

Performance Analysis of Odd-Even Number Vehicle License Plate Restriction System on Road Sisingamangaraja, Kebayoran Baru, South Jakarta, Indonesia

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ABSTRACT

In 2013, under the rule of Governor Joko Widodo, the DKI Jakarta government proposed the odd-even number vehicle license plate restriction system for use in Jakarta, where the level of congestion had exceeded the fairness threshold between the volume of vehicles and existing road infrastructure. After conducting surveys in 2018, this study assessed the success of the odd-even system and determined the system is effective in reducing vehicular traffic on the protocol roads and should continue to be enforced. Exactly in working hours.

Keywords: *Analysis of Even Odd Vehicle Number Plate System Performance, Road Sisingamangaraja, Jakarta*

INTRODUCTION

In 2013, Governor Joko Widodo proposed the odd-even number vehicle license plate restriction system in an effort to alleviate traffic congestion by reducing the number of vehicles on the roads of DKI Jakarta. In 2018, the odd-even system enforcement area was expanded beyond the protocol/main roads to include the toll road that leads into Jakarta Province. Entitled 'Traffic Arrangements In The Jakarta Toll-Tangerang, Tangerang-Merak, and Jakarta-Bogor-Ciawi', this regulation is intended to (1) limit the hours and days of operation of goods cars from 06.00–09.00 Western Indonesian Time, Monday–Friday, and (2) limit the hours and days of operation of goods cars as referred to national holidays.

There are currently as many as 18 million motorized vehicles in use on the roads of DKI Jakarta and that number is continually increasing. In 2016, BPS DKI Jakarta estimated an average annual population growth of 5% through 2021, while the road length was projected to increase by less than 0.1%. The general traffic composition is motorcycles 73.92%, passenger cars 19.58%, car loads 3.83%, bus cars 1.88%, and special vehicles 0.79%. The vehicles are predominantly privately owned.

The goal of this study was to assess the success of the odd-even number vehicle license plate restriction system in DKI Jakarta Province, specifically at Road Sisingamangaraja, Kebayoran Baru South Jakarta. This required collection of the

following data: (1) vehicle volume, (2) degree of saturation of Road Sisingamangaraja and (3) optimized performance or capacity of Road Sisingamangaraja. Analysis of the data will allow for assessment of the performance of the odd-even plate system regulation on traffic Clock and provide insight into possible solutions to relieve traffic congestion in DKI Jakarta.

2. MATERIALS & METHODS

2.1 Study site description

The following are general data on Sisingamangaraja, Kebayoran Baru, South Jakarta:

Province : DKI Jakarta.
City : South Jakarta.
Area : 141.3 Kilometers.
Population Data : 2.2 million people (BPS Jakarta)
Street Name : Road Sisingamangaraja.
Regional type : Administration / Commercial.
Road Length : 1.8 Kilometers
Road type : - Segment 1=3 lanes 1 direction
 - Segment 2 =3 lanes 1 direction
Road Type : 3 Lanes 1 direction (1/3).
Lane Width : 10 Meters.
Kereb : 2 Meters.
Median : 7 meters.
Road Markings: Yes.
Traffic Sign : Yes.

2.2 Survey Planning

The surveys needed to fulfill three criteria: measure the desired variable, and with high validity. Economically, the survey must be inexpensive (labor cost and time). The survey must minimally disturb the environment. This environment can be in the form of humans (and other living things) or roads (and other inanimate objects). The surveys should also not disturb the general public.

Various research permit files were completed, the appropriate observer road location was determined along with survey

time and observation period, research tools were prepared and tool operation was tested.

2.3 Survey Site Selection

The surveys were performed on the Jalan Sisingamangaraja, Kemayoran Baru, South Jakarta, starting from the intersection of Jalan Panglima Polim Raya and ending at the intersection of Jalan Jenderal Sudirman. Data was available for the 1.8km of a one-way road from 500m from the intersection of Jalan Panglima Polim Raya to the intersection of Jalan Jenderal. Sudirman is a two lane four lane road eight meters lane width and two meter lane divider. With a pedestrian width of 1 meter.

2.4 Survey Data Collection

In transportation studies, data and information collection activities are directly carried out in the field because transportation activities themselves are inherent and integrated with community activities. This study utilised the Survey Traffic Calculation Method and the use of survey vehicles to obtain real travel time data.

Two survey workers recorded traffic volume in the road segment with pen/pencil and paper using survey forms UR-1, UR-2 and UR-3 for urban roads and forms USIG-1 and USIG-2 for intersections without a traffic signal. Every 15 minutes the surveyor made a sign on the vehicle survey form and blank form for photocopying and step-by-step instructions that are done for filling out forms, operational analysis or planning, given in the Appendix according to those found in MKJI 1997 urban roads.

2.5 Determination of Research Time

Traffic flows change throughout the day, and the number of vehicles passing a location in the afternoon will be different than late at night or in the morning. This difference is called fluctuation in traffic flow.

Vehicle traffic flow was recorded during peak hours in the morning and evening. Based on the recording results, we

further grouped the pattern of observed daily traffic flows. The recorded LHR data obtained is used for calculating the approach to the state of the region for a moment. The research time is carried out during rush hour (when there is a heavy/maximum traffic volume). LHR data collection for several days is due to Jalan Sisingamangaraja, the flow of vehicles during the working day is

considered to have a solid flow in normal weather conditions.

Data retrieval of space mean speed was taken during peak hours in the morning and evening. The survey was conducted during a one-week period by taking in the hours prevailing odd-even number vehicle license plate system enforcement.

3. RESULT

Table 1. Traffic Flow Volume (Q) on Odd Plate Cars

Monday, 3 September 2018										
	Type of vehicle	Light vehicles		Heavy vehicle / (Busway)		Motorcycle		Total Flow (Q)		
1	emp	LV :	1	HV :	1,2	MC :	0,25			
2	Time	vehicle / hour	smp/hour	vehicle / hour	smp/hour	vehicle / hour	smp/hour	vehicle / hour	vehicle / hour	smp/hour
			[(2)/2] x emp LV		[(4)/2] x emp HV		[(6)/2] x emp MC	(2)+(4)+(6)	(8)/2	(3)+(5)+(7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
3	07.00 - 09.00	1,653	1,653	113.00	135	2,007	501	3,773	1,886	2,290
4	16.00 - 18.00	1,702	1,702	93.00	111	2,456	614	4,251	2,125	2,427
5	TOTAL	3,355	3,355	206	247	4,463	1,115	8,024	4,012	4,717

Table 2. Vehicle speed on odd plate

Monday, 3 September 2018								
		Vehicle Travel Time (Existing)					Distance	Speed actual
1	Sample	1	2	3	4	Average		
2	Time	Seconds	Seconds	Seconds	Seconds	Seconds	km	km / hour
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
3	07.00 - 09.00	154	157	164	168	160.75	1.8	40.31
4	16.00 - 18.00	161	163	166	173	166	1.8	39.10

Table 3. Side Obstacles in Odd Plate Cars

Monday, 3 September 2018											
	Obstacle Type	Pedestrian		Parking Vehicle and stop		Vehicle in and out		Slow vehicle		Total Frequency of weights	Class Side Obstacles
1	Weight factor	PED	0,5	PSV	1	EEV	0,7	SMV	0,4		
2	Time	Frequency /hour	Frequency weight	Frequency /hour	Frequency weight	Frequency /hour	Frequency weight	Frequency /hour	Frequency weight		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3	07.00 - 09.00	88	44.00	47	47.00	163	114.10	22	8.80	213.90	Low
4	16.00 - 18.00	117	58.50	33	33.00	227	158.90	38	15.20	265.60	Low
5	Average	102.50	51.25	40.00	40.00	195.00	136.50	30.00	12.00	714.40	High

Table 4. Degree of Saturation (DS), Odd - Even Traffic (Odd Plate)

Monday, 3 September 2018						
1	Time	Traffic flow (pcu / hour)	Capacity (smp/jam)	Degree of Saturation	Speed (km/jam)	Objective
	(1)	(2)	(3)	(4)	(5)	(6)
2	07.00 - 09.00	2,290.35	3,169.00	0.72	50,5	DS < 0,8
3	16.00 - 18.00	2,427.60	3,169.00	0.75	49,5	DS < 0,8
4	Average	4,717.95	6,338.00	1.49	100	DS < 0,8

4. DISCUSSION

The results of the field survey and the results of segment data analysis were

carried out on road Sisingamangaraja, Kebayoran Baru, South Jakarta, both roads of two lanes in each one direction, which enforce the odd-even number license plate restriction system, in the morning hours of 6:00–10:00 and in the afternoon from 16:00–20:00 and in the Normal system from 11:00–16:00. Refer to the MKJI 1997 book.

The results of the field survey and data analysis that have been carried out on Odd-Even traffic flows are obtained by the DS degree of gain >0.79 , indicating that the traffic accumulation/congestion the vehicle at the time / hours and the results of the degree of saturation above have met the target (DS <0.80) Referring to the book MKJI 1997.

5. CONCLUSION

Based on the results of traffic surveys, the authors conclude it is necessary to continue the odd-even number license plate restriction system in the capital city of Jakarta.

ACKNOWLEDGEMENTS

This research is fully supported by Mercu Buana University Internal Research. The authors acknowledge Mercu Buana University for funding this research.

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How to cite this article: Suprianto D, Widyaningsih N. Performance analysis of odd-even number vehicle license plate restriction system on road Sisingamangaraja, Kebayoran Baru, South Jakarta, Indonesia. International Journal of Research and Review. 2019; 6(7):523-527.
