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TRAFFIC PERFORMANCE ANALYSIS DUE TO SHOPPING CENTER ACTIVITIES (Case Study of Ahmad Yani Street, Ketintang Street and Ahmad Yani-Ketintang Street Intersection Surabaya)

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ABSTRACT

The growth of commercial areas in urban areas, especially shopping centers, has contributed significantly to the increase in traffic volume. This study aims to analyze the influence of Royal Plaza visitor activities on traffic volume and degree of saturation on the Jalan Ahmad Yani network, Jalan Ketintang, and the Ahmad Yani-Ketintang intersection in Surabaya City. The method used refers to the Indonesian Road Capacity Guidelines (PKJI) 2023, with primary data collection through a traffic volume survey for four days in three time periods (day, evening, night), then analyzed to obtain capacity values, actual volume, and degree of saturation (DS) on each road segment. The results of the analysis show that the highest traffic volume was recorded at 5444.70 SMP/hour on Jalan Ahmad Yani, with a road capacity of 5115.64 SMP/hour, resulting in a degree of saturation (DS) value of 1.06. This value indicates that the level of road service is in category F, which reflects very saturated traffic conditions and congestion. Meanwhile, the Ahmad Yani–Ketintang intersection shows DS ranging from 0.85 to 1.19, depending on peak times. This finding confirms that the presence of Royal Plaza places a significant traffic burden on the surrounding road network, and a traffic management strategy is needed to mitigate the impact and improve road service performance.

Keywords : *Degree of saturation, traffic volume, Royal Plaza, PKJI 2023, road performance.*

1. INTRODUCTION

Shopping centers are a vital element in the development of modern urban areas. Their function is not only as a place for economic transactions, but also as a magnet for social activities that have a major impact on the surrounding transportation system. One of the main challenges in urban spatial planning is how to balance economic growth and the efficiency of an integrated transportation system. (Alfian Haris Aryawan, 2018). In big cities like Surabaya, the growth of commercial centers is not always balanced by an increase in the capacity and efficiency of the road network, which ultimately has an impact on the decline in the level of road service. (Muhamad Lukman Nur Hakim, Herry Widhiarto, 2014).

Surabaya City as the economic center of East Java has experienced significant growth in the commercial sector, including the construction of large-scale shopping centers such as Royal Plaza. Royal Plaza is located on Jalan Ahmad Yani, which is a primary arterial road with high traffic density. (Adie et al., 2021). The existence of the shopping center has great potential in increasing the intensity of vehicle flow, especially on weekends and holidays. (Salfa Hanum Cahyani, 2023).

A similar study at Pesona Depok Mall by (Febira Chaerunisa, 2019) found that more than 22% of vehicles passing through the area were headed to the shopping center, and the increase in volume pushed the DS value from 0.83 to 0.86. Research by (Agustinus Rivaldo, John H. Frans, 2023) in the Ruko Lontar area of Surabaya shows that the elimination of right turns and traffic diversion can reduce

DS from 0.677 to 0.329. This shows that technical evaluation and intervention are very necessary in areas with high commercial activity.

Furthermore, a study by (Iqbal Kharis Hanafi, 2022) in Gresik stated that the projection of vehicle volume in the next five years without handling will increase DS from 0.76 to 0.87. While (Andreas Ohotan, Meike M. Kumaat, 2023) using VISSIM simulation in Manado and showing that shopping centers can increase the average delay by 40 seconds per vehicle.

Traffic problems arising from shopping center activities need to be analyzed to determine the extent of their influence on the performance of the surrounding road network. Without proper transportation management and planning, increased vehicle volumes due to shopping activities can reduce the level of road service, increase delays, and worsen congestion. (Pongkorung et al., 2024).

This study aims to analyze the influence of shopping center activities on traffic performance on Jalan Ahmad Yani, Jalan Ketintang, and the Ahmad Yani-Ketintang intersection. This study uses an analysis method based on PKJI 2023 to measure traffic volume, road capacity, and degree of saturation. It is hoped that the results of this study can provide technical and strategic policy recommendations for improving traffic performance in the area around the shopping center.

The problem formulation in this research is: :

1. How much does the traffic volume and degree of saturation due to shopping center visitor activities affect the performance of the Jalan Ahmad Yani, Jalan Ketintang, and Jalan Ahmad Yani – Jalan Ketintang intersection networks ?

2. LITERATURE REVIEW

Transportation System

An effective transportation system is essential for regional development, especially in large cities with rapid population and economic growth. This system includes road networks, transportation facilities, and traffic management to ensure smooth and efficient mobility of people and goods. In Indonesia, the road transportation system is the most widely used because of its accessibility and flexibility. However, urban transportation systems often experience pressure due to an imbalance between road capacity and increasing travel demand, causing congestion and declining service quality. Good transportation planning requires vehicle volume data and road network performance evaluation to improve efficiency and reduce problems.

Indonesian Road Capacity Guidelines 2023 (PKJI 2023)

Indonesian Road Capacity Guidelines PKJI 2023 is a technical document prepared by the Directorate General of Highways as a reference in analyzing the performance of road sections and intersections. PKJI is used by transportation planners, local governments, and academics in evaluating whether a road is able to serve traffic flow optimally. PKJI 2023 is a revision of the previous version, with adjustments to capacity parameters, free flow models, and passenger car units (PCU) based on the development of road conditions in Indonesia. provides a method for calculating road capacity, both for one-way, two-way, and collector and arterial roads. In addition, PKJI also provides guidance in assessing unsignalized intersections, signalized intersections. In this study, PKJI 2023 is the main reference for calculating traffic volume, road capacity, and degree of saturation in order to

determine the level of road service affected by shopping center activities. (PKJI, 2023).

Traffic Volume

Traffic volume is the number of vehicles passing a point on a road during a given time, usually measured in vehicles per hour or passenger car units (PCU/hour). It is affected by the time of day and day, as well as the characteristics of road users. In transportation research, traffic volume is converted to PCU to equalize the effects of different types of vehicles on road capacity, since vehicles vary in size and speed. Thus, this conversion helps in more accurate traffic planning and management.

Tabel 2.1 Passenger Car Unit Factor.

No.	Vehicle Type	Class	CPU	
			Section	Crossroads
1.	Sedan/Jeep, Oplet, Microbus, Pick Up	LV	1.00	1.00
2.	Standard Bus, Trailer Truck, Heavy Truck,	HV	1.20	1.30
3.	Motorcycle	MC	0.25	0.40
4.	Rickshaw, Bicycle, etc.	UM	0.80	1.00

Source: PKJI, 2023

High traffic volumes, especially during peak hours, often put pressure on road infrastructure. Therefore, evaluating vehicle volumes is essential in the study of the impact of shopping centers on traffic.

Road Capacity

Road capacity is defined as the maximum amount of traffic that can pass a point on the road per unit time (per hour) under certain conditions. For two-lane, two-way roads, capacity is calculated for two-way traffic (a combination of both directions), while on multi-lane roads, traffic is separated by direction and capacity is calculated per lane. Urban road capacity is usually expressed in passenger car units per hour (pcu/hour). To analyze road capacity, the calculation formula that is in accordance with PKJI can be used as follows :

$C = Co \times FCw \times FCsp \times FCsf \times FCcs$ ……..(2.1)

Description :
C = Capacity
Co = Basic Capacity
FCw = Capacity correction factor for road width
FCsp = Capacity correction factor due to direction division
FCsf = Capacity correction factor due to side disturbances
FCcs = Capacity correction factor due to City size

Intersection Capacity

Unsignalized intersections are road intersections that do not use signal lights to regulate traffic, these intersections are usually found on local roads in the city or in housing complexes. The calculation of the capacity of unsignalized intersections is determined by the following equation : (PKJI, 2023)

$C = Co \times Fw \times Fcs \times Frsu \times Flt \times Fmi$ (smp/jam)……..(2.2)

Description :
C = Capacity (Pcu/Hour)
Co = Basic Capacity (Pcu/Hour)

Vol …. No … (…), …, pp. ….
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Fw = Capacity Correction Factor For Intersection Road Width
Fcs = Capacity Coreection Factor due to City size (Population)
Frsu = Capacity Correction Factor due to Environmental type, side disthurbances and non-motorized vihicles
Flt = Capacity Correction Factor due to Left turning movement
Frt = Capacity Correction Factor due to Right turning movement
Fmi = Capacity Correction Factor due to traffic flow on minor roads

Degree of Saturation

The degree of saturation is one of the most crucial indicators in analyzing road performance. This value indicates the level of utilization of road capacity by actual vehicle volume. The higher the DS value, the greater the possibility of congestion because the road capacity is almost fully utilized. The DS value is calculated using the formula:

DS : $\frac{V}{C}$……………………………………………………………………………(2.3)

Description :
V = Traffic Volume (Cpu/Hour)
C = Maximum Road Capacity (Cpu/Hour)

If the DS value approaches or exceeds 1, then the traffic flow becomes very unstable, delays often occur, and the potential for congestion increases. Roads with DS > 1 are declared saturated and require technical intervention such as traffic engineering or road widening.

Level Of Service

Level of Service is a classification of road performance based on the degree of saturation. PKJI divides LOS into six levels, from A to F, with A indicating free flow conditions and F indicating total congestion.

Tabel 2.2 Level of Service Category

Degrees of saturation (DS)	Level of Service (LOS)	Characteristics Service
0.00-0.20	A	Aris is free, there is nothing obstacle
0.21-044	B	Steady current, speed tall
0.45-0.74	C	Steady current, speed starting to be affected
0.75-0.84	D	The current is approaching saturation, the delay is starting to be felt
0.85-1.00	E	The current is unstable, delays often occur
> 1.00	F	The current is very saturated, traffic jams occur continuously

Source: PKJI, 2023

Understanding Level of Service is essential in formulating transportation policies and making technical decisions to improve traffic performance.

3. RESEARCH METHODOLOGY

This study uses a quantitative approach with survey data obtained directly from the research location, then analyzed based on the Indonesian Road Capacity Guidelines. (PKJI 2023)

Survey Time and Location

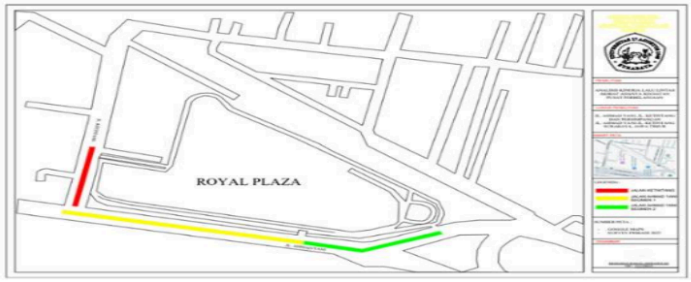

Figure 3.1 Research Location

Data collection using the Traffic Counting method was carried out for 4 days, namely on Monday, Tuesday, Saturday and Sunday. The time for implementing Traffic Counting per day is divided into 3 time ranges, namely the afternoon peak (12.00 - 13.00), Evening Peak (15.00 - 16.00) and Night Peak (18.00 - 19.00). The method used in calculating traffic volume is by manual means and LHR collection is carried out at a predetermined location **Figure 3.1** with 10 surveyors.

Vehicle data is converted to Passenger Car Units (SMP) using the equivalence factor according to PKJI 2014. Road capacity is calculated based on geometric characteristics and road classification. Furthermore, the degree of saturation (DS) is calculated using **Formula 2.3**

4. ANALYSIS AND DISCUSSION

In analyzing road performance, it is important to know the road capacity and the traffic volume of the road being studied. To calculate the road capacity, the geometric of the road must be known. Meanwhile, to determine the traffic volume of the road, the number of vehicles passing per unit time must be calculated.

Road Geometry

Tabel 4.1 Road Geometry

Road Characteristics	Ketintang Road	Ahmad Yani Street	
		Segment I	Segment II
Road Type	2/2 UD	6/2 D	6/2 D
Pavement Width	6.50 meters	12.75 meters	12.60 meters
Number of Lanes	2	3	3
Direction system	2	2	2
Median	-	1.85 meters	0.3 meters
Sidewalk	-	2.30 meters	1.10 meters
Roadside	3.00 meters	-	-
City Class Size	High (3,020,000 people in 2024)		

Source : Researcher's Process Results, 2024

Road Capacity

The following is an example of calculating road capacity based on the variables in the road capacity equation formula.

Ketintang Street

- **Basic capacity adjustment factor**
  The Type of Ketintang road is two (2) lanes, Two (2) directions, Therefore, the basic capacity value. (Co) is 2900 x 1 = 2900
  Co = 2900
- **Capacity correction factor for road width**
  The type of Ketintang road is two (2) lanes, two (2) directions with an effective width per lane of 9 meters. Therefore, the value of the capacity correction factor due to road width. (FCw) = 1,25
  FCw = 1,25
- **Capacity correction factor due to direction division**
  The type of Ketintang road is two (2) lanes, two (2) directions in connection with the research which only focuses on 1 direction then the division of the SP direction is 55% - 45%. Therefore, the value of the Capacity Correction Factor due to the division of directions.(FCsp) = 0,97
  FCsp = 0,97
- **Capacity correction factor due to side disturbances**
  Based on the classification of side obstacles, Ketintang Street is included in the high category because it is a commercial area with relatively high roadside activities. With a high class of side obstacles with a shoulder width of 1.5. So, the value of the capacity correction factor due to side disturbances. (FCsf) = 0,82
  FCsf = 0,82
- **Capacity correction factor due to city size**
  Based on data from the Surabaya City document in figures for 2025, it is recorded that the population of Surabaya City in 2024 is recorded at 3.02 million people. Therefore, the value of the capacity correction factor due to city size. (FCcs) = 1,04
  FCcs = 1,04

Based on the calculations of each variable that have been carried out above, the road capacity can be determined as follows :

Tabel 4.2 Road Capacity

Road Capacity	Ketintang Road	Ahmad Yani Street	
		Segment I	Segment II
Co	2900	4950	4950
FCsp	0.97	1.00	1.00
FCw	1.25	1.08	1.08
FCsf	0.82	0.98	0.92
FCcs	1.04	1.04	1.04
Capacity (C)	2998.66	5448.64	5115.05

Source: Researcher's Process Results, 2024

Level Of Service

By using the collected road capacity and traffic volume data. Service level analysis can be done using the formula in **Formula 2.3** and **Table 2.2**.. to determine the classification of road service level assessment.

The following is an example of the calculation of the road service level applied during Saturday Afternoon Peak on Jalan Ahmad Yani Segment I:

I = V/C = 5134,25 / 5448,64 = **0,94** (Including Service Level Classification F)

Tabel 4.3 Level of Service on Ketintang Road

Ketintang Road														
DAY	PEAK	UM		MC		LV		HV		TOTAL		Road Capacity	DJ	LOS
		Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour			
Saturday	Afternoon	41	32,80	2096	524,00	302	302,00	-	0,00	2439	858,80	2998,66	0,29	B
	Afternoon	33	26,40	1718	429,50	278	278,00	-	0,00	2029	733,90	2998,66	0,24	B
	Evening	40	32,00	2103	525,75	330	330,00	-	0,00	2473	887,75	2998,66	0,30	B
Sunday	Afternoon	38	30,40	1994	498,50	346	346,00	-	0,00	2378	874,90	2998,66	0,29	B
	Afternoon	30	24,00	1630	407,50	302	302,00	-	0,00	1962	733,50	2998,66	0,24	B
	Evening	35	28,00	2008	502,00	350	350,00	-	0,00	2393	880,00	2998,66	0,29	B
Monday	Afternoon	66	52,80	2478	619,50	252	252,00	-	0,00	2796	924,30	2998,66	0,31	B
	Afternoon	41	32,80	1895	473,75	354	354,00	-	0,00	2290	860,55	2998,66	0,29	B
	Evening	32	25,60	2305	576,25	301	301,00	-	0,00	2638	902,85	2998,66	0,30	B
Tuesday	Afternoon	65	52,00	2392	598,00	297	297,00	-	0,00	2754	947,00	2998,66	0,32	B
	Afternoon	39	31,20	1842	460,50	372	372,00	-	0,00	2253	863,70	2998,66	0,29	B
	Evening	30	24,00	2181	545,25	325	325,00	-	0,00	2536	894,25	2998,66	0,30	B

Source: Researcher's Process Results, 2024

Based on the table above, the lowest road service performance on Jalan Ketintang on Tuesday occurred at the afternoon peak with the highest DJ of 0.32. As a result, the level of road service decreased to category B.

Tabel 4.4 Level of Service of Jalan Ahmad Yani Segment I

Ahmad Yani Segmen I Road														
DAY	PEAK	UM		MC		LV		HV		TOTAL		Road Capacity	DJ	LOS
		Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour			
Saturday	Afternoon	22	17,60	9321	2330,25	2766	2766,00	17	20,40	12126	5134,25	5448,64	0,94	E
	Afternoon	21	16,80	7236	1809,00	3031	3031,00	40	48,00	10328	4904,80	5448,64	0,90	E
	Evening	19	15,20	6435	1608,75	3292	3292,00	19	22,80	9765	4938,75	5448,64	0,91	E
Sunday	Afternoon	24	19,20	6508	1627,00	2596	2596,00	16	19,20	9144	4261,40	5448,64	0,78	D
	Afternoon	18	14,40	8762	2190,50	3002	3002,00	36	43,20	11818	5250,10	5448,64	0,96	E
	Evening	31	24,80	6582	1645,50	3585	3585,00	20	24,00	10218	5279,30	5448,64	0,97	E
Monday	Afternoon	23	18,40	8577	2144,25	3218	3218,00	97	116,40	11915	5497,05	5448,64	1,01	F
	Afternoon	18	14,40	8079	2019,75	3481	3481,00	64	76,80	11642	5591,95	5448,64	1,03	F
	Evening	15	12,00	8216	2054,00	2972	2972,00	19	22,80	11222	5060,80	5448,64	0,93	E
Tuesday	Afternoon	28	22,40	8287	2071,75	3157	3157,00	68	81,60	11540	5332,75	5448,64	0,98	E
	Afternoon	25	20,00	7808	1952,00	2846	2846,00	49	58,80	10728	4876,80	5448,64	0,90	E
	Evening	15	12,00	8026	2006,50	3259	3259,00	16	19,20	11316	5296,70	5448,64	0,97	E

Source: Researcher's Process Results, 2024

Based on the table above, the lowest road service performance on Jalan Ketintang on Monday occurred at the afternoon peak with the highest DJ of 1.03. As a result, the level of road service experienced a significant decline reaching

category F..

Tabel 4.5 Level of Service of Jalan Ahmad Yani Segment II

Ahmad Yani Segmen II Road														
DAY	PEAK	UM		MC		LV		HV		TOTAL		Road Capacity	DJ	LOS
		Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour	Vihicle/Hou	Pcu/Hour			
Saturday	Afternoon	24	19,20	9402	2350,50	2465	2465,00	23	27,60	11914	4862,30	5115,64	0,95	E
	Afternoon	26	20,80	7256	1814,00	2734	2734,00	48	57,60	10064	4626,40	5115,64	0,90	E
	Evening	16	12,80	6593	1648,25	2832	2832,00	18	21,60	9459	4514,65	5115,64	0,88	E
Sunday	Afternoon	22	17,60	8956	2239,00	2368	2368,00	22	26,40	11368	4651,00	5115,64	0,91	E
	Afternoon	25	20,00	7369	1842,25	2557	2557,00	57	68,40	10008	4487,65	5115,64	0,88	E
	Evening	14	11,20	8793	2198,25	2706	2706,00	16	19,20	11529	4934,65	5115,64	0,96	E
Monday	Afternoon	23	18,40	8521	2130,25	2879	2879,00	98	117,60	11521	5145,25	5115,64	1,01	F
	Afternoon	21	16,80	8178	2044,50	3303	3303,00	67	80,40	11569	5444,70	5115,64	1,06	F
	Evening	18	14,40	8494	2123,50	2805	2805,00	19	22,80	11336	4965,70	5115,64	0,97	E
Tuesday	Afternoon	28	22,40	8489	2122,25	2832	2832,00	86	103,20	11435	5079,85	5115,64	0,99	E
	Afternoon	22	17,60	8246	2061,50	3104	3104,00	58	69,60	11430	5252,70	5115,64	1,03	F
	Evening	16	12,80	8503	2125,75	2945	2945,00	23	27,60	11487	5111,15	5115,64	1,00	F

Source: Researcher's Process Results, 2024

Based on the table above, the lowest road service performance on Jalan Ketintang on Monday occurred at the afternoon peak with the highest DJ of 1.06. As a result, the level of road service experienced a significant decline reaching category F.

Intersection Service Level

To find the Level of Service of an Intersection, traffic capacity and volume data are required. Intersection Capacity can be calculated using Formula 2.2. The following is an example of a calculation using the Intersection Capacity formula:

Calculation of the Capacity of the Ketintang-Ahmad Yani Road Intersectio

Calculation of road capacity on Saturday afternoon based on the variables in the Intersection capacity equation formula (C)

- **Basic Capacity**

  This Intersection Type is 324 which is a 3-lane Intersection, 2 lanes on minor roads, 4 lanes on major roads. So, the Basic Capacity value (Co) = 3200

  Co = 3200
- **Average Approach Width**

  This Intersection Type is 324 which is a 3-lane Intersection, 2 lanes on minor roads, 4 lanes on major roads. So, the Average Approach Width value (Fw) = 1,29

  Fw = 1,29
- **Major Road Median**

  This Intersection Type is 324, namely Intersection 3, 2 lanes on minor roads, 4 lanes on major roads. With a main road median width of more than 3m, the value of the Major Road Median (Fm) = 1,20

  Fm = 1,20
- **City Size**

  This Intersection Type is 324, Based on data from the Surabaya City document in 2025 figures, it is recorded that the population of Surabaya City in 2024 is recorded at 3.02 million people. So, the City Size Adjustment Factor value

(FCcs) = 1,05
Fcs = 1,05

- **Side Obstacles**
  This Intersection Type is 324, namely Intersection 3, 2 lanes on minor roads, 4 lanes on major roads. With a high commercial area class, the Side Obstacle value (Frsu) = 0,93
  Frsu = 0,93
- **Turn left**
  This Intersection Type is 324 which is a 3-way Intersection, 2 lanes on minor roads, 4 lanes on major roads. With a left turn proportion of (762,60+425,80)/71255,40 = 0,167
  So, Left Turn value (Flt) = 1,0 – 0,167 x 0,16 = 0,973
  Flt = 0,973
- **Turn right**
  This Intersection Type is 324 which is a 3-way Intersection, 2 lanes on minor roads, 4 lanes on major roads. With a Right Turn Proportion of 0 because if there is no right turn lane at the intersection it can be done by ignoring the FRT. So, the Right Turn value (Frt) = 1,0 – 0 x 0,16 = 1
  Frt = 1
- **Minor Ratio**
  This Intersection Type is 324 which is a 3-lane Intersection, 2 lanes on minor roads, 4 lanes on major roads. If Qmi (Minor road traffic flow) is 425.80 and Q total is 71255,40 Then, Rmi 425,80/71255,40 = 0,1. So, the Minor Ratio value (Fmi) = $16,6 \times 0,1^4 - 3,33 \times 0,1^3 + 25,3 \times 0,1^2 - 8,6 \times 0,1 + 1,95 = 1,34$
  Fmi = 1,34

Based on the variable calculations that have been carried out, the following intersection capacity was obtained :

Tabel 4.6 Intersection Capacity

Capacity Adjustment Factor										
DAY	PEAK	Basic Capacity	Approach Width	Road Median	City Size	Side Obstacles	Turn Left	Turn Right	Minor Ratio	Capacity
		Co	Fw	Fm	Fcs	Frsu	Flt	Frt	Fmi	C
Saturday	Afternoon	3200	1,29	1,20	1,00	0,93	0,97	1,00	1,34	5987,98
	Afternoon	3200	1,29	1,20	1,00	0,93	0,98	1,00	1,34	6049,71
	Evening	3200	1,29	1,20	1,00	0,93	0,97	1,00	1,34	5987,98
Sunday	Afternoon	3200	1,29	1,20	1,00	0,93	0,97	1,00	1,34	5987,98
	Afternoon	3200	1,29	1,20	1,00	0,93	0,98	1,00	1,34	6049,71
	Evening	3200	1,29	1,20	1,00	0,93	0,97	1,00	1,34	5987,98
Monday	Afternoon	3200	1,29	1,20	1,00	0,93	0,97	1,00	1,34	5987,98
	Afternoon	3200	1,29	1,20	1,00	0,93	0,98	1,00	1,34	6049,71
	Evening	3200	1,29	1,20	1,00	0,93	0,97	1,00	1,34	5987,98
Tuesday	Afternoon	3200	1,29	1,20	1,00	0,93	0,97	1,00	1,34	5987,98
	Afternoon	3200	1,29	1,20	1,00	0,93	0,98	1,00	1,34	6049,71
	Evening	3200	1,29	1,20	1,00	0,93	0,97	1,00	1,34	5987,98

Source: PKJI, 2023

After the Intersection Capacity is obtained, the service level analysis can be done using Formula 2.3. The following is an example of a calculation using the road service level calculation formula during Saturday Afternoon Peak.

Ds = V/C
= 7125,40/5987,98 = 1,19 (Including Service Level Classification F)

Tabel 4.7 Intersection Service Level

Intersection Service Level					
DAY	**PEAK**	**Volume**	**Basic Capacity**	**Degree of Saturation**	**LOS**
		(Smp/Jam)	**(Smp/Jam)**	**(DS)**	
Saturday	Afternoon	7125,40	5987,98	1,19	F
	Afternoon	5943,80	6049,71	0,98	E
	Evening	5469,25	5987,98	0,91	E
Sunday	Afternoon	6081,55	5987,98	1,02	F
	Afternoon	5930,80	6049,71	0,98	E
	Evening	5492,05	5987,98	0,92	E
Monday	Afternoon	5677,35	5987,98	0,95	E
	Afternoon	5156,80	6049,71	0,85	E
	Evening	5452,65	5987,98	0,91	E
Tuesday	Afternoon	5763,25	5987,98	0,96	E
	Afternoon	5192,15	6049,71	0,86	E
	Evening	5316,00	5987,98	0,89	E

Source: Pedoman Kapasitas Jalan Indonesia (PKJI)

Based on the table above, the lowest Intersection service performance on Saturday occurred at the afternoon peak with the highest DJ of 1.19. This has an impact on the decline in the level of road service to category F.

5. CONCLUSION AND SUGGESTIONS

Based on the results and discussion of the analysis of traffic performance due to the presence of shopping centers in Surabaya City, the following conclusions can be drawn :

1. Traffic Volume

   The highest analysis result of the Royal Plaza Shopping Center vehicle volume crossing Jalan Ketintang is 947.00 SMP/hour. Jalan Ahmad Yani Segment I is 5591.95 SMP/hour. Jalan Ahmad Yani Segment II is 5444.70 SMP/hour. Meanwhile, the Jalan Ahmad Yani-Jalan Ketintang intersection is 7125.40 SMP/hour.

2. Degree of Saturation

   Based on the research results, it is known that the performance of Ketintang Road, which is reviewed from the calculation of the level of service (LOS), has a Ds value of 0.32. This value indicates that the level of road service is in category B. Jalan Ahmad Yani Segment I produces a degree of saturation (DS) value of 1.03. This value indicates that the level of road service is in category F. Jalan Ahmad Yani Segment II produces a degree of saturation (DS) value of 1.06. This value indicates that the level of road service is in category F. Meanwhile, the Jalan Ahmad Yani-Jalan Ketintang intersection produces a degree of saturation (DS) value of 1.19. This value indicates that the level of road service is in category F.

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