

**THE IMPACT OF ROAD SPACE UTILIZATION ON ROAD PERFORMANCE ON THE
MURADI ROAD SECTION, SUNGAI PENUH CITY, JAMBI****Yuskal Despian¹, Eva Rita², Zuherna Mizwar³**

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E-mail: yuskaldespian294@gmail.com^{1*}, evarita@bunghatta.ac.id², zuhernamizwar@bunghatta.ac.id³**Received: 13/07/2026 | Revised: 20/07/2026 | Accepted: 18/08/2026 | Published: 25/08/2026****Abstract**

The inappropriate use of roadside space (Rumija) can cause lateral obstructions and reduce traffic performance. This study aims to identify the form and intensity of Rumija use, analyze the performance of Muradi Road in Sungai Full, analyze its impact on road performance, and formulate management strategies. The study employed a quantitative approach with a descriptive-evaluative design. Data were obtained through rough observation of Rumija, road geometric measurements, surveys of traffic volume and lateral obstructions, documentation, and interviews with three expert informants. The analysis of the road section's performance was based on the 2023 Indonesian Road Performance Index (PKJI), whilst the management strategies were formulated based on expert judgment using the Plan-Do-Check-Act (PDCA) approach. The research findings indicate that the use of Rumija is not yet in line with its intended function, primarily due to parking on the carriageway and road shoulders, street vendor activities and motorcycle taxi stands on the pavements, as well as blocked drainage systems. The maximum traffic volume reached 2,082.8 vehicle passes per hour with an effective capacity of 1,689.9 vehicle-passes per hour. The degree of saturation ranged from 0.86 to 1.16, the average speed was 12.5 km/h, and the Level of Service (LOS) was D- F. Side obstructions were dominantly caused by vehicles entering and exiting the road, accounting for 35 per cent. Management strategies include parking control, the reorganization of street vendors, the restoration of pavements, drainage improvements, and strengthened inter-agency coordination. Road performance needs to be improved through the restoration of the Rumija's function and the integrated and sustainable control of ancillary activities.

Keywords :Road Space Utilization, Road Performance, Muradi Road Section, Sungai Penuh City, Jambi**INTRODUCTION**

Road is Wrong One the main infrastructure in the transportation system that functions to support movement man And goods as well as connect various activity center. In its implementation, function road No only determined by body road, but also by the regularity of use room Which become part from Room Owned by Road (Rumija). Based on Capacity Guidelines Road Indonesia (PKJI) 2023, Rumija is space intended for the road along with the equipment And is at under the control of the road organizer to ensure the implementation as well as security function road [1]. However, in urban area development, space the often experience use that is not in accordance with its main function, such as use body road And shoulder road For parking r, sidewalk For trade activities, as well as the use of road space for various other activities. These conditions become the more complex along with increasing activity economy And volume Then urban crossings that have the potential to reduce the capacity and quality of road services. Problems The use of Rumija was also found on the Muradi Road section of Sungai Penuh City, which is a primary collector road and connects Sungai Penuh City with Kerinci Regency and surrounding areas. On this section, various forms of spatial use are found that have the potential to disrupt the road's function, including vehicles parked on the roadway, sidewalks used by street vendors, and buildings located too close to the road. near with room owned by road, limitations shoulder road, as well as condition facility pedestrian foot Which inadequate. This problem has implications for the emergence of side obstacles and disruptions to the smooth flow of traffic.

In a way scientific And practical, study about utilization Rumija important because of the activities in that space can develop into side barriers that affect capacity, speed, degree of saturation, and road service levels. PKJI 2023 places pedestrian activities, vehicle stops or parking r, vehicle in and out from land in around roads, and slow vehicles as components Which can cause obstacle to traffic flow [1]. The higher the intensity of activity the, the more big potential the occurrence of traffic conflicts and a decline in road performance. context Road Muradi,

problem the become the more important Because the road section is in the area with activity public And Then relatively high traffic. Thus, the management of Rumija No can only is seen as a matter of physical arrangement of road space, but also as part of an effort to maintain capacity, safety, comfort, And level service traffic. Based on condition the, This study aims to identify the form and intensity of utilization Rumija on the Muradi Road section, analyzing the performance level of the road section based on indicators Then cross, analyze the impact of the use of Rumija on the performance of road sections, as well as formulating strategy handling to improve Rumija's performance. The research focus is directed at the components room owned by road Which covering track Then cross, road shoulders, sidewalks, and drainage, taking into account activities that are a source of side obstacles. The research was conducted on the road section Muradi City River Full with consider that location has problems utilization room Which in a way direct related with parking activities, street vendors, activity pedestrian foot, And condition facility road. Objective the in line with formulation of research objectives in thesis, that is identify the use of Rumija, analyze the performance of the section, determine the impact, and determine solutions to improve Rumija performance.

Contribution study This located on integration of road space utilization studies with analysis performance traffic in the context of the Muradi Road section of Sungai Penuh City. The research not only describes form Rumija's problems, but also link them to road performance indicators so that can give understanding Which more comprehensive regarding the consequences of utilization room Which not in accordance with traffic operations. The results of the study are expected to enrich study regarding the management of Rumija in urban areas while providing an empirical basis for local governments and technical agencies in determining parking management policies, control activity on sidewalk and road shoulders, as well as maintenance of drainage facilities. Thus, study This is expected to provide a theoretical contribution to the development of transportation studies. And management road as well as contribution practical in supporting the arrangement of road space that is more orderly, safe, comfortable, and able to maintain traffic performance.

LITERATURE REVIEW

Based on Guidelines Capacity Road Indonesia (PKJI) 2023, Road Ownership Space (Rumija) is defined as room which is intended for the road body and its equipment and is under the control of organizer road use ensure organization as well as security function road [1]. PKJI 2023 also places pedestrian activities, vehicles stopping or parking, vehicles entering and exiting from land in around road, And vehicle slow as component obstacle side effects that affect capacity, speed, degree of saturation, and level of road service [1]. This framework is the main theoretical reference in evaluating the performance of road sections in this study. Studies previously by Utami et al. [2] on the RE. Martadinata Road and Pancasila Road sections of Sungai Penuh City show that obstacle on asset Rumija Still Enough big, especially on sidewalks due to activity trader foot five, body road consequence parking illegal, as well as channel drainage that is not functioning in a way optimal. findings the emphasized that the Rumija problem in Sungai Penuh City has become a recurring issue and needs to be studied further, especially to understand the relationship between the form of space utilization and traffic performance on certain road sections.

From a methodological perspective, quantitative research with a descriptive-evaluative design was chosen because able to produce numerical data that can be analyzed descriptively and inferentially [3]. To formulate a handling strategy that is qualitative-strategic, this research refers to the approach expert judgment as explained in the Delphi methodology, which emphasizes the importance of expert competence, experience, and authority in the decision-making process [4]. Related management drainage road, study by T omigolung [5] emphasizes the importance of restructuring drainage system and its integration with environmental drainage to prevent weakening of construction road, while Sohn et al. [6] emphasized that the effectiveness of the drainage system is very important the ability to drain rainwater and reduce the risk of flooding and losses due to flooding. Second study the become runway theoretical for formulation strategy handling drainage on Jalan Muradi. Based on this review, the study direct linking form utilization Rumija with indicator performance Then cross on section road primary collectors in medium-sized urban areas, such as Road Muradi City Sungai Penuh, is still limited. This research is aimed at filling the gap the with integrating analysis of Rumija utilization and road section performance into a comprehensive study framework.

RESEARCH METHOD Research

Approach and Location

This research use approach quantitative with design descriptive-evaluative For identify utilization Room Owned by Road (Rumija), measuring the condition of side obstacles, and analyzing performance section Road Muradi based on indicator Then cross. The quantitative approach was chosen because part big research data in the

form of numbers obtained through geometric measurements, enumeration volume Then cross, measurement speed, as well as calculation capacity, degrees boredom, and level service road. Approach This in accordance with the characteristics of quantitative research generate numerical data for analysis in a way descriptive and inferential [3]. Besides quantitative analysis, study Also using expert judgment to formulate a strategy for handling the use of Rumija through the Plan-Do-Check-Act (PDCA) approach. Study implemented on section Road Muradi, City River Full, Which is a primary collector road connector City Sungai Penuh with Kerinci Regency and the surrounding areas. This section has long overall around 22 km with type road 2/2 T T. Observations are focused on segments throughout 4 km until city borders Sungai Penuh and Kerinci Regency, then a 1 km segment was designated as the main observation location because it has the highest level of side obstacles. The obstacles that become consideration election location covering parking on the body road, activity trader foot five, vehicle in and out area shops, pedestrian activities, and inappropriate use of Rumija.

Research Flow

In conducting this research, researchers need to go through several stages of research implementation. Method scheme study Which used to solve each problem in the research is presented in the following research flowchart.



Figure 1. Research Flow

Population and Sample

Study This No using population and samples in the sense of social survey research because the object main study in the form of section road, condition Rumija, traffic volume, and side obstacle events. Determination location observation done in a way purposive based on condition the section that has the highest level of side resistance.

Observation main done on a 1 km segment, with a traffic volume survey at Sta 0+750 and a side obstacle survey at Sta 0+700 to Sta 0+900. To obtain Rumija's handling strategy, the study used 3 expert informants selected through purposive sampling, each One people from the Department of Public Works and Spatial Planning, Service The Sungai Penuh City Transportation Agency and the Civil Service Police Unit. The selection of experts was based on competence, experience, and authority relevant to road and traffic management. And Rumija. The criteria used include a minimum of a bachelor's degree in a relevant field, a minimum of 10 years of work experience, and a technical position. structural, or functional Which related to roads and traffic. The selection of experts refers to Nasa et al. [4].

Data Collection Instruments and Techniques

Instrument study Which used consists of on form survey, meter, stopwatch, smartphone, and tools write. Indicator The observed factors include: (1) geometric conditions of the road; (2) length and width of the road body; (3) wide shoulder road; (4) wide sidewalk; (5) width of drainage or edge channels; (6) traffic volume; (7) vehicle speed; (8) type and intensity of Rumija use; and (9) side obstacles. Identification utilization Rumija done through measurement obstacle on the traffic lane, road shoulder, channel, And sidewalk r, Then compared to with the length of the observed Rumija object to obtain the percentage of the level of resistance. Survey volume Then cross carried out by direct enumeration of vehicles at Sta 0+750 based on classification bicycle motor (SM), vehicle light (KR), and heavy vehicles (KB). Meanwhile, the obstacles side observed based on four type incident, that is pedestrians, parked or stopped vehicles, vehicle in and out, And vehicle slow, in accordance with PKJI 2023. Based on the method section thesis Which available, test validity And The statistical reliability of the instrument was not reported because the main research instruments were observation sheets and field measuring instruments. Collection Data was collected through field observations, traffic surveys, side obstacle surveys, geometric condition measurements, documentation, and expert interviews , with the following details.

a. Observation of existing conditions and Rumija.

Observations are carried out to obtain data on the physical condition of the road. And utilization Rumija. Measurements are taken every 50 m by observing the length of the section, the width of the road body, the width of the road shoulder, the width of the sidewalk , and the width of the drainage or edge channel.

b. Survey volume Then cross.

Survey done on Station 0+750 For get volume highest traffic. Vehicle counted in a way directly based on vehicle type with manual recording of each One O'clock during peak hours. The survey was conducted over 7 days, from 7:00 AM to 9:00 AM, 12.00-14.00, and 16.00-18.00.

c. Survey obstacle side.

The survey was conducted at Sta 0+700 to Sta 0+900 by observing and take notes every incident obstacle side on period observation. The types of events recorded include pedestrians, parked or stopped vehicles, vehicles entering and exiting , and slow vehicles. Data is used to determine the side obstacle class based on the 2023 PKJI.

d. Documentation. Documentation is carried out during survey field For record condition physique road sections, forms of Rumija utilization, and various obstacles found at the research location.

e. Interview Paka r. Interview done to three expert informants through expert judgment to obtain evaluation to alternative Rumija's performance improvement strategy. Informants were selected purposively based on their competence, experience, and authority related to roads, traffic, and Rumija management.

Data Analysis Techniques

Analysis Data analysis was carried out in several stages. First, an analysis of Rumija's utilization was carried out by identifying obstacles on the traffic route, shoulder road, channel, And sidewalk r. Level obstacles are determined based on comparison long the part of Rumija that experiences obstacles with the length of the observed Rumija object. Second, analysis performance section road done based on PKJI 2023, Which covering volume traffic, capacity road, degrees saturation, speed travel, And Road service level. Road section capacity is calculated by considering the basic capacity and width correction factor. rate r, separation direction, side obstacles, and city size, as formulated in Equation (1).

$$C = C_o \times FC_w \times FC_{sp} \times FC_{sf} \times FC_{cs} \quad (1)$$

with C is the road section capacity (smp/hour), C_o is the basic capacity (smp/hour), FC_w is the correction factor wide lane traffic, FC_{sp} is the direction separation correction factor, FC_{sf} is the side obstacle correction factor, and FC_{cs} is the city size correction factor. The degree of saturation is calculated by comparing traffic volume to road capacity as in Equation (2).

$$DS = Q / C \quad (2)$$

with DS is degrees saturation, Q is traffic volume (smp/hour), and C is road section capacity (smp/hour) as calculated in Equation (1). Third, analysis impact utilization Rumija done with connecting the form of Rumija utilization as variables free, that is parking on road body or shoulder, use of sidewalks by street vendors, blocked edge drains, and buildings on the roadside, with road performance variables in the form of traffic volume, vehicle speed, road capacity, degree of saturation, and level of road service. Fourth, analysis Handling strategies are carried out based on the results of expert judgment. Expert opinions are used For determine alternative solution improvement performance Rumija, then compiled using the Plan-Do-Check-Act (PDCA) approach.

RESULTS AND DISCUSSION

1. Utilization of Road Space and Side Obstacles

Results survey show that utilization Road Ownership Space (Rumija) on the Muradi Road section, Sungai City Full Not yet fully in accordance with function room road. Form the most dominant use covering vehicle Which parking on body and road shoulders, street vendor activities (PKL) And post taxibike on sidewalk r, building Which is at too near with border road, as well as closed drainage channels. On segment Station 0+000 until Station 1+000, obstacle body road reach 41.1% on side left And 37.4% on side right, whereas obstacle shoulder road reach 41.1% And 37.9%. Obstacle sidewalk on segment Which The same reach 34.6% on side left And 35.4% on right side.

Table 1. Utilization of Rumija on the Muradi Road Section

Rumija Components	Main findings	T highest level of resistance
Road body	Vehicle parking	41.1%
Roadside	Permanent parking	41.1%
T rotoar	Street vendors and motorcycle	35.4%
Channel	taxi posts Closed channel	13.2%
Border	The building is too close to the road	64.4%

Source: Research survey results.

findings the show that conflict utilization Rumija especially happen on the space that should be support smoothness per movement vehicle And road user safety. Parking on the body And shoulder road reduce wide effective traffic lanes, while the use of sidewalks by street vendors and post taxibike reduce function room pedestrian feet. This condition increases the interaction between side activities And current Then cross. In PKJI 2023, activity pedestrian foot, vehicle stop or park a vehicle in and out land side road, And vehicle slow is a side resistance component that is taken into account in the evaluation of section performance.



Figure 2. Condition of Rumija utilization on the Muradi Road section

findings the consistent with study Utami et al. [2] on the road section in Sungai Penuh City which shows that sidewalk And The road surface is disturbed by street vendors' activities and illegal parking. thus, utilization Rumija for non-transportation activities is not only a matter of spatial order, but has the potential to be a factor that influences traffic capacity and smoothness.

2. Performance of the Muradi Road Section

Analysis performance section based on PKJI 2023 show that volume Then cross maximum on Muradi Street reaches 2,082.8 junior high school/hour. On moment Which The same, capacity effective section only as big as ,689.9 smp/hour, or a decrease of 39.65% from the basic capacity of r . Condition it shows that performance section road collector primary Already very bad, Where Traffic flow has exceeded road capacity, causing critical and ongoing congestion.

Table2. Main Performance Indicators of the Muradi Road Section

Indicator	Results
Maximum traffic volume	2,082.8 smp/hour
Effective capacity	1,689.9 smp/hour
Capacity reduction	39.65%
Degree of saturation	0.86-1.16
Average speed	12.5 km/h
Level of service	LOS DF

Source: Results of research analysis.

Mark degrees saturation Which is in the range of 0.86 to 1.16 indicating that traffic conditions is at on level condition fed up, congestion And obstructed/stopped flow. Under certain conditions, this value has exceeded the operational capacity of the section. The average speed of vehicles only reaches 12.5 km/h the more strengthen indication low traffic performance. With the length of the section observed around 4 km, time The travel time is approximately 20 minutes. This situation indicates that road users face significant slowdowns due to the high level of vehicle interaction with roadside activity.

The results of side resistance observations produced total frequency weighty as big as 623.3 incident. The largest component comes from vehicles entering and leaving side road as big as 217.0 incident weighty, followed vehicle parking or stop as big as 175.0, slow vehicles amounted to 164.8, and pedestrians amounted to 66.5.

Table 3. Composition of Side Obstacles on the Muradi Road Section

Types of obstacles	Number of occurrences	Weighted value	Proportion
Pedestrian	133	66.5	11%
Parking/stopping	175	175.0	28%
Vehicles in and out	310	217.0	35%
Slow vehicle	412	164.8	26%
Total		623.3	100%

Source: Research survey results.

The dominant activity of vehicles entering and leaving parking show that activity on side of the road is Wrong One factor important Which affect the performance of Jalan Muradi. Conceptually, the condition the explain Why is the effective capacity lower than the basic capacity r? PKJI 2023 does take side obstacles into account as one of the road section capacity correction factors.

3. Impact of Rumija Utilization on Road Performance

Results study show existence relatedness between utilization of Rumija and decreased performance of the section. Parking on the roadside and shoulders reduces effective vehicle space, while street vendors and motorcycle taxi stands on sidewalks have the potential to encourage pedestrians to use vehicle space. channel Which closed increase potential for flooding and can disrupt road operations when happen Rain. In a way overall, utilization Rumija contributed to the increase obstacle side And decrease capacity effective segment. This condition is reflected in level service road Which is at on LOS D to F, with the worst conditions being at LOS F. On condition This, current Then cross experience congestion, decreased vehicle speed, increased risk of accidents, decreased comfort for road users, And increasing vehicle operating costs. findings This strengthen study previously Which show that increased side effects and utilization room road For parking can reduce capacity and increase the degree of saturation. Thus, the Muradi Road issue cannot be viewed solely as a problem. volume Then cross. Performance section is results the interaction between vehicle volume, geometric capacity, and side activities that use road space. Results study This show that control The use of Rumija is an important part of the traffic performance management strategy.

4. Strategy for Handling the Utilization of Rumija

Based on results expert judgment with the PDCA approach, the handling strategy is directed at three main problems, namely parking, street vendor activities on the sidewalk, And drainage. Strategy parking includes provision land parking r, installation no parking signs, vehicle control, and imposing sanctions. For street vendors, The strategy is directed at providing special locations, relocation, outreach, and regulating activities that still use sidewalks. Meanwhile, handling drainage is done through cleaning routine, repair channel, installation of signs prohibiting littering, and outreach to the community.

Table 4. Strategy for Handling the Utilization of Rumija on Jalan Muradi

Problems	Main strategy
Parking on the body and shoulder of the road	Provision of parking , prohibition signs, regulation and sanctions
Street vendors and motorcycle taxi posts on the sidewalk	Relocation, provision of special locations, outreach, and regulation
Closed drainage	Cleaning, repair, capacity building and supervision
Sustainability of management	Synergy between PUPR, Dishub, Satpol PP ,local government, and the community

Source: Results of expert judgment and research analysis.

Strategy This shows that solving Rumija's problem requires a combination of physical intervention, arrangement traffic, community activity control, and institutional coordination. Provision of space parking needs to be carried out simultaneously with controlling parking on the road so that the prohibition policy No only move problem to location other. Thus also, relocation Street vendors need to be accompanied by the provision of alternative locations so that the function of the sidewalk can be restored without ignoring the socio-economic aspects of the community. For drainage, thesis referring to in Tomigolung [5] which emphasizes the reorganization of the drainage system and its integration with drainage environment, and Sohn et al. [6] who emphasized the importance of drainage systems. Which capable drain rainwater effectively. Based on these findings, the management of drainage channels Road Muradi need directed No only on cleaning, but Also improvement capacity and integration of the area's drainage system.

In a way overall, study show that the decline in the performance of Jalan Muradi is closely related to disorderly use of Rumija and high side barriers. Maximum volume of 2,082.8 junior high school/hour Which facing an effective capacity of 1,689.9 smp/hour, the degree of saturation is up to 1.16, And speed an average of 12.5 km/hour indicates that the section is in operational condition Which critical. By Because That, improvement performance is not sufficiently achieved through capacity additions physique road, but It is necessary to start with restoring the function of Rumija through parking control , arranging street vendors and sidewalks , and managing access side road, as well as repair system drainage. The approach more in accordance with character problem Road Muradi Because target source obstacles found directly in the field.

Research Limitations

Study This has several limitations that need to be considered in interpreting the results. First, study focused on section Muradi Road with main observation on the segment that has obstacle side most tall, so that research results cannot be generalized to all section road in City River Full. Second, object study restricted on component Rumija in the form of a path Then cross, shoulder road, sidewalk r, drainage, and safety thresholds, so that other aspects outside these components have not been analyzed in a way deep. Third, analysis performance road based on in condition Then cross and the use of Rumija during the survey, so it does not reflect long-term changes in conditions. Fourth, the formulated management strategies are still in the form of recommendations. based on results of observations and expert judgment, so that its effectiveness after implementation in field Not yet can evaluated. By Therefore, further research needs to expand the observation period and location and conduct post-intervention evaluations to obtain a more comprehensive picture of the effectiveness of Rumija management.

CONCLUSION

Study This show that utilization Room Owned by Road (Rumija) on section Road Muradi City River Full Not yet fully in accordance with function room road. Utilization of the body and shoulder of the road as area parking r , use sidewalk by street vendors and motorcycle taxi posts, as well as the condition of the blocked drainage channels become source main side obstacles. These conditions affect the performance of the section, which shown by volume Then cross maximum as big as 2,082.8 junior high school/hour, capacity 1,689.9 junior high school/hour, degrees

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saturation 0.86-1.16, speed average 12.5 km/h, and LOS D- F service level. Strategy handling directed on parking control, arrangement and relocation of street vendors, restoration of sidewalk function, drainage improvement, and strengthening inter-agency coordination. Thus, performance improvement Road Muradi need carried out through the restoration of Rumija's function and integrated control of side activities, not only by increasing the physical capacity of the road.

Suggestion

Based on the research results, management of Road Ownership Space (Rumija) on the Muradi Road section needs to be carried out in a way integrated And sustainable. The Sungai Penuh City Government is advised to carry out regulatory parking on body And shoulder road through provision of alternative parking locations, installation of signs prohibition parking r, as well as implementation supervision And sanctions in a way consistent. Utilization sidewalk by street vendors And post taxibike need arranged through provision location alternative Which worthy so that sidewalk function as facility pedestrian foot can returned. The condition of the drainage channels also needs to be addressed through cleaning And maintenance routine, repair channels, as well as increasing public awareness to No throw away rubbish on channels. Implementation of handling needs to involve the PUPR Service, the Water Resources Service Transportation, Satpol P P, local government, and the community so that Rumija management can run smoothly effective. Study furthermore recommended develop analysis with a longer observation period and evaluating the effectiveness of the handling strategy after it is implemented.

NO TASI

Notation	Information	Units (SI)
C	road capacity	junior high
Co	basic capacity	school/hour
FCw	traffic lane width correction factor	junior high
FCsp	directional separation correction factor	school/hour
FCsf	side resistance correction factor	-
FCcs	city size correction factor	-
DS	degree of saturation	-
Q	traffic volume	-
		junior high
		school/hour

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