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FROM MEDIEVAL TO CONTEMPORARY THOUGHTS



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“From Medieval to Contemporary Thoughts”

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POLICY AND EVALUATION OF INDUSTRIAL AND TRADE ROAD PERFORMANCE IN SIDOARJO, EAST JAVA PROVINCE

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Abstract

The purpose of this study was to discuss the suitability of the industrial and trade road in Sidoarjo with the Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone and to analyze the industrial and trade road performance in Sidoarjo. This descriptive quantitative research involved 4 districts in Sidoarjo. The results showed that 62% of the industrial and trade road in Sidoarjo are not in accordance with the Decree of the Minister of Industry and Trade Number 50/1997 concerning the technical standards of the industrial area. It means that 62% of the industrial and trade road performance in Sidoarjo has a pavement that is less than 7 meters. The level of service at rush hours in the industrial and trade road performance that has not been appropriate have bad level of service (F), whereas industrial and trade road performance that has been appropriate has excellent (A) level of service. It shows that if the industrial and trade road performance is appropriate with the technical standards of the industrial area, the transportation can run well.

Keywords: transportation policy, road performance evaluation

Abstrak

Tujuan penelitian ini adalah membahas kesesuaian jalan industri dan perdagangan di Kabupaten Sidoarjo dengan SK Menteri Perindustrian & Perdagangan Nomor 50/1997 tentang Standar Teknis Kawasan Industri dan menganalisis kinerja jalan industri dan perdagangan di Kabupaten Sidoarjo. Penelitian deskriptif dengan pendekatan kuantitatif ini menggunakan 4 kecamatan sebagai lokasi sampel penelitian. Hasil penelitian menunjukkan bahwa 62% jalan industri dan perdagangan di Kabupaten Sidoarjo tidak sesuai dengan SK Menteri Perindustrian & Perdagangan Nomor 50/1997 tentang standar teknis kawasan industri. Hal tersebut berarti 62% jalan industri dan perdagangan di Kabupaten Sidoarjo memiliki perkerasan jalan kurang dari 7 meter. Tingkat pelayanan pada jam puncak di jalan industri dan perdagangan yang tidak sesuai memiliki tingkat pelayanan sangat jelek (F) sedangkan jalan industri dan perdagangan yang sudah sesuai memiliki tingkat pelayanan sangat baik (A). Hal tersebut menunjukkan bahwa jika jalan industri dan perdagangan sesuai dengan standar teknis kawasan industri maka transportasi dapat berjalan dengan baik.

Kata kunci: kebijakan transportasi, evaluasi kinerja jalan

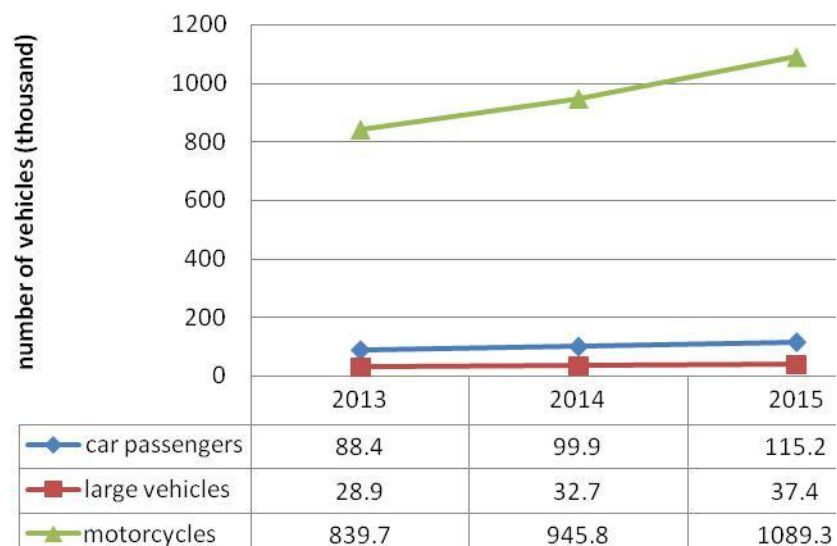
Introduction

The implementation of local autonomy demands local government to build and develop social welfare through various sectors such as industry. Likewise Sidoarjo, that has been doing the development in industrial sector which is the step in the development of the local economy. In accordance with spatial and territorial planning, the industrial developments of Sidoarjo are located in Waru District, Buduran District, Taman District and Gedangan District. The industrial development of Sidoarjo is accompanied by the development of trade sector.

Continuity of economy development through industry and trade sector can not be separated from the presence of road. Roads are used as transportation of industrial material goods traffic as well as industrial products. Roads are traffic and transportation facilities that have an important role to support economy, social, and environmental sector. Roads are also significant in developing area to reach stability and equity of interregional development and build spatial structure in order to achieve national development goals. The roads according to the Law Number 38/2004 on Road are defined as land transportation facility for traffic covering the entire part of road and its equipment, so the road conditions affect the sustainability of economic development.

The industrial and trade development of some areas in Sidoarjo influence the increase of vehicles number especially large vehicles such as pick-up truck, trailer container, etc. The increase number of vehicles in Sidoarjo in the last 3 years can be seen in Picture 1.

Picture 1. Number of Passenger Cars, Large Vehicles, and Motorcycles in Sidoarjo



Source: Badan Pusat Statistik Kabupaten Sidoarjo (2016: 26) (data has been processed)

Industrial and trade road crossed by all types of vehicles such as motorcycles, passenger cars and large vehicles. Increasing number of vehicles is accompanied by the development of road so the road performance can be maximized. Industrial and trade road performance can be maximized if industrial and trade road development are according to the determined standard. The wide of the road standard for industrial zone is regulated in Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone. In the Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone explained that technical road services in industrial zone is given for three types of road. The first, the main road with 2 lanes in one direction is supposed to have pavement width 2 x 7 meters. The second, the main road with 1 lane in two directions is supposed to have minimum

pavement width 8 meters. The third, the environmental road with two directions supposed to have minimum pavement width 7 meters.

Based on the problem that has been described above, the researcher is interested in discussing the conformity of industrial and trade road in Sidoarjo with the Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone and analyzing the industrial and road trade performance in Sidoarjo through the Level of Service (LoS).

Research Methodology

This descriptive quantitative research involved 4 districts in Sidoarjo. Data obtained from surveys through identification, observation and traffic counting. Traffic counting has been done by counting the number of vehicles passed through industrial and trade road of Sidoarjo at the point that has been determined. To simplify the calculation of the traffic volume, the type of vehicles was classified into five: small vehicles, medium vehicles, large vehicles, motorcycles and non-motorized vehicles. The survey was conducted on weekdays at peak hours (06.00 to 18.00). In addition to traffic counting, survey of geometrical road conditions was also conducted by observing and direct measurement. These geometric data were needed to determine the basic capacity of roads.

Data processing was done by quantitative analysis. Quantitative analysis was used to determine the conformity of road conditions with the policy through geometrical road condition data from observation. Quantitative analysis was also used to determine the road performance. Data that used quantitative analysis was the calculation of the number of vehicles from traffic counting.

The Conformity of Industrial and Trade Road in Sidoarjo with Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone

Public policy can be defined as a decision taken by the government in overcome the problems that occur in society (Fitri, Sjamsudin, & Hermawan, 2014). One of the important and urgent problems in society nowadays is transportation problems. In addition to improve the local economy, the development of industry and trade also triggers various problems in society like in Sidoarjo. The transportation problems are caused by the increasing number of vehicles that is in line with the increasing number of industry and trade. Related to that problem there is Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone which regulates the standard of facilities on industrial and trade zone to prevent transportation problems. Based on the transportation problems in industrial and trade road, it is necessary to evaluate the policy implementation. Evaluation of Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone has been done through the conformity of industrial and trade road in Sidoarjo with road facilities standard that has been determined. This is conducted to know the extent of the realization of the policy.

The conformity of industrial and trade road in Sidoarjo with Decree of the Minister of Industry and Trade Number 50/1997 can be seen from the width of industrial and trade road in Sidoarjo with the width of road that has been determined according to technical standards of industrial zone. Width of the road in the industrial zone that has been determined for main road which is 2 lanes in one direction with a pavement width 2 x 7 meters or 1 lane 2 directions with minimum pavement width 8 meters. While technical road services in industrial zone for environmental road is 2 directions with minimum pavement width 7 meters.

Data of industrial and trade road in Sidoarjo from industrial developments zone in Waru District, Buduran District, Taman District and Gedangan District based on survey results can be seen in Table 1.

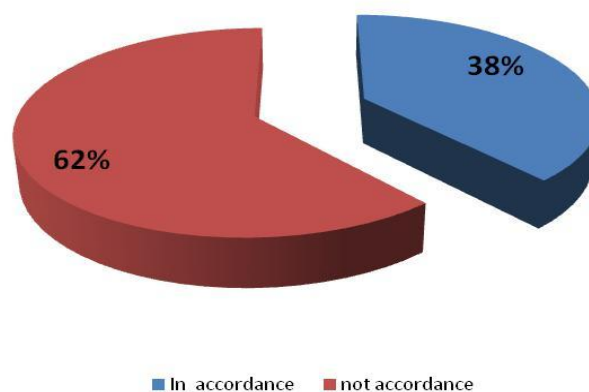
Table 1. The conditions of industrial and trade road in Sidoarjo 2016

No	Road	Type of road	Width (m)
1	Bringinbendo – Sidodadi	2 lanes 2 directions	8
2	Bringinbendo – Tanjungsari	2 lanes 2 directions	6,5
3	Ketegan – Medaeng	2 lanes 2 directions	4
4	Kletek – Sukodono	2 lanes 2 directions	7
5	Kedungturi – Kedungturi	2 lanes 2 directions	8
6	Medaeng – Medaeng	2 lanes 2 directions	10
7	Taman – Ngelom	2 lanes 2 directions	10
8	Trosobo – Jatikalang	2 lanes 2 directions	4,4
9	Trosobo – Pertapen Maduretno	2 lanes 2 directions	3
10	Trosobo – Tanjungsari	2 lanes 2 directions	3
11	Kedung Rejo – Wadungasri	2 lanes 2 directions	7,1
12	Kepuh Kiriman – Berbek	2 lanes 2 directions	9
13	Medaeng – Waru	2 lanes 2 directions	10
14	Tropodo – Ngingas	2 lanes 2 directions	5
15	Wadung Asri – Tambak Sawah	2 lanes 2 directions	8,5
16	Wadung Asri – Tambak Sumur	2 lanes 2 directions	8
17	Waru – Ngingas	2 lanes 2 directions	4
18	Gedangan – Sukodono	2 lanes 2 directions	5
19	Sruni – Keboananom	2 lanes 2 directions	5
20	Gedangan – Keboansikep	2 lanes 2 directions	5
21	Buduran – Sidokeprung	2 lanes 2 directions	4
22	Wadungasih – Buduran	2 lanes 2 directions	5
23	Buduran – Sidokerto	2 lanes 2 directions	5
24	Buduran – Sidomulyo	2 lanes 2 directions	4
25	Buduran – Sukodono	2 lanes 2 directions	5
26	Tebel - Banjarsari	4 lanes 2 directions	10

Source: Researchers (data has been processed)

Table 1 shows that there were industrial and trade roads width in 2016 that were not in accordance with Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone. Supposedly, the areas that developed for industrial and trade zone have a minimum pavement, 7 meters. Percentage of industrial and trade road that were not in accordance with the standard can be seen in the picture 2.

Picture 2 Percentage of industrial and trade road pavement width 2016 in Sidoarjo that in accordance with technical standards of industrial zone



Source: Researchers (data has been processed)

Picture 2 shows that the percentage of industrial and trade road in Sidoarjo which is in accordance with technical standards of industrial zone was 38% and industrial and trade road which is not in accordance was 62%. It shows that the number of industrial and trade roads in Sidoarjo which are in accordance with Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone were more than industrial and trade roads which were not in accordance.

Level of Service (LoS) of Industrial and Trade Road in Sidoarjo

Evaluation should be the part of planning an activity. Evaluation is used to control the achievement of activity purposes. Evaluation is related to information of the result about value and gives description about the benefit of policy. Evaluation is interpretation, scoring and rating. Evaluation can answer the question of what a difference made (Dunn, 2000).

Evaluation of road performance can be seen from the level of service (LoS). Level of Service (LoS) is the ability of road in performing its functions. The calculation of level of service is using the Level of Service formula. Level of service is determined based on quantitative values such as V/C, speed (saturation time) and qualitative values such as freedom of movement and speed, degree of traffic barriers, security and comfort. Level of service can also be seen from the level of saturation degree. In other words, the level of service is a measure or values that are certify service quality provided by road in certain conditions. There are two meaning of level of service (Tamin, 2000).

- a. Flow dependent
- b. Facility dependent

Level of service is a qualitative measurement that describes the operational conditions within traffic and driver and passenger perceptions against these conditions. Factors such as speed and travel time, freedom to maneuver, traffic stops and convenience as well as comfort are conditions that affect level of service. Each facility can be evaluated based on six levels of service, A to F, where A represents the best operational conditions and F for the worst conditions (TRB, 2000) in (Khisty dan Lall, 2005).

Table 2. The Classifications of Level of Service

Level	V/C	Characteristics
A	< 0,60	Free flow, low volume, high speed and the driver can select the desired speed
B	0,60 < V/C < 0,70	Stable flow, slightly limited by the speed of traffic and the driver can still select the desired speed
C	0,70 < V/C < 0,80	Steady flow, the speed is controlled by traffic
D	0,80 < V/C < 0,90	Flow begins to unstable and low speed
E	0,90 < V/C < 1	Unstable flow, low speed and vary, the volume at near capacity
F	>1	Stunted flow, low speed, volume above the capacity and frequent traffic jams in quite a long time so the speed can drop to zero

Source: Morlok (1985)

Based on IHCM (*Indonesian Highway Capacity Manual*), the level of service valued by comparison of traffic volumes with road capacity. As for level of service (VCR) was conducted by the following equation:

$$VCR = V/C$$

keterangan,

- VCR = volume of capacity ratio/value of level of service (passenger car equivalent/hour)
- V = volume of traffic (passenger car equivalent/hour)
- C = capacity of roads (passenger car equivalent/hour)

In this research, traffic counting has been done on two roads that were considered to represent that are Sruni – Keboananom Road and Bringinbendo – Sidodadi Road. Sruni –

Keboananom Road represent the roads that did not in accordance with technical standards of industrial zone and Bringinbendo – Sidoado Road in accordance with technical standards of industrial zone. After traffic counting has been done, the next step was calculating level of service. The comparison of industrial and trade road in accordance with technical standards of industrial zone and industrial and trade road that did not in accordance with technical standards of industrial zone can be seen from the result of level of service calculations.

The results from observations on Sruni – Keboananom Road shows that the existing conditions of Sruni – Keboananom Road consists of 2 (two) lanes and 2 (two) directions, without median barrier, road width of 5 meter without roadside, and low side friction. Based on traffic counting and calculations, the level of service of Sruni – Keboananom Road can be seen in table 3.

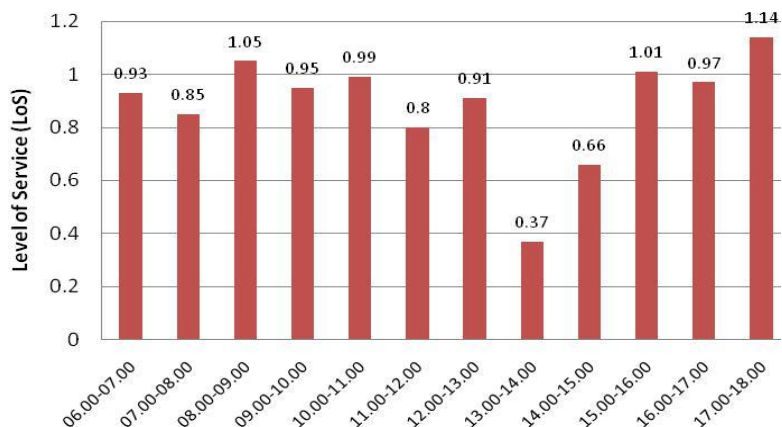
Table 3. Level of service of Sruni – Keboananom Road

No	Times	Number of vehicles per hour	Traffic volume (passenger car equivalent/hour)	Capacity (C)	Degree of traffic barriers (Dj)	Level of service (LoS)
1.	06.00 - 07.00	1.586	1.431	1.539	0,93	E
2.	07.00 - 08.00	2.071	1.315	1.539	0,85	D
3.	08.00 - 09.00	1.737	1.612	1.539	1,05	F
4.	09.00 - 10.00	1.546	1.456	1.539	0,95	E
5.	10.00 - 11.00	1.269	1.522	1.539	0,99	E
6.	11.00 - 12.00	1.050	1.232	1.539	0,80	D
7.	12.00 - 13.00	1.198	1.401	1.539	0,91	E
8.	13.00 - 14.00	618	562	1.539	0,37	A
9.	14.00 - 15.00	853	1.015	1.539	0,66	B
10.	15.00 - 16.00	1.636	1.556	1.539	1,01	F
11.	16.00 - 17.00	2.259	1.492	1.539	0,97	E
12.	17.00 - 18.00	2.753	1.755	1.539	1,14	F

Source: Researchers (data has been processed)

Table 3 shows that the average of level of service in Sruni – Keboananom Road was bad. Level of service with A category only at 13.00 to 14.00 which means that at this hour it was free flow, low volume, high speed and the driver can select the desired speed. At 14.00 to 15.00, level of service was in B category which means that stable flow, slightly limited by the speed of traffic, the driver could still select the desired speed. At 07.00 to 08.00 and 11.00 to 12.00, level of service was in D category which means that flow begins to unstable, low speed and vary and the volume at near capacity. Level of service in E category at 06.00 to 07.00, 09.00 to 10.00, 10.00 to 11.00, 12.00 to 13.00, and 16.00 to 17.00 which means that unstable flow, low speed and vary, the volume at near capacity. While the worst level of service was at 08.00 to 09.00, 15.00 to 16.00 and 17.00 to 18.00 that the level of service was in F category which means that stunted flow, low speed, volume above the capacity and frequent traffic jams in quite a long time so the speed could drop to zero. The intensity level of service per hour in Sruni – Keboananom Road can be seen in the picture 3.

Picture 3. The fluctuations level of service of Sruni – Keboananom per hour



Source: Researchers (data has been processed)

The results from observations on Bringinbendo - Sidodadi Road shows that the existing conditions of Bringinbendo - Sidodadi Road without roadside, and low side friction. Based on traffic counting and calculations, the level of service of Bringinbendo - Sidodadi Road can be seen in table 4.

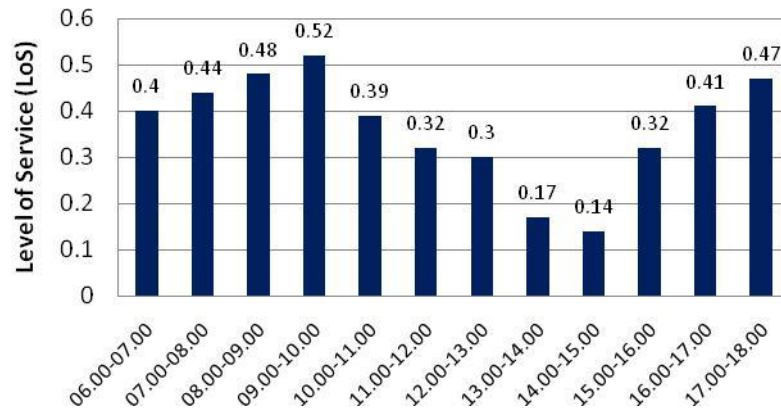
Table 4. Level of Service of Bringinbendo – Sidoadi Road

No	Times	Number of vehicles per hour	Traffic volume (passenger car equivalent/hour)	Capacity (C)	Degree of traffic barriers (Dj)	Level of service (LoS)
1.	06.00 - 07.00	1.982	1.109	2.786	0,40	A
2.	07.00 - 08.00	2.176	1.233	2.786	0,44	A
3.	08.00 - 09.00	2.260	1.331	2.786	0,48	A
4.	09.00 - 10.00	1.847	1.437	2.786	0,52	A
5.	10.00 - 11.00	1.102	1.078	2.786	0,39	A
6.	11.00 - 12.00	893	900	2.786	0,32	A
7.	12.00 - 13.00	846	831	2.786	0,30	A
8.	13.00 - 14.00	692	486	2.786	0,17	A
9.	14.00 - 15.00	515	381	2.786	0,14	A
10.	15.00 - 16.00	932	896	2.786	0,32	A
11.	16.00 - 17.00	1.474	1.150	2.786	0,41	A
12.	17.00 - 18.00	1.739	1.310	2.786	0,47	A

Source: Researchers (data has been processed)

Table 4 shows that the average of level of service per hour in Bringinbendo - Sidodadi Road was good which was the level of service in A category. It means that the level of service was free flow, low volume, high speed and the driver can select the desired speed. The intensity level of service per hour in Bringinbendo - Sidodadi Road can be seen in the picture 4.

Picture 4. The fluctuations level of service of Bringinbendo - Sidodadi per hour



Source: Researchers (data has been processed)

Conclusion

Based on the research results, it is concluded that:

- Industrial and trade road 2016 in Sidoarjo which was in accordance with Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone was 38% while industrial and trade road which was not in accordance was 62%.
- Industrial and trade road performance in Sidoarjo which was in accordance with Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone has a level of service that was better than industrial and trade road which was not in accordance. Level of services of industrial and trade road in peak hours which was in accordance with Decree of the Minister of Industry and Trade Number 50/1997 on Technical Standards of Industrial Zone has level of service "A" and industrial and trade road which was not in accordance has level of service "F".

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