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Optimization of Road Section and Signalized Intersection Performance Using PKJI 2023 at Dewi Sartika-Raya Kalibata Intersection

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ABSTRACT: As time goes by, population growth and the need for transportation will increase. The increase in the number of vehicles on the road that is not accompanied by improvements in transportation infrastructure such as roads is one of the reasons for congestion. There are many congestion points in East Jakarta, one of which is at the intersection of Jl. Dewi Sartika-Jl. Raya Kalibata. The purpose of this study is to analyze the performance of road sections and signalized intersections of Jalan Dewi Sartika, Kramat Jati East Jakarta and provide alternative solutions for the performance of signalized intersections (APILL) Jalan Dewi Sartika-Jalan Raya Kalibata, Kramat Jati East Jakarta. Conducted using the traffic counter method and using calculations on the Indonesian Road Capacity Guidelines 2023 (PKJI 2023). The results of the analysis of the performance of the signalized intersection under existing conditions are the degree of saturation value for the north arm 0.771, the south arm 0.919, and the west arm 1.042 in the afternoon peak hour. The queue length for the north arm is 136.99, the south arm is 153.76, and the west is 165.67 meters long. The average intersection delay is 81 seconds /mp so that the level of service is classified in category F. Alternative solutions, namely by making all left turns on the west arm, get the results of the degree of saturation value for the north arm 0.702, and the south arm 0.527 in the afternoon peak hour. The queue length for the north arm is 44.22, the south arm is 27.84. The average intersection delay is 14 seconds / smp and the level of service of the intersection at the afternoon peak hour is category C. And the results of the performance of the Jl. Dewi Sartika section obtained the results of the degree of saturation in the direction of Cawang 0.46, and the degree of saturation in the direction of Kp. Melayu 0.73. The level of service is classified as C.

KEYWORDS: Degree of saturation, signalized intersection, delay, queue length.

I. INTRODUCTION

Transportation is very important for humans, because it makes it easier for humans to carry out daily activities, namely connecting one area with another (Isradi et al., 2024). The existence of these transportation activities can increase the value of transportation use which, if not supported by good infrastructure, can cause several transportation problems (Fitri et al., 2018).

Transportation problems occur on every road, especially at intersections (Azahra et al., 2024). Intersections are an important part of the road network system, whether the movement in a road network is smooth or not is largely determined by the movement arrangements at the intersection, in general the capacity of the intersection can be controlled by controlling the flow of traffic in the road network system (Hojati et al., 2012). So that intersections can be said to be part of a road network which is an important or critical area in serving traffic flow (Prasetyanto, 2013).

According to the 2020 Indonesian Population Census. The administrative district/city with the largest population is East Jakarta Administrative City with a population of 3,315,114 people (27.94% of the total population of DKI Jakarta). With an increase in population, the use of transportation facilities will also increase which can be one of the factors causing traffic congestion (Alhadar, 2011).

At the signalized intersection at Jalan Dewi Sartika - Jalan Raya Kalibata there is a traffic jam where around the intersection many public transportation stops without paying attention to signs, private vehicles that do not follow the rules of driving (Isradi et al., 2020, 2021). Thus, the traffic congestion that occurs can cause losses for road users (Isradi et al., 2022).

II. RESEARCH METHOD

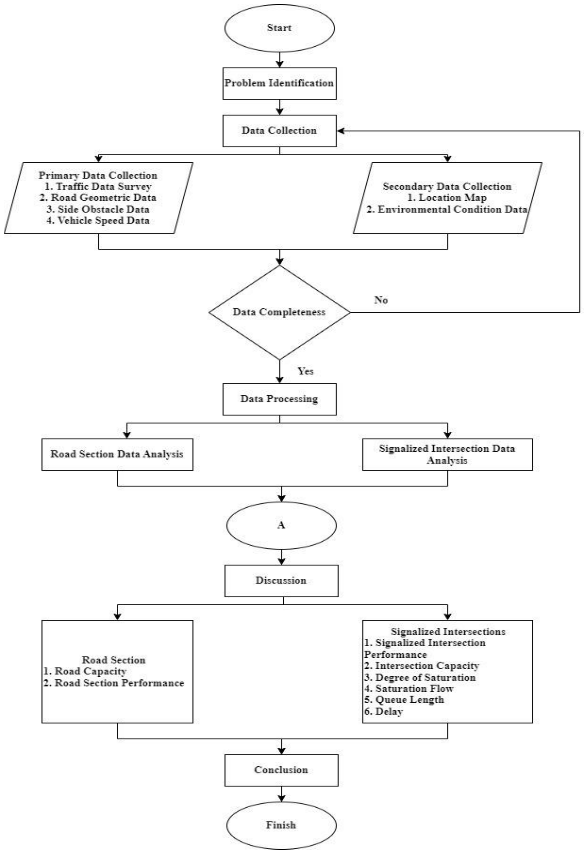

Figure 1 Flowchart

In 2023, the directorate general of Bina Marga published the latest guidelines resulting from the renewal of MKJI 1997 and PKJI 2014. This research analyzes data using PKJI 2023 (Direktorat Jendral Bina Marga, 2023). The focus of the research refers to the performance of road sections and intersection capacity (Azahra et al., 2024).

Jalan Dewi Sartika is a road located in East Jakarta and the intersection of Jalan Dewi Sartika and Jalan Raya Kalibata in the Kramatjati area of East Jakarta is a triple intersection. The traffic volume on the road is quite heavy because the land use on the road includes education, offices, shops and settlements (Andika et al., 2022).

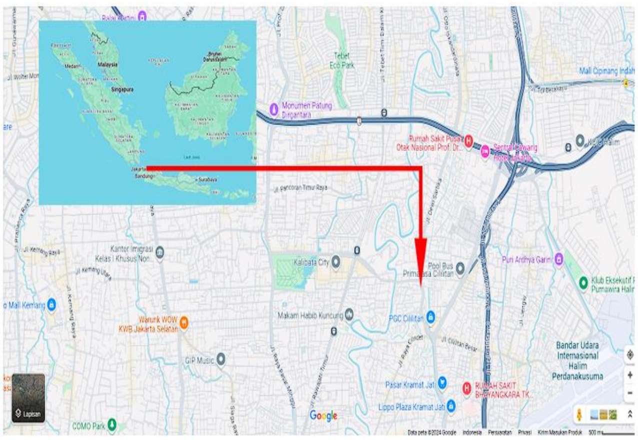

Figure 2. Research Location

The required data such as road geometric data, vehicle volume data, and vehicle speed data can be taken during a field survey that lasts for three days, namely on Monday, June 03, 2024, Friday, June 07, 2024, and Saturday, June 08, 2024. Data collection was divided into three sessions, namely morning, afternoon, and evening, where the survey time was determined at 07.00-09.00, 12.00-14.00, and 16.00-18.00. The purpose of this data collection is to be able to know the volume of vehicles crossing the Jalan Dewi Sartika Intersection and also the volume of vehicles passing through the Jalan Dewi Sartika section, then get the performance results of the Jalan Dewi Sartika section and the Jalan Dewi Sartika-Jalan Raya Kalibata intersection using the PKJI 2023 method and also provide alternative problem solving at the Jalan Dewi Sartika-Jalan Raya Kalibata Intersection (Widyaningsih et al., n.d.).

The data used in the analysis of the performance of road sections and signalized intersections includes primary and secondary data (Pennetti et al., 2020; Prasetijo & Ahmad, 2012). Primary data is obtained by conducting surveys directly at the research location, which includes:

1. Traffic Data Survey.
2. Geometric Data.
3. Side Obstacle Data.
4. Vehicle Speed Data.

Then, for secondary data obtained from related agencies as a research area, the secondary data needed in this research are:

1. Location Map.
2. Environmental Conditions.

III. RESULT AND DISCUSSION

A. Road Section Performance

Based on the survey that has been conducted, the road section to be studied and analyzed is the road section on Jl. Dewi Sartika During peak hours, the road section experiences an increase in vehicle volume which has an impact on traffic flow density (Lee et al., 1998; Manganta et al., 2019). The data will be described based on the geometric condition of the road, driver activity, and facilities available at the intersection.

Road Geometric Data

Road geometric data is collected by field surveys; the following data is obtained, as shown in Table 1 below:

Table 1. Table 1 Road Geometric Data

Description	Jl. Dewi Sartika
Road Type	4/2 T (4 lanes 2-way divided)
Width of Road	7,7m
Shoulder Width	0,5m
Median	0,45m
Road Condition	Flat
Type of Pavement	Flexible pavement

Traffic Volume Data

Traffic volume data on Jalan Dewi Sartika section obtained the highest peak hour on Friday, Juny 07, 2024, from 16.00 to 17.00. A recapitulation of peak hour traffic data can be seen in Table 2 below:

Table 2. Recapitulation of Peak Hour Traffic Data

Friday Juny 07, 2024 (Vehicles/Hour)				
Jl. Dewi Sartika 16.00 - 17.00				
Road Segment	MP	KS	SM	Total
Direction W	818	11	2771	3428
Direction S	646	26	5045	5889
Total 2 directions	1464	37	7816	9317

From the results of peak hour traffic data that has been obtained, namely on Friday, Juny 07, 2024, from 16.00 to 17.00 with a total vehicle volume of 9317 vehicles per hour, the data is calculated using the PKJI 2023 method as shown in Table 3 below:

Table 3. Calculation of Peak Passenger Car Equivalency Values

Vehicle types	MP		KS		SM		Q_{TOT}		
EMP	1		1.2		0.25				
EMP	1		1.2		0.25				
Direction	veh/hour	pcu/hour	veh/hour	pcu/hour	veh/hour	pcu/hour	direction,%	veh/hour	pcu/hour
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
North	818	818	11	13.2	2771	692,75	39%	3428	1352
South	646	646	26	31,2	5045	1261,25	61%	5889	2110,5
Total	290	290	24	28.8	4262	1065.5	100%	4576	3462,4
Separation, PA=q1/(q1+q2)								39%	
PCU Factor , F_{SMP}									0.3716

From the calculation results in table 3 above, the QTOT based on EMP for both directions is 3462,4 pcu / hour.

Table 4. Road Section Capacity

Road Section Parameters	Jl. Dewi Sartika (4/2-T)
C_0	3400
FC_{LJ}	1,00
FC_{PA}	1,00
FC_{HS}	0,84
FC_{UK}	1,04
C	2970,24

Road Section Capacity

Road Segment Capacity specifies the provisions of road capacity calculation procedures for traffic performance evaluation and design of urban road segments. The following are the calculation results:

$C = C_0 \times FC_{LJ} \times FC_{PA} \times FC_{HS} \times FC_{UK}$

C = 3400 x 1,00 x 1,00 x 0,84 x 1,04

C = 2970,24 pcu/hour

Degree of Saturation

Determining the value of the degree of saturation based on the Indonesian Road Capacity Guidelines (PKJI 2023) is the result of the calculation by dividing the value of vehicle volume (vcu/h) (Q) with the value of road capacity (vcu/h) (C). If the results obtained are <0.85, then the results obtained are not good. This result can show whether there are capacity problems with the existing facilities on the road.

DJ = q/C

DJ = 1352/2970,24

DJ = 0,46

Level of Service of Road Sections

The value of the level of service is obtained by calculating the results of the degree of saturation. From the LOS results that have been obtained and defined according to the Minister of Transportation Regulation No. 14, the level of road service classification on the road section under review is C with a DJ value <0.85, which is DJ = 0.46 on Jl. Dewi Sartika section.

B. Signalized Intersection Performance

The intersection performance analysis was conducted at the Jalan Dewi Sartika-Jalan Raya Kalibata Intersection. The data required for the research process are traffic data, geometric data, and side obstacle data obtained through observations and surveys at the research location (Li et al., 2009; Żochowska et al., 2021). As well as secondary data obtained from related agencies.

Geometric Data

Jalan Dewi Sartika Intersection is an intersection with a 322-road type, which means a 3-arm intersection with 2 lanes on the minor road and 2 lanes on the major road. The following is a description of the intersection geometry at the Dewi Sartika Road intersection:

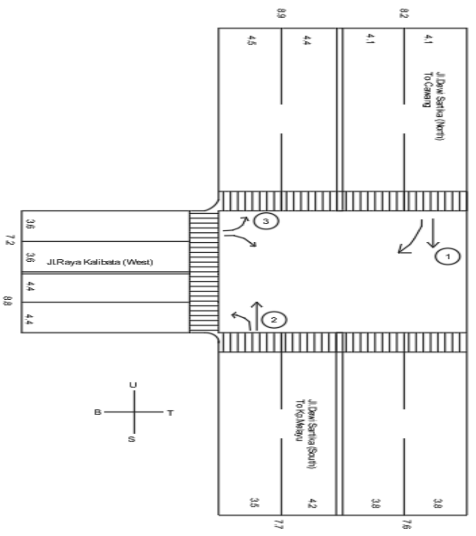

Figure 3 Ilustration of a Signed Intersection at Jalan Dewi Sartika

Traffic Data

The following are the results of the total vehicle volume obtained in the intersection survey and carried out for 2 hours in 3 days, which are Monday, Friday, and Saturday, by taking morning, afternoon, and evening times (Kasus et al., 2020).

Table 5. Recapitulation of Intersection Traffic Data Results

Time	**Monday, 03 Jun 2024**	**Friday, 07 Jun 2024**	**Saturday, 08 Jun 2024**
	Total veh/h	Total veh/h	Total veh/h
07.00 – 08.00	12847	10701	8374
08.00 - 09.00	12738	9804	7306
12.00 - 13.00	9022	12716	10993
13.00 - 14.00	8896	12235	10558
16.00 - 17.00	8751	14085	12374
17.00 - 18.00	8845	14681	12079

The peak hour traffic volume is on Friday evening at 17.00–18.00 am, amounting to 14681 vehicles per hour. This data will be used as a reference in analyzing the capacity of signalized intersections. The calculation results can be seen in the following table:

Table 6. Calculation of Traffic Data on Friday, June 07, 2024 (16:00-17:00)

Traffic composition (%):		**MP =**		**KB =**		**SM =**					
SMP factor =		MP, EMP =	1	KB, EMP =	1.3	SM, EMP=	0.15	q_{KB} Total			q_{KTB}
Traffic flow		veh/h	vcu/h	veh/h	vcu/h	veh/h	vcu/h	veh/h	vcu/h	R_B	veh/h
North	BKi										
	LRS	421	421	3	4	2480	372	2904	797		10
	BKa	371	371	3	4	1790	269	2164	643	0,447	6
	qTotal	792	792	6	8	4270	641	5068	1440		16
South	qBKi	377	377	11	14	1970	296	2358	687	0,46	6
	qLRS	300	300	12	16	3286	493	3598	809		10
	qBKa										
	qTotal	677	677	23	30	5256	788	5956	1495		16
West	qBKi	361	361	2	3	1405	211	1768	574	0,478	10
	qLRS										
	qBKa	403	403	6	8	1443	216	1852	627	0,522	6
	qTotal	764	764	8	10	2448	427	3620	1202		16

Capacity of Signalized Intersection

Intersection Capacity C is calculated for the total flow entering from all intersection arms and is defined as the multiplication of the base capacity (C_O) by correction factors that take into account differences in environmental conditions compared to ideal conditions. (Direktorat Jenderal Bina Marga et al., 2023).

C = J0 x Whi/s

C (North) =2678 x 53/170 = 835 vcu/h

C (South) =2823 x 53/170 = 880 vcu/h

C (West) =2380 x 43/1,70 = 602 vcu/h

Table 7 Intersection Capacity Calculation Results

Directions	**J_0**	**W_{hi}**	**s**	**Capacity C vcu/hour**
North	2678	53	170	835
South	2823	53	170	880
West	2380	43	170	602

Degree of Saturation at Intersections

The degree of saturation can be defined as the ratio or ratio of traffic flow to capacity.

DJ = q/C

Dj (North) = 643/850 = 0,7706

Dj (South) = 809/880 = 0,9187

Dj (West) = 627/602 = 1,042

Queue length

If DJ > 0,5 Nq1=0,25×s×{(DJ-1) + √((DJ-1) ^2 + (8×(DJ-0,5))/s)}

Nq1(North) = 1,116 vcu

Nq1(South) = 3,439 vcu

Nq1(West) = 8,800 vcu

Nq2 = Nq2 = s x ((1-R_H)) / ((1-R_H X Dj)) x q/3600

Nq2(North) = 27 vcu

Nq2(South) = 36,5 vcu

Nq2(West) = 30,1 vcu

Nq = Nq1 + Nq2

Nq (North) = 1,116 + 27 = 28,1 vcu

Nq (South) = 3,439 + 36,5 = 40 vcu

Nq (West) = 8,8 + 30,1 = 38,9 vcu

Ql = Nq x 20/L_E

Ql (North) = 28,1 x 20/4,1 = 136,99m

Ql (South) = 40 x 20/5,2 = 153,76m

Ql (West) = 38,9 x 20/4,7 = 165,67m

Number of Vehicle stops

R_{KH} = 0,9 x (Nq / q x s) x 3600

R_{KH} (North) = 0,9 x 28,1 / (681 x 170) x 3600 = 0,832 stop/vcu

R_{KH} (South) = 0,9 x 40 / (809 x 170) x 3600 = 0,942 stop/vcu

R_{KH} (West) = 0,9 x 38,9 / (627 x 170) x 3600 = 1,183 stop/vcu

Vehicle Stopping Ratio

N_{KH} = q x DJ

N_{KH}(North) = 643 x 0,832 = 535,23 vcu/h
N_{KH} (South) = 809 x 0,942 = 761,94 vcu/h
N_{KH} (West) = 602 x 1,042 = 742,02 vcu/h

Intersection delay

The delay data to be analyzed are intersection traffic delays (T_{LL}), geometric delays (T_G), intersection delays (T).

Intersection Traffic Delay

Due to the degree of saturation value obtained by researchers> 0.60 is described as follows:

T_{LL} (N) = 170 x (0,5 x (1-0,356) ^2) / ((1-0,356 x 0,7706)) + (1,116 x 3600)/835 = 53,4 det/smp

T_{LL} (S) = 170 x (0,5 x (1-0,356) ^2) / ((1-0,356 x 0,9187)) + (3,439 x 3600)/880 = 66,5 det/smp

T_{LL} (W)= 170 x (0,5 x (1-0,289) ^2) / ((1-0,289x 1,996)) + (86,13 x 3600)/602 = 114,1 det/smp

Geometric Delay of Intersection

$T_G = (1 - R_{KH}) \times P_B \times 6 + (R_{KH} \times 4)$

TG(N) = (1 – 0,832) × 0,53 × 6 + (0,832× 4) = 3,78 sec/vcu

TG(S) = (1 – 0,942) × 0,459 × 6 + (0,942× 4) = 3,93 sec/vcu

TG(W) = (1 – 1,183) × 0,52 × 6 + (1,183× 4) = 4,16 sec/vcu

Intersection Delay

$T = T_{LL} + T_G$

T (N) = 53,4+ 3,78 = 57,2 sec/vcu

T (S) = 66,5 + 3,93 = 70,41 sec/vcu

T (W) = 114,1 + 4,16 = 118,3 sec/vcu

Average Intersection Delay

T_{Tot} (N) = 643 x 57,2 = 36801,02 sec/vcu

T_{Tot} (S) = 809 x 70,41 = 56925,45 sec/vcu

T_{Tot} (W) = 627 x 118,3 = 74205,1 sec/vcu

T_I = (∑ (q X T))/qTotal = 167931,57/2079 = 80,77 sec/vcu

Intersection Level of Service Analysis for Delay

The results of calculations related to intersection performance and traffic behavior can be presented in the form of Table 8 below:

Table 8. Intersection Performance and Traffic Behavior

Directions	Capacity C SMP/hour	Degree of saturation D_J	Traffic flow q	Intersection Traffic delay T_{LL} (sec/vcu)	Intersection geometry delay T_G (sec)	Intersection delay $T_{LL}+T_G$ (sec/vcu)	Average Intersection delay (sec/vcu)	Level of service Los
				Traffic performance				
N	835	0,7706	643	53,4	3,78	57,20	80,77	F
S	880	0,9187	809	66,5	3,93	70,41	80,77	F
W	602	10,420	627	114,1	4,16	118,30	80,77	F

The results of the analysis of the performance of the signalized intersection at the Jalan Dewi Sartika-Jalan Raya Kalibata Intersection obtained a degree of saturation North of 0.7706, degree of saturation South of 0.9187, degree of saturation West of 1.042 with a delay value of 80.77 seconds per vehicle, this indicates that the level of service of the intersection based on delay is type "F". Therefore, an alternative solution or handling is needed at the signalized intersection.

C. Improvement Solution at Intersections

The alternative solution that will be given is the prohibition of right turns on Jalan Raya Kalibata which leads to Jalan Dewi Sartika by installing signs prohibiting right turns on Jalan Raya Kalibata. And made a U-turn 300 m from the north arm.

Table 9. Calculation of Vehicle Volume at Intersection (Improvement Solution)

Traffic composition (%):		MP =		KB =		SM =					
SMP factor =		MP, EMP=	1	KB, EMP=	1.3	SM, EMP=	0.15	q_{KB} Total			q_{KTB}
Traffic flow		veh/h	vcu/h	veh/h	vcu/h	veh/h	vcu/h	veh/h	vcu/h	R_B	veh/h
North	BKi										
	LRS	421	421	3	4	2480	372	2904	797		10
	BKa	371	371	3	4	1790	269	2164	643	0,447	6
	qTotal	792	792	6	8	4270	641	5068	1440		16
South	qBKi	377	377	11	14	1970	296	2358	687	0,46	6
	qLRS	300	300	12	16	3286	493	3598	809		10
	qBKa										
	qTotal	677	677	23	30	5256	788	5956	1495		16

Intersection Capacity (Improvement Solution)

$W_{HH} = W_{MS} + W_A$

W_{HH} = 8 + 6 = 14 sec/s

S_{bp} = ((1,5 x 14+ 5)) / ((1-0,536)) = 56 sec

W_{Hi} (N) = (56 − 14) × 0,456 = 19 sec

W_{Hi} (S) = (56 − 14) × 0,534 = 30 sec

Table 10. Intersection Capacity (Improvement Solution)

Directions	J_0	W_{Hi}	s	Capacity C vcu/hour
North	2678	19	56	835
South	2823	30	56	880

Capacity

C (N) = 2678 x 20/56 = 916 vcu/h

C (S) = 2823 x 30/56 = 1535 vcu/h

Degree of saturation

DJ (N) = 643/916 = 0,7021

DJ (S) = 809/1535 = 0,5267

Queue length

Nq1 (U) = 0,25 × 56 × {(0,7021− 1) + √ (0,7021− 1)2 +(8 x (0,7021-0,5))/56 = 0,631 vcu

Nq1 (S) = 0,25 × 56 × {(0,5267− 1) + √ (0,5267− 1)2 +(8 x (0,5267-0,5))/56 = 0,056 vcu

Nq2 = 56 x ((1-0,386))/ ((1-0,395 x0,7021)) x 643/3600 = 8,4 vcu
Nq2 = 56 x ((1-0,614))/ ((1-0,614 X 0,5267)) x 809/3600 = 7,2 vcu

Nq (U) = 0,631 + 8,4 = 9,1 vcu
Nq (S) = 0,077 + 7,2 = 7,277 vcu

PA (U) = 9,2 + 20/4,1 = 44,22 m
PA (S) = 7,2 + 20/5,2 = 27,84 m

Number of Vehicle stops

R_{KH} = 0,9 x (Nq / q x s) x 3600
R_{KH} (N)= 0,9 x 44,22 / (643 x 56) x 3600 = 0,269 stop/ vcu
R_{KH} (S)= 0,9 x 28,61 / (809 x 56) x 3600 = 0,171 stop/ vcu

Vehicle Stopping Ratio

$N_{KH\,=}$ q x DJ
N_{KH} (N) = 643 × 0,269 = 172,75 vcu
N_{KH} (S) = 809 × 0,171 = 137,95 vcu

Intersection delay

The delay data to be analyzed are intersection traffic delays (T_{LL}), geometric delays (T_G), intersection delays (T).

Intersection Traffic Delay

Due to the degree of saturation value obtained by researchers> 0.60 is described as follows:
T_{LL} (N) = 56 x (0,5 x (1-0,386) ^2) / ((1-0,386 x 0,7021)) + (0,631 x 3600)/643 = 17 sec
T_{LL} (S) = 56 x (0,5 x (1-0,614) ^2) / ((1-0,614 x 0,5267)) + (0,056 x 3600)/809 = 6,3 sec

Geometric Delay of Intersection

$T_G = (1 - R_{KH}) \times P_B \times 6 + (R_{KH} \times 4)$
T_G (N) = (1 – 0,269) × 0,53 × 6 + (0,269× 4) = 3,03 sec/vcu
T_G (S) = (1 – 0,171) × 0,459 × 6 + (0,171× 4) = 2,97 sec/vcu

Intersection Delay

$T = T_{LL} + T_G$
T (N) = 17 + 3,03 = 19,99 sec/vcu
T (S) = 6,3 + 2,97 = 9,27 sec/vcu

Average Intersection Delay

T_{Tot} (N) = 643 x 19,99 = 12864,06 vcu/det
T_{Tot} (S) = 809 x 9,27 = 7498,73 vcu/det
T_I = (∑ (q X T)) / qTotal = 20362,79/1452 = 14 vcu/det

Impaired Traffic Performance (Improvement Solution)

Table 11: Intersection Traffic Performance (Improvement Solution)

Directions	Capacity C	Traffic performance						
	SMP/ hour	Degree of saturation	Traffic flow	Intersection Traffic delay	Intersection geometry delay	Intersection delay	Average Intersection delay (sec/vcu)	Level of service Los
		D_J	q	T_{LL}	T_G	$T_{LL}+T_G$		
				(sec/vcu)	(sec)	(sec/vcu)		
N	916	0,7021	643	17	3,03	19,99	14	B
S	1535	0,5267	809	6,3	2,97	9,27	14	B

Based on the results of the calculation of the improvement solution, the North saturation degree value is 0.7021, the South saturation degree is 0.5267 with a delay value of 14 seconds per vehicle, this shows that the level of service at the Jalan Dewi Sartika - Jalan Raya Kalibata intersection is included in type "B" which has good characteristics.

IV. CONCLUSION

Based on the results of the analysis, the following conclusions are obtained:

1. The volume of vehicles crossing Jl. Dewi Sartika towards Cawang in the peak hour 16.00-17 is 1352 smp / hour. And the volume on Jl. Dewi Sartika towards Kp. Melayu in the afternoon hour period 16.00-17.00 namely, 2110.5 smp / hour. Based on the results of the above analysis, the peak hour traffic flow at the intersection Jl. Dewi Sartika - Jl. Raya Kalibata as follows:
   Friday 17.00-18.00:
   North Arm = 1440 vcu/hour
   South Arm = 1495 vcu/hour
   West Arm = 1202 vcu/hour
2. Based on the results of the analysis of the performance of the signalized intersection (APILL) on Jalan Dewi Sartika - Jl. Raya Kalibata, Kramat Jati East Jakarta, the following results are obtained, the capacity of the North arm is 835 vcu / hour, the capacity of the South arm is 809 vcuvcu / hour, the capacity of the West arm is 602 vcu / hour. Degree of Saturation of the North arm 0.771, degree of saturation of the South arm 0.919, degree of saturation of the West arm 1.042. Average intersection delay 80,77 seconds, and level of service "F". Therefore, an effective solution must be given. And based on the results of the performance analysis of Jalan Dewi Sartika, Kramat Jati, East Jakarta, the results obtained, the capacity of the Cawang direction 2970 smp / hour, the capacity of the Kp. Melayu direction 2881 smp / hour. Degree of Saturation direction Cawang 0.46, degree of saturation direction Kp. Melayu 0,73. And the Level of Service in the direction of Cawang & Kp. Melayu is "C". Therefore there is no need for a solution.

3. Based on the results of the alternative performance analysis of the APILL intersection Jalan Dewi Sartika-Jalan Raya Kalibata, Kramat Jati East Jakarta by changing the phase of the West approach to turn left all and then making a U-turn at a distance of 300 m on the north arm of the intersection obtained the following results, North arm capacity 916 smp / hour, South arm capacity 1535 smp / hour. North arm saturation degree 0.702, South arm saturation degree 0.527. Average Intersection Delay 14 seconds, and Level of service of the intersection from the results of the analysis of alternative solutions in the afternoon period, showing an increase with each including LOS “B”. Which means for planning a signalized intersection (APILL) alternatives produce a better delay value.

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