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Level of road user satisfaction with safety and confort on jalan Mohammad hatta

Chitra Utary*, Muh Akbar and Dhea Riski Amanda³

Department of Civil Engineering, Universitas Musamus, Merauke, 99611, Indonesia

Abstract. Mohammad Hatta Road is a type of district road that is used as a link between Kurik District and MalindiMalindiMalindi District. The increased activity and mobility of residents on Jalan Mohammad Hatta have not been balanced with safety and comfort for road users, such as damage to the road body and a lack of supporting facilities on the road. The purpose of this study was to determine the factors that influence the lack of safety and comfort levels of road users and the influence between satisfaction variables on safety and comfort variables on Jalan Mohammad Hatta. This research method uses the correlation test method. This test is used to find the relationship between variable X (satisfaction) and variable Y (safety and comfort) on Jalan Mohammad Hatta which has bad road conditions. The data used in this study were obtained by distributing questionnaires with a total sample of 394 respondents. The results of this study showed that people were dissatisfied a percentage of 83.61%, insecure with a percentage of 83.92%, and very uncomfortable with percentage of 84.01%, in terms of several factors, namely road conditions, stability of vehicles, health, travel effectiveness, economy, pavement structure, socio-cultural conditions, facilities, and accessibility. There is a relationship between the satisfaction variable and the safety variable with a correlation value of 0.905 and a relationship between the satisfaction variable and the comfort variable with a correlation value of 0.886. So it shows that the higher the level of safety and comfort, the higher the level of satisfaction of road users.

Keywords. Correlation, Satisfaction, Security, Comfort, road users and Transportation.

* Corresponding author: utary_ft@unmus.ac.id

1 Introduction

In the development of a region, roads have an important role, especially in the process of distributing goods and services through land transportation. Roads are traffic infrastructures that must have good facilities, quality, and feasibility to realize the safety and comfort of road users [1][2]. However, in its implementation, there are still several roads that do not meet good road qualification standards for road users. In 2015 the total length of roads built by the government in Merauke Regency reached 1,826,211 km, the length of roads that had been paved only reached 507,484 km or around 39%, and the remaining length of 806,320 km or 61% were still dirt roads. The length of roads in good condition only reached 321,640 km (24%), roads in moderate conditions reached 252,644 km (19%), roads in damaged conditions reached 233,800 km (18%), and roads in[1] severely damaged conditions reached 506,100 km (39%) [3], [4]

Jalan Mohammad Hatta is one of the asphalt roads which is included in the category of heavily damaged with a PCI damage level value of 38.4. However, in reality, this road still has to support the social and economic life of the surrounding community because this road is the only access to connect the Kurik District and the Malind District[2], [5]. Kurik District is the second largest rice surplus area after Merauke Regency, besides producing rice, Kurik District also has several other superior products such as vegetables, tubers, and animals that are purposely raised or hunted. Increased activity and mobility of the population on this road have not been matched by safety and comfort for road users, such as damage to the road body, lack of road support facilities such as lack of lighting at night, traffic signs, road markings, and other road accessories. This of course affects the safety and comfort of the road users.

A road not only requires a sense of security but also comfort for its use, the environment and the quality of roads that are getting better, safer, and more comfortable can increase feelings of security, and comfort and have a significant effect on the quality of the population [5].

The research hypothesis uses a correlation test to prove whether there is an influence factor on the safety and comfort of Jalan Mohammad Hatta on the level of satisfaction of road users. Assuming that the higher the level of safety and comfort, the higher the level of satisfaction of road users and minimizing the occurrence of accidents.

In general, research on the level of satisfaction of road users only uses two dependent variables, but in this study, three dependent variables are used, namely the satisfaction variable (X) on the safety variable (Y1) and comfort (Y2). In addition, the number of samples used in this study has a larger number of 394 samples, which when compared to several related articles only uses 100 samples, can also be an advantage in this study.

The purpose of this study was to determine the level of satisfaction perceptions of road users about safety and comfort on Jalan Mohammad Hatta. The scope of the

research includes the damaged physical condition of the road, the lack of road equipment facilities (traffic signs, road markings, and lighting at night), as well as the perception of the level of satisfaction of road users in terms of several factors such as; health, economy, anxiety, accessibility, and effectiveness. Then this study also wanted to know the relationship between the independent variables, namely safety and comfort on road user satisfaction as the dependent variable.

2 Methodologi

2.1 Types of Research

This type of research in this study is qualitative research and quantitative research. Qualitative research is research that generally uses data analysis and is research with descriptive characteristics. This qualitative research approach is in the form of a perspective or point of view from the respondent using a data collection technique in the form of a questionnaire [6]. While quantitative research is research based on concrete data that is measured and then processed using statistics as a calculation tool, related to the problem to be studied. Quantitative data in this study were in the form of questionnaire results which were converted into numbers and then processed using statistical test methods.

2.2 Research sites

The location of this research is Jalan Mohammad Hatta, Kurik District, Merauke Regency. The sampling location is at coordinates 8°17'18.0"S 140°16'03.6"E and samples will be taken along Jalan Mohammad Hatta. The research location can be seen in Figure 1.

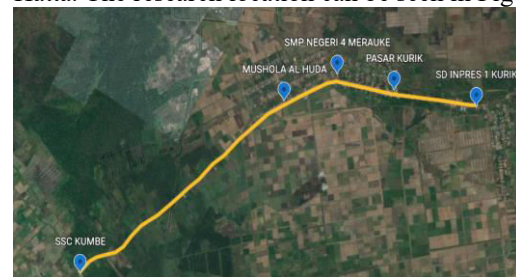


Fig. 1 Research sites

2.3 Data Analysis Techniques

The population size was determined from the number of people in the Kurik District and Malind District with a total of 26,827 people. While the number of samples is determined using the Slovin formula as follows.[6]–[8]

$$J_s = \frac{jp}{1 + Jp.e^2} \quad (1)$$

With:

J_s = Number of samples

jp = Total population

e = degree of tolerance

Based on equation (1), the calculation of determining the number of samples used in this study was 394 samples.

2.4 Data analysis method

2.4.1 Skala Likert

The use of the Likert scale aims to manage data from the results of distributing questionnaires based on statements or questions that have been completed by respondents. The answers to each question item or statement have levels from very satisfied to very dissatisfied. The Likert scale form in this study consists of five answer choices with a score range of 1-5 and the following equation is used [9]–[11]

$$\text{Skala likert} = T \times P_n \quad (2)$$

With:

T = total respondents' answers

P_n = choice of Likert score numbers

The percentage of assessment can be obtained by using the formula:

$$\frac{\text{the number of respondents/ answers}}{\text{ideal score value}} \times 100\% \quad (3)$$

In order to interpret the data from the results of the questionnaire, a qualitative level interval was created as follows.

Table 1. Score intervals

Score intervals	Criteria
84%-100%	very dissatisfied
68%-84%	not satisfied
52%-68%	neutral
36%-52%	satisfied
20%-36%	very satisfied

2.4.2 Validity test

After the data from the questionnaire results are tabulated using a Likert scale, it is necessary to test its validity using the validity test method which aims to evaluate whether the series of measuring instruments has accurately measured the object that is the research target.

With the provision that if the value of r count > r table and is positive then it is considered valid, and if the value of r count < r table then it is considered invalid. The formula used in the validity test [12]–[14] can be seen in the following equation.

$$R_{xy} = \frac{js(\sum xy) - (\sum x \sum y)}{\sqrt{[js \sum x^2 - (\sum x)^2][js \sum y^2 - (\sum y)^2]}} \quad (4)$$

With :

R_{xy} = correlation coefficient of scores per item and total score

js = number of samples

$\sum x$ = total score per item

$\sum y$ = total number of x

$\sum xy$ = the number of times the score per item and the total score

$\sum x^2$ = the result of the squared score per item

$\sum y^2$ = total xy amount

2.4.3 Correlation test

To test the relationship between the dependent variable and the independent variable, the correlation test method is used. The correlation test used in this study uses Spearman's rank correlation test, which aims to find a relationship or test the significance of the hypothesis when the variables linked are ordinal. By making a decision H₀ is accepted if the sig. < 0.05, it can be concluded that there is a significant correlation between variables, and H₁ is accepted if sig. > 0.05, it can be concluded that there is no significant correlation between variables [15], [16]. This test aims to test whether there is an influence between the satisfaction variable on the safety and comfort variable by using software in the form of the SPSS version 25 application.

3 Result and Discussion

Based on survey results and measurements of the current road conditions, shows that the condition of Jalan Mohammad Hatta has a length of ±2.5 km and a width of 5 m. Jalan Mohammad Hatta is a type of district road which is the main connecting route between the Kurik District and the Malind District with the surrounding conditions where there are many government buildings such as shopping areas, police offices, health clinics, banking buildings, schools and so on.

3.1 Validity test

Based on the results of distributing questionnaires to 394 respondents with calculations using the SPSS application, the results of the analysis of the validity test per item are obtained which are presented in Table 2.

Table 2. Item validity test results

Question items	r count	r table	information
1	0,844	0,099	Valid
2	0,818	0,099	Valid
3	0,701	0,099	Valid
4	0,859	0,099	Valid
5	0,782	0,099	Valid
6	0,834	0,099	Valid
7	0,705	0,099	Valid
8	0,716	0,099	Valid
9	0,764	0,099	Valid
10	0,840	0,099	Valid
11	0,735	0,099	Valid

12	0,824	0,099	Valid
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3.2 Uji Korelasi

After testing its validity, the next step is to test the relationship between the dependent variable and the independent variable by using a correlation test on variable X, namely the level of satisfaction with variable Y, the safety and comfort of Jalan Mohammad Hatta users, which were previously tested between indicators using the SPSS application, then presented as a whole in Table 3. and Table 4 below.

Table 3. Correlation test results of satisfaction (X) and security (Y1) variables

			K	A
Spearman's rho	K	Correlation Coefficient	1	0.905**
		Sig. (2-tailed)	.	0
		N	394	394
	A	Correlation Coefficient	0.905**	1
		Sig. (2-tailed)	0	.
		N	394	394

Based on Table 3. with a total sample of 394 samples, a correlation coefficient of 0.905 was obtained which indicates a relationship between variable X (satisfaction) and variable Y1 (safety), and is included in the very strong correlation criteria. With Spearman's rank correlation decision making, H0 is accepted if the significance value is <0.05 then there is a significant correlation between variables and H1 is accepted if the significance value is > 0.05 then there is no significant correlation between variables. So it can be concluded that H0 is accepted and H1 is rejected because there is a correlation between the variables X (satisfaction) and Y1 (safety) with a significance value (2-tailed) of 0.000 <0.05.

Table 4. Correlation test results of satisfaction (X) and comfort (Y2) variables

			K	A
Spearman's rho	K	Correlation Coefficient	1	0.886**
		Sig. (2-tailed)	.	0
		N	394	394
	N	Correlation Coefficient	0.886**	1
		Sig. (2-tailed)	0	.
		N	394	394

From the correlation results in Table 4, a correlation coefficient of 0.886 is obtained which indicates a relationship between variable X (satisfaction) and variable Y2 (comfort), and is included in the very strong correlation criteria. With Spearman's rank correlation decision making, H0 is accepted if the significance value is <0.05 then there is a significant correlation between variables and H1 is accepted if the significance value is > 0.05 then there is no significant correlation between variables. So it can be concluded that H0 is accepted and H1 is rejected because there is a correlation between the variables X (satisfaction) and Y2 (comfort) with a significance value (2-tailed) of 0.000 <0.05.

3.3 3.3 Data Description

3.3.1 3.3.1 Characteristics of Respondents

Jalan Mohammad Hatta has quite high mobility with various activities in it such as road users or various community activities around the road such as sellers and buyers in markets, places to eat, banking and so on. The following are the characteristics of the 394 respondents which are presented in the following.

Table 5. Characteristics of Respondents

NO.	Characteristics of Respondents	Categori
1	Gender male	Male : 211 people
		Female : 183 people
2	Age	16-20 years : 89 people
		21-28 years : 139 people
		29-39 years : 55 people
		39-48 years : 66 people
		49-55 years : 36 people
		> 56 years : 9 people
3	Transportation type	bicycle : 9 units
		Motorcycle : 291 units
		car : 70 units
		Truk : 15 units
		other : 9 units
4	Last education	Tidak sekolah: 10 people
		elementary school : 60 people
		Junior/senior high school: 225 people
		Bachelor/postgraduate: 89 people
		other : 10 people
5	Type of work	
		Tidak pekerja: 66 people

	Mahasiswa : 129 people
	PNS/TNI/POLRI:35 people
	farmer : 35 people
	self-employed : 35 people
	other : 94 people

Table 5 shows the characteristics of the 394 respondents who use Jalan Mohammad Hatta who have various characteristics, and are divided into five criteria such as: gender, age, type of vehicle, education, and occupation.

The results of distributing the questionnaires in this study were divided into 3 aspects, which were used to determine the perceptions of road users on satisfaction, safety and comfort on Jalan Mohammad Hatta. The perception of road users is presented in Figure 2.

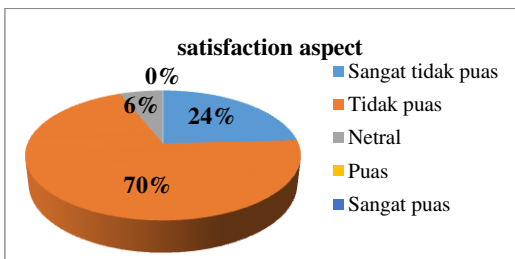


Fig 2. Graph of perceptions of road user satisfaction

In Figure 2, the respondent's choices are quite varied, in the aspect of community satisfaction they tend to choose the dissatisfied category (TP) with a percentage of 70%, this can be proven by the results of the percentage of respondents' perceptions on the aspect of satisfaction on Jalan Mohammad Hatta which is considered high. The percentage with the very dissatisfied category (STP) obtained a percentage of 24%, and those who chose neutral obtained a percentage of 6%. Meanwhile, the lowest results surveyed were very satisfied (SP) and satisfied (P) with a yield of 0%.

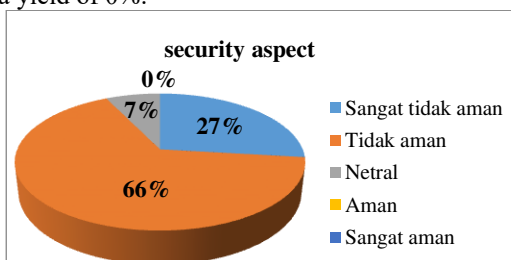


Fig 3. Graph of road user safety perceptions

The results of user perceptions are in Figure 3. The highest percentage is obtained in the unsafe category (TA) with a percentage of 66%, the very unsafe category (STA) with a percentage of 27%, the neutral category with a percentage of 7% and the lowest percentage is 0% for safe (A) and very safe (SA) categories.

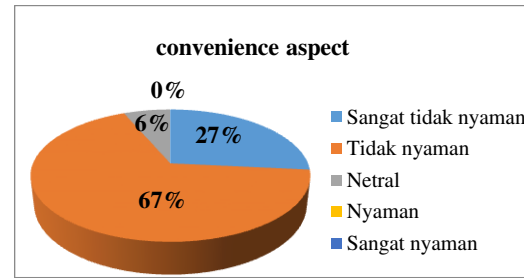


Fig 4. Grafik persepsi kenyamanan pengguna jalan

Figure 4 above shows the highest respondent's perception of 67% in the uncomfortable category (TN). People who choose the very uncomfortable (STN) category with a percentage of 27%, the neutral category (N) with a percentage of 6%, and the comfortable (Ny) and very comfortable (SN) categories with the lowest percentage of 0%.

The average score for each item of questionnaire questions obtained based on the current condition of Jalan Mohammad Hatta regarding aspects of satisfaction, safety and comfort is calculated using a Likert scale with a large percentage of results according to the respondent's choice. The total score obtained from the questionnaire results is shown in Table 6.

Table 6. Skor rata-rata

No.	satisfaction aspect	The average score of Respondents' answers
1	Road Pavement Structure	4,19
2	Socio-cultural	4,19
3	Road equipment facilities	4,18
4	Accessibility	4,17
No.	Security Aspect	The average score of Respondents' answers
1	Road Conditions	4,21
2	Socio-cultural	4,20
3	Road equipment	4,17
4	Stability	4,21
No.	Aspek Kenyamanan	The average score of Respondents' answers
1	Health	4,21
2	Effectiveness	4,20
3	Worry	4,19
4	Economy	4,20

In Table 6, the highest score is obtained on the satisfaction aspect, namely on the road pavement structure indicator and socio-cultural conditions with an average score of 4.19, for the safety aspect, namely on indicators of damaged road conditions and completeness of facilities with an average score of 4

.21, as well as for the comfort aspect, namely the health indicator of road users with an average score of 4.21. While the results of the questionnaire that get the lowest score on the satisfaction aspect with the accessibility indicator with an average score of 4.17, the safety aspect with the road completeness indicator with an average score of 4.17, and the comfort aspect with the anxiety indicator with an average score of 4.19. Based on the results in Table 6. by using a Likert scale to measure the attitudes and opinions of respondents to the problems to be studied, the results obtained are close to a value of 5 which is considered to have an average score with a very bad category and if the value obtained is close to 1 then it can be concluded to have an average score with a very good category.

3.3.2 Distribusi frekuensi persentase nilai skor

The questionnaire used in this study consisted of three variables with 12 question items and five alternative answers. The results of distributing this questionnaire were changed in the form of a Likert scale and then the percentage score value would be calculated. The percentage value of the score is obtained from equation 2 and the results of the percentage of the score are grouped according to the score interval in table 1, after that calculate the frequency of these values, then the percentage score is obtained in Table 7.

Table 7. Persentase nilai skor

No	Score intervals	Criteria	Frequency	Percentage
1	84%-100%	Very dissatisfied	135	34%
2	68%-84%	Not satisfied	244	62%
3	52%-68%	Neutral	15	4%
4	36%-52%	satisfied	0	0%
5	≤36%	Very satisfied	0	0%
Total			394	100%

Table 7. shows the results that respondents tend to feel dissatisfied with the condition of Jalan Mohammad Hatta, this can be proven from the results of the frequency of scores with a percentage of 62%. The percentage of scores with very dissatisfied criteria is 34%, neutral criteria is 4% and the lowest percentage is very satisfied and satisfied criteria is 0%. Based on the data on the percentage of score values, a recapitulation of the perceptions of road users is obtained by determining the total score, the average percentage score per aspect is presented in Table 8.

Table 8. Recapitulation of value percentages based on Respondents' perceptions

No.	Perception of road users	Percentage of average scoring scores	Criteria
1	Satisfaction in terms of several factors	83,61%	Not satisfied
2	Security is reviewed from several factors	83,92%	Not safe
3	Convenience in terms of several factors	84,01%	Very uncomfortable

In Table 8. regarding satisfaction, safety and comfort in terms of several factors, it can be concluded that people feel dissatisfied, insecure and very uncomfortable when passing Jalan Mohammad Hatta. This can be seen from the percentage results based on the score of the results of distributing questionnaires with a satisfaction aspect value of 83.61% which includes the criteria of dissatisfaction, the security aspect of 83.92% which includes the criteria of unsafe, and the comfort aspect with a value of 84.01%. which includes the very uncomfortable criteria.

4 Conclusion

Based on the results of the analysis, the factors that influence the lack of satisfaction with the safety and comfort of road users include damaged road conditions that can allow accidents to occur, vehicle stability when passing through damaged roads, and the user's health condition due to excessive shocks with an average score the highest was 4.21. As for other factors such as user attitudes and behavior, travel effectiveness, and people's income with an average score of 4.20. Damaged pavement structure, socio-cultural conditions, and user anxiety when crossing the road with an average score of 4.19. Lack of road support facilities with an average score of 4.18, accessibility and completeness of the road with an average score of 4.17. Based on these factors, it can be concluded that people are dissatisfied with a percentage score of 83.61%, insecure with a percentage score of 83.92%, and very uncomfortable with a percentage score of 84.01%.

There is an influence between the level of user satisfaction with safety and comfort on Jalan Mohammad Hatta, with a correlation value of the X variable and Y1 variable of 0.905 with a sig.(2-tailed) value of $0.000 < \alpha (0.05)$ and the correlation value of the X variable and the variable Y2 is 0.886 with a sig.(2-tailed) value of $0.000 < \alpha (0.05)$. So it shows that the higher the level of safety and comfort, the higher the level of user satisfaction on Jalan Mohammad Hatta. For this reason, it is hoped that this research will have implications for related parties to pay more attention to road conditions, especially on Jalan

Mohammad Hatta to be repaired immediately and complete facilities on the road, especially lighting facilities at night to provide safety and comfort for road users. [13]

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