prepare the tools and survey forms that will be used in the research.
- The second stage is to divide the area of the road into several segments that are useful to facilitate the process of analyzing the level of damage that occurs.
- The Third step is to determine the type of damage by referring to the Bina Marga method.
- The fourth step is to record the results of the research on the form that has been provided.
- The fifth Performs the average LHR calculation.

3. RESULT AND DISSCUSSSION

3.1 Type of Damage

From the results of research conducted to determine the type of damage that occurs on the Teuku Umar Tuban National road section, several types of damage with different severities and extents are also obtained. The following is a table of each damage that occurred on the Teuku Umar Tuban National road section.

Table 1 Type of Road Damage Segment 1(Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Patholes	0.009	1100	0.0008
2	Patching	86.99	1100	7.90
3	Cracking	179.92	1100	16.35
	Total	266.919	1100	24.26

Table 2 Type of Road Damage Segment 2 (Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Patholes	0.0093	1100	0.0008
2	Patching	194.082	1100	17.64
3	Cracking	95.33	1100	8.66
4	Bleeding	0.7	1100	0.06
	Total	290.121	1100	26.37

Table 3 Type of Road Damage Segment 3 (Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Patching	162.85	1100	14.80
2	Cracking	348.41	1100	31.67
3	Bleeding	7.44	1100	0.67
4	Revelling	0.0003	1100	0.00003
5.	Depression	9.6	1100	0.87
	Total	528.30	1100	48.02

Table 4 Type of Road Damage Segment 4 (Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Potholes	0.0034	1100	0.0003
2	Patching	193.96	1100	17.63
3	Cracking	137.38	1100	12.5
4	Revelling	0.0045	1100	0.0004
5.	Bump and Sugs	0.138	1100	0.01
	Total	331.486	1100	30.13

Table 5 Type of Road Damage Segment 5 (Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Potholes	0.0056	1100	0.0005
2	Patching	40.62	1100	3.69
3	Cracking	109.5	1100	9.95
4	Revelling	0.0507	1100	0.0046
	Total	150.176	1100	13.65

Table 6 Type of Road Damage Segment 6 (Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Potholes	0.0228	1100	0.0021
2	Patching	10.74	1100	0.97
3	Cracking	96.65	1100	8.78
4	Revelling	20.79	1100	1.89
	Total	107.82	1100	9.80

Table 7 Type of Road Damage Segment 7 (Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Potholes	0.0035	1100	0.0003
2	Patching	43.98	1100	3.99
3	Cracking	186.22	1100	16.9
4	Revelling	0.58	1100	0.05
5	Bleeding	17.49	1100	1.59
6	Depression	0.004	1100	0.0004
	Total	248.28	1100	22.57

Table 8 Type of Road Damage Segment 8 (Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Patching	32.7	1100	2.97
2	Cracking	207.56	1100	18.87
3	Revelling	0.426	1100	0.039
4	Depression	0.003	1100	0.0003
	Total	240.689	1100	21.88

Table 9 Type of Road Damage Segment 9 (Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Patching	23.4	1100	2.13
2	Cracking	296.21	1100	26.93
3	Revelling	0.01	1100	0.0009
4	Bump and Sugs	1.24	1100	0.11
5	Depression	0.075	1100	0.0068
	Total	320.935	1100	29.17

Table 10 Type of Road Damage Segment 10 (Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Patholes	0.013	1100	0.0012
2	Patching	0.0039	1100	0.0004
3	Cracking	170.15	1100	15.47
4	Depression	0.0039	1100	0.0004
	Total	320.935	1100	15.47

Table 11 Type of Road Damage Segment 11 (Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Patholes	0.0554	1100	0.005
2	Patching	42.29	1100	3.844
3	Cracking	119.847	1100	10.89
4	Ravelling	0.117	1100	0.010
	Total	162.31	1100	14.75

Table 12 Type of Road Damage Segment 12 (Richo, 2022)

No.	Type of Damage	Area m^2	Area of Segment	Percentage
1	Patching	46.024	1100	4.18
2	Cracking	124.08	1100	11.28
3	Ruts	6.56	1100	0.596
4	Ravelling	0.038	1100	0.0035
5	Bleeding	2.53	1100	0.23
6	Depression	5.5	1100	0.5
	Total	184.74	1100	16.79

From the table above, the segment that suffered the highest damage was segment 3, which was 48.03% and the segment with the smallest damage rate was segment 6, which was 9.8%..

3.2 LHR Survei Data

Table 13 Determination of LHR Level

Class of LHR	LHR
0	<20
1	20 – 50
2	50 – 200
3	200 – 500
4	500 – 2000
5	2000 – 5000
6	5000 - 20000
7	20000 - 50000
8	>50000

(Source: *Tata Cara Penyusunan Program Pemeliharaan Jalan Kota*, 1990)

The following are the results of LHR calculations carried out over several days to find the peak value of road density.

Tabel 13 The Highest of LHR Data (Richo, 2022)

No.	Vehicle Type	EKR	Road	Volume Data
			Vehicle/Hour	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

Referring to the LHR table above, it can be seen that the Teuku Umar Tuban National Road is 4.

4, CONCLUSSION

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

1. The type of damage that occurs and the percentage of damage that occurs on the Teuku Umar Tuban National Road is:

   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. Teuku Umar Tuban National Road is included in category 4 in determining the level of road density based on procedures for the preparation of the city road maintenance program.

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REFERENCES

[1]

Hardiyatmo, H. C. (2015). Teknik Fondasi 2. *Gramedia Pustaka Utama*, 275. https://www.academia.edu/download/57492139/Hardiyatmo_____-_1996_-_Teknik_Pondasi_1.pdf

[2]

Sukirman, S. (1999). Tl I/ ,1. *Perkerasan Jalan Lentur*, 1–129.

Tata Cara Penyusunan Program Pemeliharaan Jalan Kota. (1990). *018*.

[3]

Hardiyatmo, H. C. (2015). Teknik Fondasi 2. *Gramedia Pustaka Utama*, 275. https://www.academia.edu/download/57492139/Hardiyatmo____-_1996_-_Teknik_Pondasi_1.pdf

[4]

Direktorat Jendral Bina Marga, K. U. (1997). *Tata Cara Perencanaan Geometrik Jalan Antar Kota No. 038/TBM/1997 Direktorat Jenderal Bina Marga*. *038*, 1–54.