

# MOTORCYCLE POTENTIAL PROBLEMS IN JAKARTA

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## Abstract

After the economic crisis in 1997, motorcycles become a popular transport mode in Indonesian cities. However this condition leads to large number of violation and accident rate. This study tried to discuss how this problem started and what possible measure can be taken to solve the problems, mainly based on literature review. The traffic data used were compiled from the data provided by PT Pamintori Cipta. Interview survey was conducted to find people perception of motorcycles issues. The conclusion suggests that there is a need of further comprehensive study to find out what condition that makes motorcyclists voluntary return to use public transport and social engineering and intensive training program should be implemented for younger generation to improve traffic condition in Jakarta.

**Keywords :** motorcycle violation, traffic safety, and public transport.

## BACKGROUND

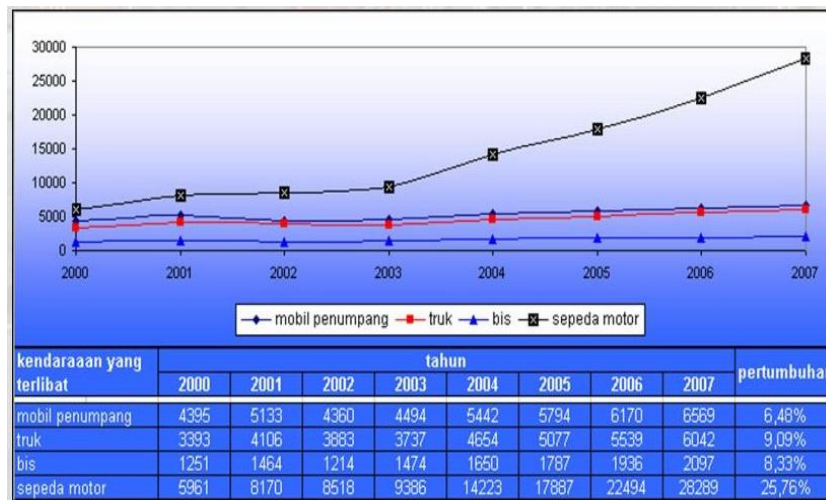
After South East Asia Regional Economic Crisis in 1997, many Indonesians have some difficulties to cover their living cost. For people who reside in urban area, the contribution of transportation cost to the living cost is significant. Therefore, they tend to choose cheaper transportation mode available.

Public transport is a mode provided by the government to the society with some advantages (such as efficiency on using road space and cheaper cost per passenger) compared to private cars. However, the condition and system of current public transport is very bad. Passengers often have uncomfortable experiences such as be forced to board or alight when the vehicle is still moving or unacceptable crowd inside the vehicle.

Those conditions make people find other alternative modes more comfortable for them. Positive response came from market by providing very easy procedures to own new motorcycles. As if supporting the market, the government lifts the subsidy on fuel price, followed by increase on public transport fares. Suddenly a new condition comes where motorcycles offer higher accessibility and mobility with cheaper operation costs.

Unfortunately, the high increase of motorcycle ownership is followed by the increase on accident rate. Figure 1 shows that motorcycle accident growth rate increased by approximately 26% yearly. In 2007, there were 28,289 accident involving motorcycles

in Jakarta. Other source said that until November 2006, there were 4,150 accidents recorded, with 80% of that accident involved motorcycles.



Source: Pamintori Cipta (2008)

**Figure 1** Number of Accident for Each Involving Vehicle Type

Mannering and Grodski (1995) describe five reasons why the motorcycle accident risk are relatively high. They are:

- Other road users do not consider motorcycle as a threat to cause collisions and they tend to pay attention on the vehicle with same size or larger (buses or trucks);
- Operating motorcycle requires a complex process of physical coordination and good psychomotor ability; some users might have physical and reflex limitation, and those limitations them vulnerable to accident risks;
- Most motorcyclists do not have improper training; when they face unpredicted conditions, they have higher risks of accident.
- Motorcyclists are the risk seekers from people from different age and socio-economy background; the number of accident may exceed the expected number.
- Motorcycles have higher acceleration rates compared to other vehicles which contribute to a higher accident risk.

Ironically, most motorcyclists are not able to afford the accident cost. Based on a study conducted by Widyastuti (2009), the treatment cost for slight injury is about Rp. 1,250,000.00, for serious injury is Rp. 4,500,000.00, and for fatal accident is Rp. 10,000,000.00, and these costs are higher than the monthly income of most motorcyclists. With the increasing number of motorcycles and traffic problems involved, some policies need to be implemented for the motorcyclist to improve the traffic safety on the road.

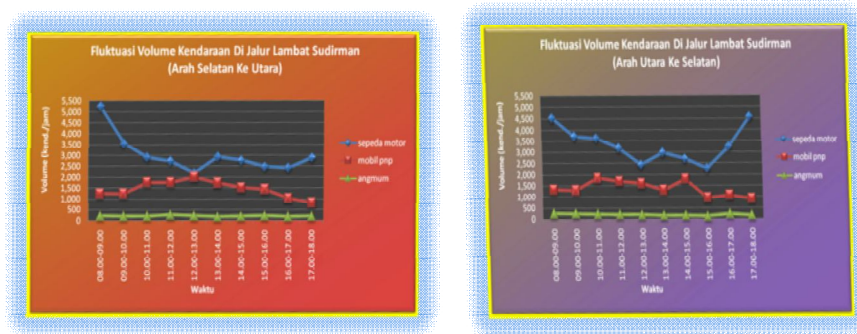
Since 2005 the number of motorcycles on the road have been increasing dramatically. On some road segments, the proportion of motorcycles has been more than 50% of the total vehicles traveling on the roads (See Table 1)

**Table 1** Percentage of Motorcycle on Various Road Segments in Jakarta

Road Segment	Motorcycle Composition	Flow (Veh / Hour)	Road Segment	Motorcycle Composition	Flow (Veh / Hour)
<i>Administrative of North Jakarta</i>			<i>Administrative of East Jakarta</i>		
Mangga Dua	50.44 %	1253	Perintis Kemerdekaan	30.12 %	5961
Sunter	53.37 %	1467	Jakarta Bogor	50.23 %	1264
<i>Administrative of West Jakarta</i>			<i>Administrative of South Jakarta</i>		
Daan Mogot	55.71 %	1888	Saharjo	76.02 %	2487
West Ring Road	44.63 %	2069	Gatot Subroto	58.28 %	6058
Brigjen Katamso	48.07 %	1546	Sudirman	29.78 %	6750
Palmerah	81.70 %	700	Fatmawati	76.09 %	847
<i>Administrative of Central Jakarta</i>			Panjang	52.33 %	5075
Mas Mansyur	69.54 %	1166	Metro Pondok Indah	45.01 %	2818
Senen	79.57 %	854			
Thamrin	36.05 %	6021			

Source: Pamintori Cipta (2006-2008)

Figure 1 shows the fluctuation of vehicles on the slow lane of the Sudirman Arterial Road. It is shown that the numbers of motorcycles and passenger cars have a negative correlation. This trend is likely to occur on saturated roads, because motorcycles and passenger cars are competing for the same space. Since motorcycles have higher flexibility, then the flow of motorcycles is higher than that of passenger cars. If the number of vehicles is converted into passenger car unit (pcu), the maximum flow at one time is approximately 3200 pcu/hours. This number is similar to the capacity calculated using IHCM method (3300 pcu/hours for 2 lanes with 3.5 m wide/lane).



Sources: PT Pamintori Cipta (2008)

**Figure 2** Vehicle Fluctuation

High number of motorcycles means that more people are using the road segment, because private vehicles usually have low occupancy rates (1.26 person/car based on SITRAMP, 2004). If the occupancy rate of motorcycle is 1.69 person/motorcycle (SITRAMP, 2004) and at the same time four motorcycles can occupy the same road space required by one car, then motorcycles are 5.36 times more efficient than car.

### MOTORCYCLIST TRAFFIC VIOLATION

Motorcycles have smaller dimension than passenger cars. As a result, motorcycles have some disadvantages compared to passenger cars such as lower maximum speed and slower acceleration. The optimum travel length is also shorter than that of passenger cars (about 30 km). However, this disadvantage only gives effect on free flow condition. On

interrupted traffic flow conditions, motorcycles have advantages on travel time because motorcycles have higher flexibility and can occupy gaps between bigger vehicles.

Excessive use of the motorcycle flexibility can be dangerous and considered as traffic violation when the motorcycle maneuver disturbs other road users. Unfortunately, most motorcyclists do not consider this maneuver as traffic violation. Some traffic violations commonly occurred in Jakarta will be discussed in the following section.

### **Frequent Lane Shifting**

The main purpose of providing road marking is to make sure that the traffic flows smoothly from vehicles running on the track. However, the marks are more suitable for passenger cars and other heavy vehicles. For Motorcycles, the interval between marks is too wide, since one lane can be occupied by three to four motorcycles moving parallel.

Furthermore, there is no regulation that explicitly regulates how motorcyclist should move on this lane. Providing one lane for only one motorcycle at one time could be considered wasting road capacity. With this condition, it is common for motorcyclist to maneuver from one lane to another, although these maneuvers are dangerous for all road users. If there were a clear regulation to prohibit motorcycles to make sudden lane change, these maneuvers would have been declared as traffic violation. However, in term of road capacity, these maneuvers could significantly increase the road capacity.

### **Red Light and Traffic Sign Violation**

Based on the observation on signalized intersection, when the red light is on, some possible actions conducted by motorcyclists are:

- a. Move slowly to minimize the gap with the leading vehicle;
- b. Stop;
- c. Shift to spaces available on less crowded lane; and
- d. Combination of a, b, and c

Light vehicles tend to act (a), (b), or the combination of (a) and (b) and motorcycles have a tendency to do all mentioned actions above. A study at Demangan intersection by Priyanto (2007) shows the tendency of the motorcycle, as described in Table 2.

**Table 2** Motorcyclist Tendency at Demangan Intersection

Criteria	A	B	C	A+B	A+C	B+C	A+B+C
Number of Motorcycle per Cycle Time	0.5	4.5	6.5	4.45	6.5	1.2	1.4

**Notes:**

A = Move slowly on queue

B = Stop

C = Shift Lanes

Putranto and Sucipto (2007) conducted a study to calculate violation rate at Harmoni signalized intersection. The results of this study show that on a higher traffic volume condition, motorcyclists tend to stop in front of the first vehicle queued before the stop line and move before the signal light turns green. While on the lower traffic volume condition, motorcyclists tend to stop before the stop line, but they also tend to cross the intersection when the signal light is red.

## **Contra Flow**

Contra flow movement is a traffic violation type which occurs less frequent compared to the previous types. This movement occurred on undisturbed flow condition or on the road with median which has long U-Turn facility. Most contra flow travel is a shortcut movement to nearest accesses. Based on the observation and interviews, most motorcyclist will not make a long contra flow travel, with an average maximum trip length about 100 meters.

## **Using Pedestrian Facilities**

When the traffic is congested, some motorcyclist use pedestrian facilities available as additional lanes. This violation often occurred on arterial roads which have wide pedestrian walkways. The government has taken some measures by placing motorcycle trap on some location. However, since the width of motorcycles is not much different from the average width of people, this trap can be passed by motorcycles, although the speed of the motorcycles must be reduced.

Other violations that often occurred on pedestrian facilities are contra flow movements and using pedestrian bridge as a U-Turn shortcut. This violation type is very disturbing and endanger the pedestrian.

## **Overload**

Sometimes motorcyclists use their motorcycle as tools to transport goods and people while ignoring the capacity of the motorcycle used. Some motorcyclists bring goods that much higher than the riders or much wider than the motorcycle. Very often motorcycles carry more than two persons, including children.

## **Illegal Public Transport**

When the economic condition is bad, motorcycle can be used as a public transportation vehicle, which generate additional income for families. Such motorcycles are called *ojek* and operated without any specific licenses. This *ojek* service grows particularly in residential areas.

## **MEASURES CONCEPTS**

### **Existing Policies for Motorcycles**

Large number of motorcycle requires some special policies. Until 2009, there were policies which control road users including motorcycle, based on Law No. 14/1992 of Traffic and Road Transport. Further, the Government Regulation No. 43/1993 of Infrastructure and Traffic, Article No. 61, stating that “*On the road with two or more lanes, slower vehicle should take the most left lane*”. The Government Regulation No. 44/1993 of Vehicles and Drivers, Article No. 217, regulates the driving license procedure and requirement. It stated that the minimum age for the people to have Driving License type C (for motorcycle) is 16 years.

In 2006, a new policy took place in Jakarta. Based on this policy, “*the motorcycle must use the leftmost lane and turn the main light at all time.*” This policy has a purpose to increase the safety of the motorcyclist. However, lack of enforcement makes this policy unsuccessful.

In early 2009, the Traffic Police held *Gerakan Bersama Tertib Lalulintas (Geber Lalin)* operation in Jakarta. The main purpose of this operation is to enforce the motorcyclist to use a standard helmet.

In 2009, a new Law No. 22/2009 of Traffic and Road Transport took effect, replacing the Law No. 14/1992. There is some changes on motorcycle regulation in this Law, including the change on age requirement to get a motor cycle driving license, from 16 years to 17 years (Article No. 81).

The latest policy issued by the government is the Government Regulation No. 44/2009. Based on this regulation, motorcycles are allowed to use toll roads as long as motorcycles exclusive lanes are provided. However, there is concern that this regulation will be used for justification convert some existing lanes on toll roads to motorcycle lanes since additional revenue could be collected from large population of motorcycles.

### Road User Perception on Motorcycle

To get better understanding about the current trend of motorcycles, an interview survey was conducted to road users (Pamintori Cipta, 2008). The samples of road users were chosen using random stratified method. The Characteristics of the sample are presented in Table 3.

**Table 3** Sample Characteristics

Road User Type	Age							Sex	
	< 17 yrs	17-22 yrs	23-30 yrs	31-40 yrs	40-50 yrs	50-60 yrs	>60 yrs	Male	Female
Car User	0%	0%	5%	41%	54%	0%	0%	82%	18%
Motorcycle User	2%	13%	50%	24%	8%	1%	0%	93%	7%
Public Transport User	0%	12%	29%	52%	5%	2%	0%	63%	37%

The questionnaires consists of questions related to motorcycles issues, such as advantages of motorcycle compared to other mode, reasons for using motorcycles, environmental, violation, and policies for motorcycles. The results of this survey show that travel time is one of the main reasons why people chose motorcycles and the operation cost of motorcycle is cheaper compared to those of other modes.

### Traffic Management Measures

Basically, there are two types of traffic management measures to control motorcycles. One is to optimize supplies and the other is to control demands. Current popular measure which optimizes supplies is providing exclusive lanes for motorcycles. The purpose of providing motorcycle lanes is to ease additional conflict caused by maneuver movement of motorcycles and to increase the safety of motorcycles users.

The first country to apply motorcycle lanes is Malaysia (November 1993). Based on Law and Sohadi (2005), there are two types of motorcycle lanes, one is exclusive lane and the other is inclusive lane. The exclusive lane is a lane that completely separated from mixed traffic lane including those in junctions, while inclusive lane is a lane provided on

the left most of mixed traffic road, usually in the form of paved shoulder. Law and Sohadi also found that recommended safe width for motorcycle exclusive lane is 3.81 meter.



**Left:** Exclusive Lane

**Right:** Inclusive Lane

**Sources:** Law and Radin Sohadi (2005)

**Figure 3** Motorcycle Lanes in Malaysia

Motorcycle lanes were applied in Jakarta in the late 2006. In December 2006, Metro Jaya Regional Police, in cooperation with Transport Agency, conducted a campaign program for motorcycles to move on the leftmost lanes and turn on the light. The fines for motorcyclists who violate the rule is applied starting in January 2007. However, this program did not last long. In mid 2007, many motorcycles traveled on the middle lane or even in the rightmost lane.



**Left:** Illustration of Motorcycle Lanes

**Right:** Existing condition

**Sources:** PT Pamintori Cipta (2008)

**Figure 4** Concept of Motorcycle Lanes in Sudirman Arterial Road

The left picture of Figure 4 shows the illustration of motorcycle lanes in Sudirman Arterial Road, Jakarta, and the right picture shows the actual traffic condition on the slow lanes, especially on peak hours. Large public transport demand that caused many and frequent stops on slow lanes made it impossible to convert leftmost lane to be motorcycle lane. Moreover, providing exclusive motorcycle lanes will encourage road users to shift to motorcycle users since it is cheaper, faster, and more comfortable (if motorcycle lanes is

provided). On the contrary, measures that control demand are expected to reduce the comfort of using motorcycles. Some measures that have been used in foreign countries are shown in Table 4. If those measures are to be implemented in Jakarta, then the quality and quantity of public transport should be greatly increased first, so that motorcyclists would have alternative modes similar or even better quality than motorcycles.

**Table 4** Motorcycle Measures in Foreign Countries

City/State /Country	Control Measures for Motorcycles	Main Reason
California	Restrict on 2 phase motorcycle Conversion on off road motorcycle	Air Quality
Vietnam	Import Quota	Trade Deficit
Chicago	Restriction on Scooter	Safety and Air Quality
	Total Restriction on 2012	
Philippines	Restriction on Toll Road	
Taiwan	Restriction on Motorcycle under 150 cc Motorcycle priority and Exclusive lane	
Uzbekistan	Restriction on Motorcycle to enter City Center	Safety, Security
Yemen	Total Restriction on 2005	Safety, Security

### Other Measures

Aside from engineering and management aspects, measures on social engineering should be implemented. In fact, this aspect is the most important aspect because motorcycle problems are resulted from bad driving behaviors. Putranto et. al. (2006) found a correlation between age groups and safe driving. It was found that younger age group is more careless and tend to violate the rule than the older age group.

The other concern is the knowledge of traffic rules. About 89% of motorcyclists do not know the regulation completely, because they did not follow the right procedures to get driving license. For this reason, there is a need training program for safe driving needs and the right procedure to own driving license should be tighten up.

### CONCLUSIONS

High number of motorcycles leads to large number of traffic violation and high traffic accident rate. These conditions are caused by the failure of the government to provide public transport that is cheaper, faster, and more comfortable than motorcycles and



a policy of easy procedure for motorcycle industries to produce and sell motorcycles to the people who perceive that this mode is cheaper for them to travel.

This problem has been around for several years and come to a condition where no simple measures can be implemented to solve it. To limit the number of motorcycles, while not providing better public transport, is against the nation primary principles (*just and civilized humanity and social justice for all people of Indonesia*). Providing adequate public transport is not simply to convert motorcyclist back to use the public transport because private vehicles are more comfortable. In addition, social engineering and training or education program should be implemented for younger generation to improve traffic condition in Jakarta.

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## REFERENCES

- Komalasari, Evie. Tri Tjahjono, dan Ellen Tangkudung. 2009. "Tinjauan Sikap Masyarakat Pengguna Sepeda Motor di Dalam Mengutamakan Keselamatan Berlalulintas". *Simposium XI FSTPT*. Universitas Diponegoro. Semarang.
- Law, Teik Hua and Sohadi, Radin Umar. 2005. "Determination of Comfortable Safe Width in an Exclusive Motorcycle Lanes" . *Journal of EASTS vol 6 Pp 3372 – 3385*
- Mannering, Fred L and Grodsky, Lawrence L. 1995. "Statistical Analysis of Motorcyclists' Perceived Accident Risk" . *Accident Analysis and Prevention vol 27*. USA
- Pamintori Cipta. 2008. "*Kajian Kebijakan dan Strategi Manajemen Lalu Lintas Kendaraan Bermotor Roda Dua di Wilayah DKI Jakarta*". Presentation to Government of DKI Jakarta. Jakarta.
- Pemerintah Republik Indonesia. 1992. *Undang-Undang Nomor 14 Tahun 1992, tentang Lalulintas dan Angkutan Jalan*. Jakarta
- Pemerintah Republik Indonesia. 1993. *Peraturan Pemerintah Nomor 43 Tahun 1993, tentang Prasarana dan Lalulintas Jalan*. Jakarta.
- Pemerintah Republik Indonesia. 1993. *Peraturan Pemerintah Nomor 44 Tahun 1993, tentang Kendaraan dan Pengemudi*. Jakarta.
- Putranto, Leksmono S. et. al. 2006. "*Hubungan antara Perilaku Pengemudi Sepeda Motor pada Berbagai Keadaan Lalulintas Jalan Dengan Karakteristik Pengemudi, Kendaraan, dan Perjalanan*". Simposium IX FSTPT. Universitas Brawijaya Malang.
- Putranto, Leksmono S dan Kurniawan, Helmy. 2006. *Sebaran Posisi Sepeda Motor di Jalur Jalan pada Berbagai Kondisi Arus Lalu Linta*. Simposium FSTPT IX Universitas Brawijaya, Malang.
- Putranto, Leksmono S and Sucipto, Robby. 2007. *Red Light Violation by Motorcyclist at a Signalized Intersection in Jakarta*. Proceeding of the Eastern Asia Society for Transportation Studies, Vol.6.

- Republik Indonesia. 2009. *Undang-Undang Nomor tentang Lalulintas dan Angkutan Jalan*. Jakarta.
- Widyastuti, Hera. et. al. 2009. “Studi Prakiraan Beban Biaya Kecelakaan Bagi Pengguna Sepeda Motor”. *Simposium XI FSTPT*. Universitas Diponegoro. Semarang.