

Road Segment Performance Analysis

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Abstract:

Section Jl. Raya Roomo Manyar Gresik is an access for large vehicles to enter and leave the factories around it, not to mention the entry and exit of factory workers during shift changes. With a 2/2UD road, it is not uncommon to make Jl. Raya Roomo Manyar Gresik is one of the congestion centers in the Gresik Regency — evaluation of the performance of the Jl. Raya Roomo Manyar Gresik shows that the Jl. Raya Roomo Manyar Gresik is experiencing saturation obtained from the MKJI 1997 performance analysis method of the road segment, and according to the Ministry of Transportation regulation No.96 of 2015, the Jl. Raya Roomo Manyar Gresik is included in the service level category D with a V/C ratio of 0.84.

Keywords: roads, road performance, level of service

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Introduction

Gresik Regency is one of the largest industrial areas in East Java Province, with around 1,800 factories, and continues to increase yearly. The increase in the industrial area has resulted in a rapid increase in traffic, which can cause conflicts and traffic jams on the roads (Ayunaning, 2023), one of which has happened on Jl. Raya Roomo Manyar Gresik.

Jl. Raya Roomo Manyar Gresik is an access for large vehicles to enter and leave the factories around it, not to mention the entry and exit of factory workers during shift changes. With a 2/2UD road, it is not uncommon to make Jl. Raya Roomo Manyar Gresik is one of the congestion centers in the Gresik Regency. Based on field observations, the problems on the Jl. Raya Roomo Manyar Gresik occurs in the morning, afternoon, and evening. This problem occurs because the traffic volume in the area is increasing, and there are many side barriers along the side of the road, in the form of vehicles stopping and parking on the side of the road, public transport boarding and unloading passengers, pedestrians and street vendors (PKL). Due to these problems, evaluating the road section Jl is necessary. Raya Roomo Manyar Gresik used the 1997 Indonesian Road Capacity Manual (MKJI) to determine the performance of the Jl. Raya Roomo Manyar Gresik during the design life.

Method

I researched Jl. Raya Roomo Manyar Gresik, where Jl. Raya Roomo Manyar Gresik is one of the roads in the national arterial road functions category based on government administration and load. The Law of the Republic of Indonesia No. 38 of 2004 explains that national roads are arterial and collector roads in the primary road network system that connects provincial capitals, national strategic roads, and toll roads. (Nashruddin & Buana, 2021).

Data collection in this study was carried out by direct observation in the field to obtain primary data, which was carried out from 06.00 WIB to 18.00 WIB for five days. Obtained secondary data collection was through the Gresik Regency Government Transportation Service and various relevant sources (Rafi & Pratama, 2019). Then the data obtained was then processed and analyzed using the 1997 Indonesian Highway Capacity Manual (MKJI). (Susanto, 2021).





Figure 1. Surveying

was conducted on Monday, as shown in Figure 1, and based on the graph, the peak hours with the most significant total volume in both directions occurred on Monday afternoon. Obtained the traffic volume in both directions at peak hours 11.00 AM – 12.00 AM of 1,170 smp/hour and 1,156 smp/hour.

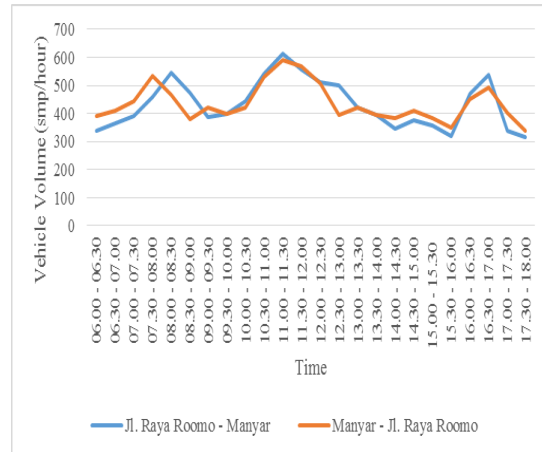


Figure 2. Fluctuations in Traffic Volume for Jl. Raya Roomo Manyar Gresik

Results and discussions

The research conducted aims to determine whether the Jl. Raya Roomo Manyar Gresik is included in what level of service, and is it solid or not?

Road Geometry

Jalan Raya Roomo Manyar Gresik's geometric conditions can be seen in the table below.

Table 1. Road Description

Description	Information
Road type	2/2UD
Environmental conditions	Factories, Shops, and Offices
The width of the road	7 meters
Road shoulder width	1 meter
Road classification	National Artery

Traffic Volumes

The survey obtained a graph of traffic volume fluctuations to determine peak hours (Wardi et al., 2021). The survey in this study

Side Barriers

At peak hours at 11.00 – 12.00, the side friction was 422 incidents/hour. Based on MKJI 1997, the class of side resistance on this road segment is classified as medium category (300-499 event weights/hour).

Analysis of Service Level of Existing Conditions

Performance analysis based on the comparison between volume (V) and segment capacity (C) calculated based on MKJI 1997 (Wahab et al., 2021). Data for calculating this road's level of service (LOS) is at level E with a V/C ratio value of 0.84. That means the traffic volume on this road is approaching or is at the capacity of the road segment, the traffic flow is unstable, and the speed sometimes stops. It is shown in Table 2.

Table 2. Service levels for roads during peak hours

Roads	Capacity (smp/hour)	Traffic volumes (smp/hour)	V/C Ratio	LOS
Jl. Raya Roomo Manyar Gresik	2.790	2.326	0,84	E

Alternative Solutions for Improving Road Performance

It is increasing the level of service on the Jl. Raya Roomo Manyar Gresik urgently needs alternative recommendations because the results of the evaluation show that the service level performance of these roads during peak hours is at level E. Alternative solutions that can propose are as follows:

1) Reduction of side resistance

Reducing the side resistance is expected to increase the capacity adjustment factor for side resistance and shoulder width (FCSF) effects. Due to the side friction that occurred on the Jl. Raya Roomo Manyar Gresik is classified as medium (M), so it is recommended to reduce the side friction as follows:

- a. Prohibit vehicle parking/stopping on the shoulder of the road along Jl. Raya Roomo Manyar Gresik. Because at some points, there are no signs prohibiting parking or stopping on Jl. Raya Roomo Manyar Gresik.
- b. Prohibiting street vendors (PKL) from selling on the side of the road so that the bodies and shoulders of the road can function again as they should.

Assuming the number of side friction from the survey results is reduced by the number of stopped vehicles, parked vehicles, and street vendors (PKL), the frequency of side friction is 230 incidents/hour. Reducing the value of this side friction can improve roads' level of service (LOS) to level D with a V/C ratio of 0.79.

1) Road widening

Widening of Jl. Raya Roomo Manyar

Gresik is expected to increase the capacity of the road section by changing the type of road from two undivided two-way lanes to four undivided two-way lanes. Widening the road section can increase the level of service (LOS) to level D, which means that the traffic flow is near stable at low speed.

Conclusion

The results of the research and analysis, in general, can be concluded that the Jl. Raya Roomo Manyar Gresik, based on calculations using MKJI 1997, it is known that the Jl. Raya Roomo Manyar Gresik is experiencing saturation, and based on the 2015 Minister of Transportation Regulation No. 96, it is included in the service level category D with a V/C ratio of 0.84.

References

- Ayunaning, K. (2023). Performance Analysis of Signalized Intersections (Case Study: Jalan Kragan – Jalan Veteran Gresik). *Journal of Development Research*, 7(1), Process. <https://doi.org/10.28926/jdr.v7i1.260>
- Nashruddin, A. Z., & Buana, C. (2021). Analisis Penilaian Kerusakan Jalan dan Perbaikan Perkerasan pada Jalan Raya Roomo, Kecamatan Manyar, Kabupaten Gresik. *Jurnal Teknik ITS*, 10(1). <https://doi.org/10.12962/j23373539.v10i1.59866>
- Rafi, A., & Pratama, A. T. (2019). ANALISIS KINERJA PADA RUAS JALAN TENTARA PELAJAR (SEMARANG).
- Susanto, H. (2021). ANALISIS KINERJA RUAS JALAN RAYA CITAYAM BERDASARKAN METODE MKJI 1997. *Jurnal Ilmiah Teknik Sipil: Akslerasi*, 3(1).
- Wahab, W., Armen, R., & Rusli, A. M. (2021). Studi Analisis Kinerja Ruas Jalan Jhoni Anwar dan Gajah Mada Kota Padang. *Jurnal Teknik Sipil ITP*,

- 8(2), 6.
<https://doi.org/10.21063/jts.2021.v802.06>
- Wardi, S., Omi Yeza, N., & Anita, S. (2021). Analisis Kinerja Ruas Jalan (Studi Kasus: Jalan Raya Siteba Kota Padang). *Jurnal Teknik Sipil ITP*, 8(2), 5. <https://doi.org/10.21063/jts.2021.v802.05>