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Performance Analysis of Unsignaled Intersection at Lawe Sigala-Gala of Intersection and Semadam Intersection, Southeast Aceh Regency

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ABSTRACT
Problem then cross often found in the city city big , for example city Kutacane . Problem congestion and chaos then cross often happened at the intersection roads , especially at intersections no signaled , the intersection of Jl. Lawe Sigala -gala and Simpang Goodbye Southeast Aceh District . This thing influenced by several factor that is the more increasing volume last traffic and the number of riders no obey regulations then cross . Analyze capacity and rate performance something deviation no signal so done data data from field , in the form of geometric data intersection (width each leg of the intersection), type and amount vehicles that cross intersection after multiplied with number equivalence from each _ vehicle , so obtained uniformity in unit car passenger (junior high school). Then calculated capacity and rate performance intersection that includes degrees boredom and procrastination deviation with method Manual of Indonesian Road Capacity 199 1 . Current then cross at the intersection Street lawe the biggest galaxies of the day Saturday of 311.25 SMP / hour . Current then cross at the intersection good luck biggest of the day Tuesday amounted to 292.27 SMP / hour . At the intersection lawe wolf score Degrees The biggest boredom is 0.161 (DS <1) . At the intersection good luck Degrees The biggest boredom is 0.154 (DS <1) . b based on DS Value shows that last volume cross on both intersection still under capacity basic requirements _ ie C $_0$ = 2700 smp /hour m. Congestion at the intersection _ Jl. Lawe Sigala -Gala and Simpang Goodbye Southeast Aceh Regency is caused by traders who use segment road and parking vehicles that do not regularly .

Keywords : Prices, Promotions, Purchase Decision

INTRODUCTION

junction Street is point meeting from network Street highway . This thing caused because at the intersection often cause various obstacles traffic is also caused because intersection is the place vehicle from various direction meet and change direction . Happening problem traffic that is increase in the volume of vehicles in the area intersection will influence capacity intersection so that level performance then cross intersection the will decreases , and divides user traffic will cause loss like cost and time trip .highway _ is one _ infrastructure for smoothness traffic good in a city nor rural or area other . The more fast development something area or city the more there 's a lot of traffic . This thing caused because increase income population so that capable have vehicle alone Because more increase amount vehicle on the road raya will cause congestion then possible traffic _ influence quality from service Street that . Congestion as well as bustle then cross that often occurs on segment Street or intersection road . one _

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part from Street considered highway _ need for analyzed as well as evaluated is intersection . At the signaled intersection , the distribution of time green During conflict current the vehicle is very influential capacity as well as operation intersection that .intersection Street Lawe Sigala -gala and Simpang Goodbye Southeast Aceh Regency is intersection no signaled . Setting pattern traffic junction this not optimal and current then cross at the intersection this enough solid , and factor discipline from user Street Becomes more aggressive and exist risk tall that intersection will blocked by scrambling vehicles _ room for pass intersection so that result in existence traffic jams at intersections that will affect the condition traffic at certain hours belonging to activity user very high road that is in the morning day , noon day , and in the afternoon .

LITERATURE REVIEW

Crossroads

According to Hobbs (1995), the intersection of Street is knot formed transportation _ from a number of approach where current vehicle from a number of approach the meet and seek leave intersection . Many problems at the intersection occur because existence conflicting movement _ one each other, especially turning vehicle _ right (Vehicle left usually given movement free). The solution is increase capacity intersection , with certain parameters _ or reduce traffic volume .

Types of Intersection Movement Meeting

From various form , nature and purpose movement vehicles in the area intersection , there four (4) basic types movement traffic at the intersection namely :

1. Splitting (*Diverging*) , is incident scatter movement that vehicle _ to the point intersection , possible planning _ movement separate current without subtraction no will cause point conflict and area potential accident .
2. Merging (*Merging*) , is join moving vehicle _ from a number of segment Street when to the point intersection . Requirements critical is that the time interval and distance , between arrival vehicle at point join , customize with speed yourself and the vehicle that comes next on stream main .
3. Intersect (*crossing*) , is The vehicle you want To do movement crossing (cutting) on a current then cross .
4. Crossing (*weaving*) is driver or The vehicle you want To do movement overtake or move path . Movement overtaking at the meeting Street angular small (less than 30 degrees).

Conflict Points at the Crossroads

Current affected traffic _ _ _ conflict on a intersection have Act in demand kflex , every movement turn left , turn right or straight each face different and related conflicts _ Act in demand movement that .

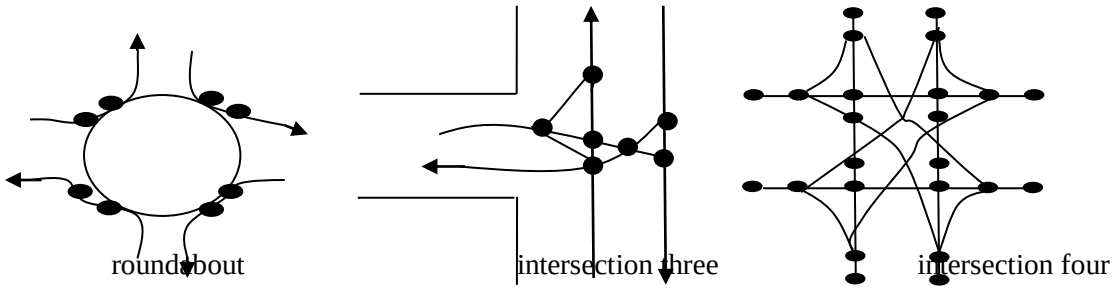

Figure 1. Potency point conflict at the intersection

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Purpose of the Intersection Arrangement

From selection Settings intersection can be found goals you want to achieve like following :

1. Reduce nor avoid possibility happening accident originating _ from various condition point conflict .
2. Guard capacity from intersection in order the operation can be achieved utilization appropriate intersection _ with plan .
3. In the operation from Settings deviation must give clear and definite instructions _ simple , direct then traffic in a suitable and safe place .

Types of Junction Arrangements

By detail Settings intersection plot could grouped to be :

1. Arrangement intersection with lamp traffic .
2. Arrangement intersection without lamp then cross .
   a. Sign
   b. Rotary
3. *Fly over*

Signs and Markings

Channeling

example from a number of regulated intersection _ with canalization .

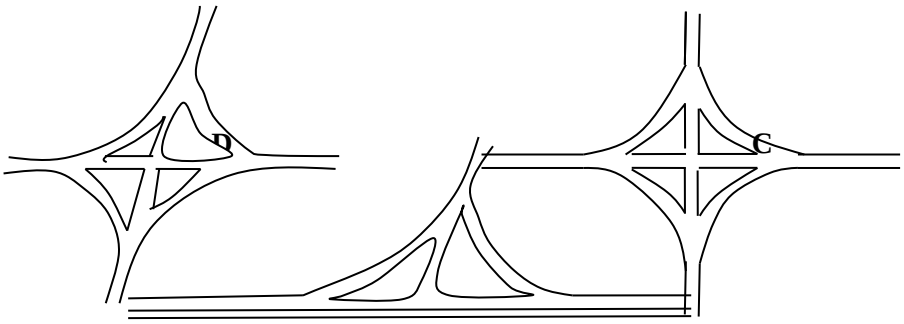

Figure 2 Intersection With Canalization

Yield Signs (Give A Chance)

Arrangement this used for protect current then cross from one _ segment road on the road mutual path _ intersect without current stop same once , so that driver no too late when compared with *stop sign* .

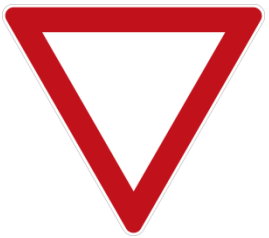

Figure 3 Yield Sign

Traffic Conditions and Characteristics _

Characteristics then cross explain characteristic current then cross by qualitative nor quantitative in related with speed , magnitude current and density then cross as well as relationship with time nor type vehicles that use room road . Characteristics required for Becomes reference planning then cross ,

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characteristic then tight cross _ relationship with analyzing and calculating the data so that Becomes clear and systematic .
Average Daily Traffic (LHR)
Formula For Average Daily Traffic (LHR) i.e. (MKJI, 1997):

VJRD = LHR x K x D..... .....(2.1)

With :
VJRD = Design volume based on direction (pcu / day)
LHR = then cross average daily (pcu / day)
K = proportion then cross daily happening _ during peak hours
D = proportion then peak hour _ in something direction certain

2.7.2 Density
Density is calculated by the equation:

$D = \frac{q}{v}$..... .....(2.2)

Where:
q = current (pcu /hour)
V = Average speed space (km/h)

Degrees of Saturation
Degrees saturation that is ratio current to capacity , used as factor main in determine level performance intersection and segment Street Degree value saturation show is segment Street the have problem capacity or no (MKJI, 1997).
With formula (MKJI, 1997):

$DS = \frac{Q}{C}$..... .....(2.3)

Where:
DS = Degree saturation
Q = Current then cross
C = Capacity

Table 1. Ds . Value Requirements

Condition (v/c)	Conclusion
V/C < 1	Last volume cross still under capacity
V/C = 1	Last volume cross same with capacity
V/C >1	Last volume cross has exceed capacity

2.8 Unsignalized Intersection Capacity
Capacity intersection is current traffic maximum that can be through something intersection at state then cross beginning and state Street as well as signs _ _ then cross .
Total capacity for whole arm intersection is results multiplication between capacity base (C0) i.e. capacity at condition certain (ideal) and factors adjustment (F), with take into account influence condition field to capacity (MKJI, 1997) :

C = Co x FW x FM x FCS x FRSU x FLT x FRT x FMI .....(2.4)

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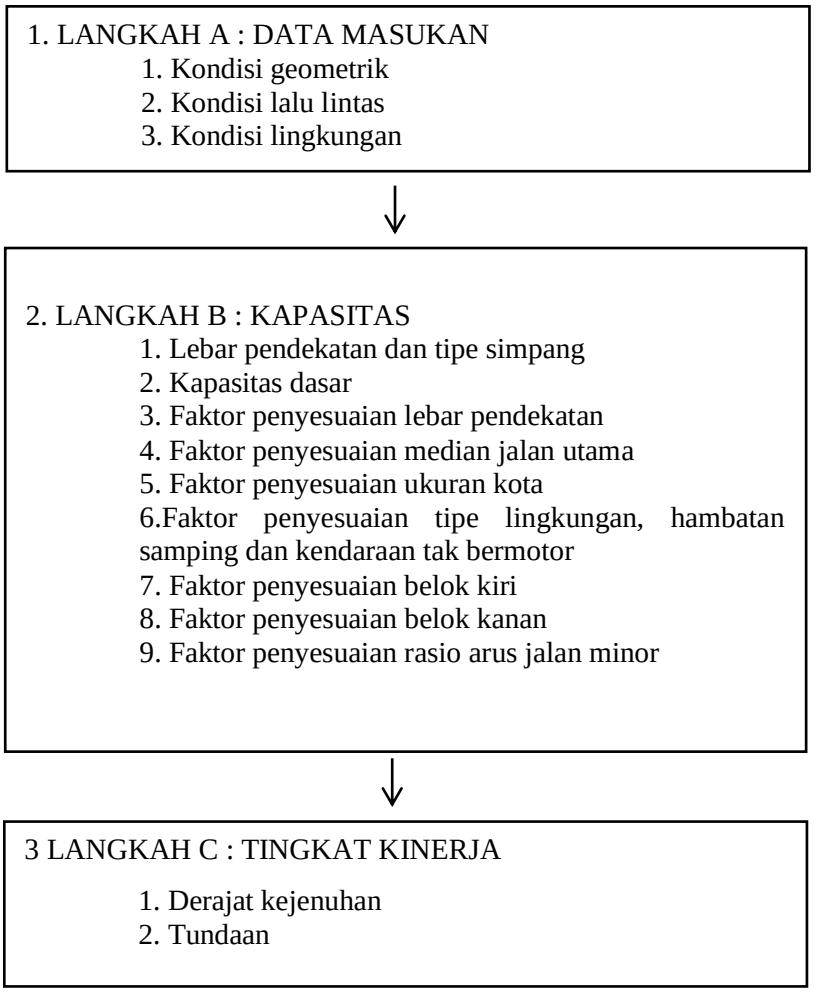
Where:
C = Capacity
Co = Capacity base
FW = Factor adjustment wide enter
FM = Factor adjustment Street main
FCS = Factor customization city
FRSU = Factor adjustment type environment road , obstacle side and vehicle not motorized
FLT = Factor adjustment turn left
FRT = Factor adjustment turn right
FMI = Factor adjustment ratio current minor road

Operational Analysis
Operational analysis final diagram as a reference procedure calculation and data analysis



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RESEARCH METHODS

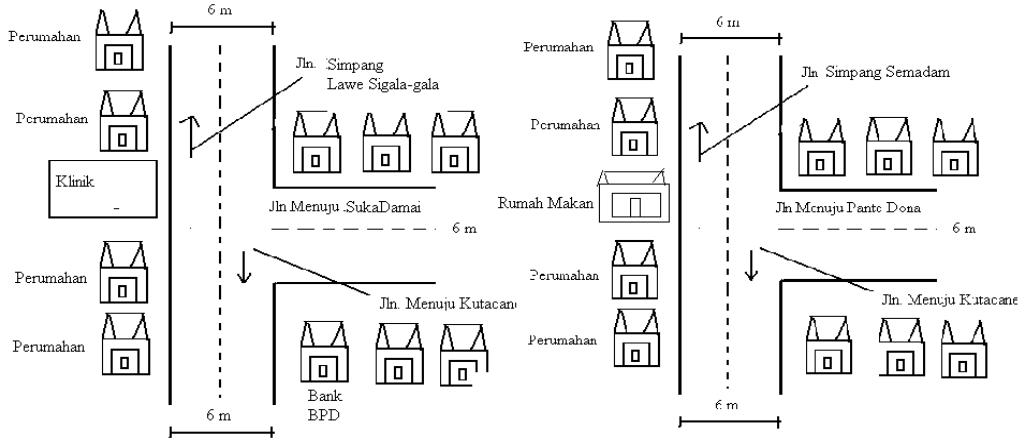
3 .1 Research Time and Location

Study this conducted for 4 days that is day wednesday and saturday for Street intersection Lawe All in all and on the day tuesday and thursday for Street intersection Goodbye . Survey done during peak hours for each arm branching namely :

1. morning _ Among 07.00 until _ by 9:00 a.m.
2. noon _ Among 12.00 until _ by 14.00 WIB.
3. Afternoon _ Among 16.00 until _ by 18.00 WIB.

Study implemented in the area intersection Street intersection Jl. Medan – Jl. Kutacane – Jl. Lawe The wolves that are in Lawe Sigala- gala, and at the intersection of Jl. Medan – Jl. Kutacane – Jl. intersection Semadam , which is in Simpang Goodbye .

Figure 5 Research Site Sketch



3.2Survey Tool

1. meter , function for determine point beginning survey until point end survey where in analyze capacity and delay at the intersection of Jl . Medan – Jl. Kutacane – Jl. Lawe Sigala- gala, and at the intersection of Jl. Medan – Jl. Kutacane – Jl. intersection Goodbye , and also for count wide large walk on every intersections and road medians .
2. Timer (Clock and *Stopwatch*) , in nature analyze capacity and delay segment Street must held during peak hours so that get maximum volume vehicles that cross intersection the calculated every 15 minute interval , therefore that in To do survey tool gauge time , for example hours or *stopwatch* .
3. tools _ Write u for calculate vehicle volume need prepared tools write that is HVS paper or book where in it made the tables that represent whole type required vehicle _ for evaluate capacity and delay at the intersection .

3.3Data Analysis and Processing

Required data for analyze capacity and delay at the intersection of Jl. Medan – Jl. Kutacane – Jl. Lawe sigala -gala, and at the intersection of Jl. Medan – Jl. Kutacane – Jl. intersection Semadam , namely :

1. LHR

Obtained from Observation Field then processed with Using Equality As following :

VJRD = LHR x K x D .... (3.1)

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with ,
VJRD = design volume based on direction (pcu / day)
LHR = then cross average daily (pcu / day)
K = proportion then cross daily happening _ during peak hours
D = proportion then peak hour _ in something direction certain

2. Density
For count density with equality as following :
formulated ,

D = $\frac{q}{v}$ ....(3.2)

where ,
q = current (pcu /hour)
V = average speed space (km/h)

3. Degrees Saturation
For count degrees saturation with equality as following :
Formula :

DS = $\frac{Q_{Smp}}{C}$ ....(3.3)

with :
DS = degree saturation
Q = current then cross
C = capacity

Data collection was carried out at the intersection of Jl. Medan – Jl. Kutacane – Jl. Lawe sigala-gala, and at the intersection of Jl. Medan – Jl. Kutacane – Jl. intersection Goodbye . At the crossroads the there is three (3) arms branching . Every arm intersection placed a post consisting of of 3 personnel , where each personnel on duty record vehicle volume consist from moving vehicle _ straight , vehicle turn right , and turning vehicles left on each arm intersection . Survey then cross conducted for 4 days that is day Tuesday, Thursday and Wednesday, Saturday

4. RESULTS AND DISCUSSION

4.1Survey data calculation

Table 1. The data obtained at the intersection good luck day Tuesday

TUESDAY			
NO	NOTATION	DESCRIPTION	SCORE
1	C_0	IT 322	2700
2	F_W	$W_1 = 3$, $F_W = 0.73 + 0.076 \times 3$	0.958
3	F_M	Not there is a median on the road main	1
4	F_{CS}	population 0.2 million (small)	0.88
5	F_{RSU}	environment Commercial , high SF and UM below 5%	0.88
6	F_{LT}	$P_{LT} = 36{,}11\%$; $F_{LT} = 1.0 - P_{LT} \times 0.16$	0.942

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7	F_{RT}	P_{RT} = 31.75 %; F_{RT} = 1.0 + P_{RT} x 0.26	1.083
8	F_{MI}	$_{PMI}$ = 32.77 % ; F_{MI} = 1.19 x P_{MI}^2 - 1.19 x P_{MI} + 1.19	0.928
9	C	C = C_0 x F_W x F_M x F_{CS} x F_{RSU} x F_{LT} x F_{RT} x F_{MI}	1895,6762

Table 2. The data obtained at the intersection lawe all day _ Wednesday

WEDNESDAY			
NO	NOTATION	DESCRIPTION	SCORE
1	C_0	IT 322	2700
2	F_W	W_1 = 3 , F_W = 0.73 + 0.076 x 3	0.958
3	F_M	Not there is a median on the road main	1
4	F_{CS}	population 0.2 million (small)	0.88
5	F_{RSU}	environment Commercial , high SF and UM below 5%	0.88
6	F_{LT}	P_{LT} = 35,70 % ; F_{LT} = 1.0 - P_{LT} x 0.16	0.943
7	F_{RT}	P_{RT} = 33.69 % ; F_{RT} = 1.0 + P_{RT} x 0.26	1.088
8	F_{MI}	$_{PMI}$ = 32.07 % ; F_{MI} = 1.19 x P_{MI}^2 - 1.19 x P_{MI} + 1.19	0.931
9	C	C = C_0 x F_W x F_M x F_{CS} x F_{RSU} x F_{LT} x F_{RT} x F_{MI}	1911,851

Table 3. The data obtained at the intersection good luck day Thursday

THURSDAY			
NO	NOTATION	DESCRIPTION	SCORE
1	C0	IT 322	2700
2	FW	W1 = 3 , FW= 0.73 + 0.076 x 3	0.958
3	FM	Not there is a median on the road main	1
4	FCS	population 0.2 million (small)	0.88
5	FRSU	environment Commercial , high SF and UM below 5%	0.88
6	FLT	PLT = 32,25 % ; FLT= 1.0 - PLT x 0.16	0.948
7	FRT	PRT = 34,81 % ; FRT= 1.0 + PRT x 0.26	1.091
8	FMI	PMI = 35 %; FMI = 1.19 x PMI2 - 1.19 x PMI + 1.19	0.919
9	C	C = C_0 x F_W x FM x FCS x FRSU x FLY x FRT x FMI	1904,407

Table 4 Data obtained at the intersection lawe all day _ Saturday

SATURDAY			
NO	NOTATION	DESCRIPTION	SCORE
1	C_0	IT 322	2700
2	F_W	W_1 = 3 , F_W = 0.73 + 0.076 x 3	0.958
3	F_M	Not there is a median on the road main	1

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4	F_{CS}	population 0.2 million (small)	0.88
5	F_{RSU}	environment Commercial , high SF and UM below 5%	0.88
6	F_{LT}	P_{LT} = 34,15 % ; F_{LT} = 1.0 - P_{LT} x 0.16	0.945
7	F_{RT}	P_{RT} = 34,54 % ; F_{RT} = 1.0 + P_{RT} x 0.26	1.090
8	F_{MI}	P_{MI} = 31.28 % ; F_{MI} = 1.19 x P_{MI}^2 - 1.19 x P_{MI} + 1.19	0.934
9	C	C = C_0 x F_W x F_M x F_{CS} x F_{RSU} x F_{LT} x F_{RT} x F_{MI}	1927,885

4.2 Recapitulation Results Intersection Capacity and Performance Level

Table 5. Semadam Intersection

Day	C (junior high school /hour)	DS	DTI	D_{TMA}	D_{TMI}	DG (det/ smp)	D (det/ smp)
Tuesday	1895,676	0.154	1.574	1.175	2,378	4.876	6.45
Thursday	1904.407	0.133	1.355	1.012	2,057	4.877	6.232

Table 6. Lawe Sigala-gala intersection

Day	C (junior high school /hour)	DS	DTI	D_{TMA}	D_{TMI}	DG (det/ smp)	D (det/ smp)
Wednesday	1911,851	0.129	1.313	0.980	1,926	4.943	6.255
Saturday	1927,885	0.161	1,648	1,231	2,388	4.889	6,537

4.3 Discussion

Calculation results can be known that at the intersection Jl. Simpang Lawe Sigala -Gala and Jl. Simpang Goodbye Southeast Aceh Regency still worthy accommodate current then the traffic that will be come.Height score capacity maximum at intersection amounted to 1927,885 smp / hour occurred in every day 07.00-8.00 no _ exceed capacity basic (Co=2700 smp / hour) and this will Keep going increase in accordance with increase population with increase amount vehicle .

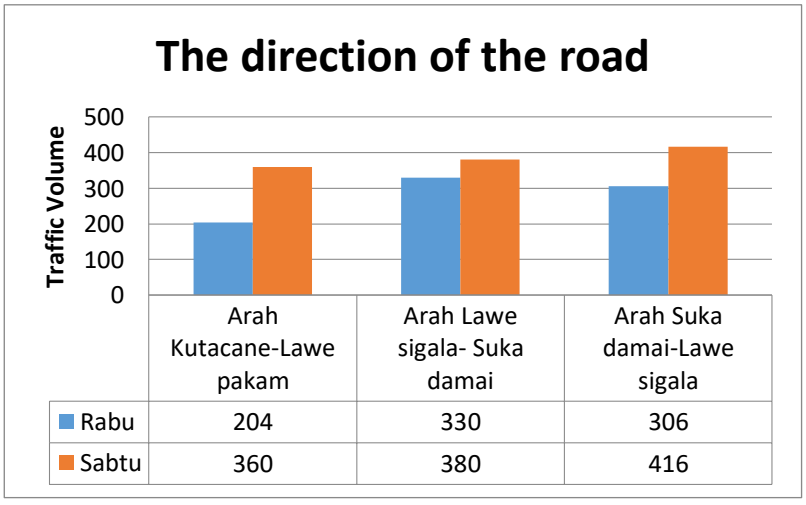

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Figure 6 Chart Traffic volume / Day on Jalan Lawe Sigala _

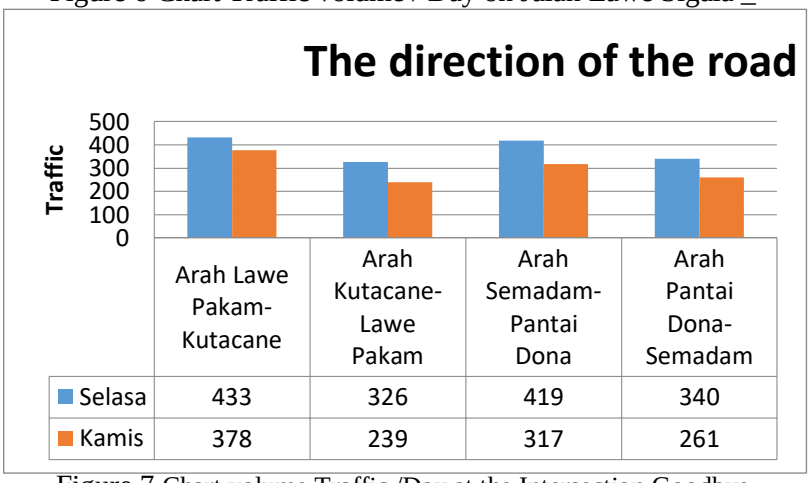

Figure 7 Chart volume Traffic /Day at the Intersection Goodbye

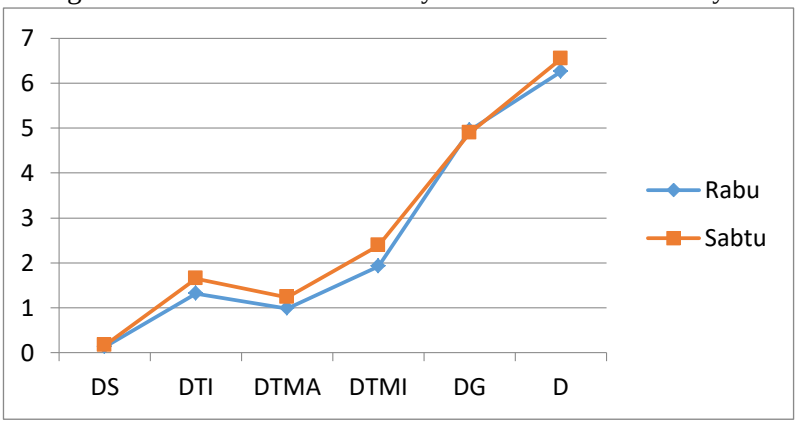

Figure 8 Graph of Capacity Recapitulation and Performance Level of Intersections on Sections Jalan Lawe Sigala-Gala

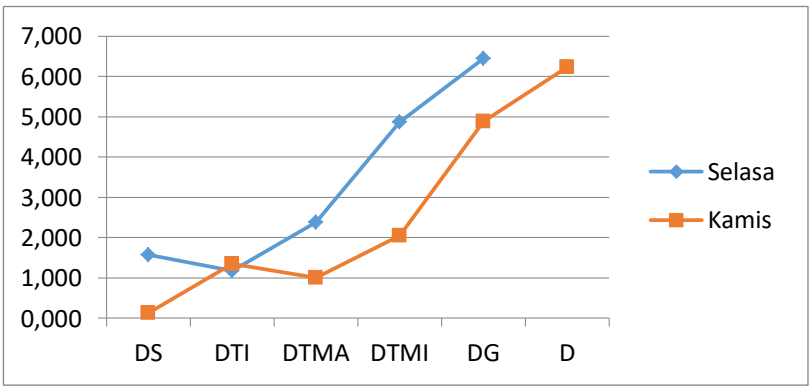

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Figure 9 Graph of Capacity Recapitulation and Intersection Performance Level on the Section Semadam Intersection

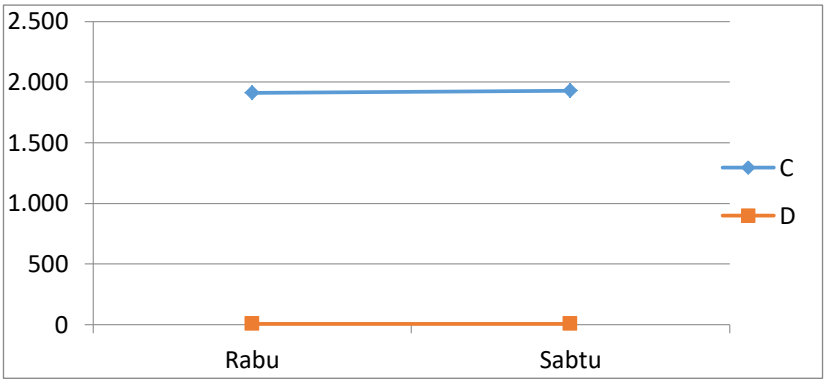

Figure 10 Chart Comparison Capacity Delay Traffic intersection With the results of a survey on Jalan Lawe Sigala _

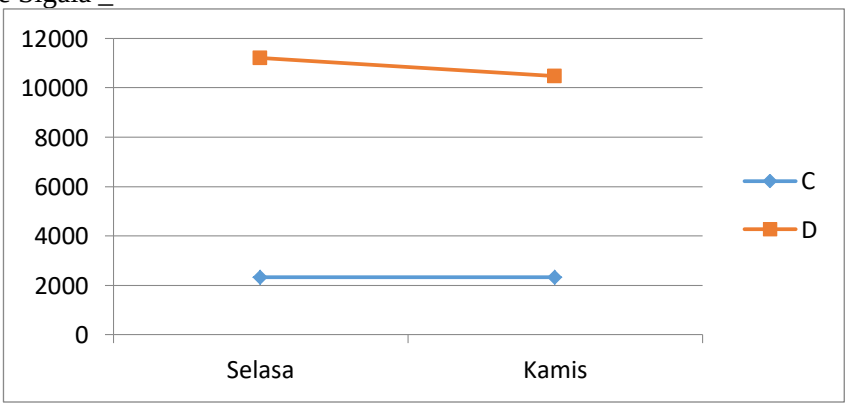

Figure 11 Comparison Graph of Intersection Traffic Delay Capacity with Survey Results on the Semadam . Simpang Road Section

See results obtained _ that is time delay on second intersection show that time delay no big so that no occur congestion . As for the influence traffic jam at the intersection sedam and intersection lawe wolf according to review researcher caused merchants who wear segment road and parking vehicles that do not regular or carelessly . For Thing that government area should discipline street vendors and regulate parking decent vehicle _ so that congestion or time delay tall no happen .

CONCLUSION

From the analysis carried out , then obtained a rus then cross at the intersection Street lawe the biggest wolf of the day Saturday of 311.25 SMP / hour . A rus then cross at the intersection good luck biggest of the day Tuesday amounted to 292.27 SMP / hour . Degree Value Saturation the largest at the Lawe junction the odds are 0.161 (DS<1). That is on Saturday. Degree Value Saturation largest at Simpang Goodbye is 0.154 (DS<1). That is on Tuesday. Based on DS Value shows that last volume cross on both intersection still under capacity basic requirements _ ie C_0 = 2700 smp / hour. Congestion at the intersection _ Jl. Lawe Sigala -Gala and Simpang Goodbye Southeast Aceh Regency is caused by traders who use segment road and parking vehicles that do not regularly .

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