MOTORCYCLE

Summary

This factsheet summarizes some facts and figures to highlight important statistics and accident characteristics involving motorcycles in Malaysia. For many years, motorcycle has been the most preferable, convenient and affordable mode of transport. Figure 1 illustrates the number of motorcyclist fatalities compared to other road users in Malaysia. The trend for two decades shows motorcyclist has continued to outnumber other road users. Recent statistics (2009) showed that the ratio of other road users to motorcyclist fatalities is 1: 1.52. Table 1 describes some important motorcycle accident characteristics and statistics. In 2009, the number of registered motorcycles has reached almost nine million (accumulated figure). Assuming that 70% of the accumulative registered motorcycles are on the road, there are at least 6.2 million active motorcycles in the country. Out of them, 113,962 have been involved in road accidents, causing fatalities of 3,640 riders, and another 430 pillions. Most of the road accidents involving motorcycles occurred at straight roads, with no significant difference in the number of accidents during daytime and night time. Utilizing MROADS, with a focus on age, the dataset for 2009 was used. Based on the five point summary, median age for rider is 29, while pillion is 21 years old. For rider, the first quartile (25%) comes from riders aged 8 to 20 years old, whereas for pillions, the first 25% of the problem lies between ages 1 to 16 years old. A case study done in the district of Klang on motorcycle accident and land use interaction showed that more m-KSI (killed and seriously injured motorcycle accident) is observed at land use type that attract or generate traffic such as residential and industrial area. Klang has more than 50% of green area consisting of agriculture farms, forest and open spaces.

Key Findings on Motorcycle Fatalities:

- Biggest reduction 1986-1987 : 12%

- Biggest increment 1993-1994 : 22%

Last ten years trend

- Biggest increment 2007-2008 : 7%

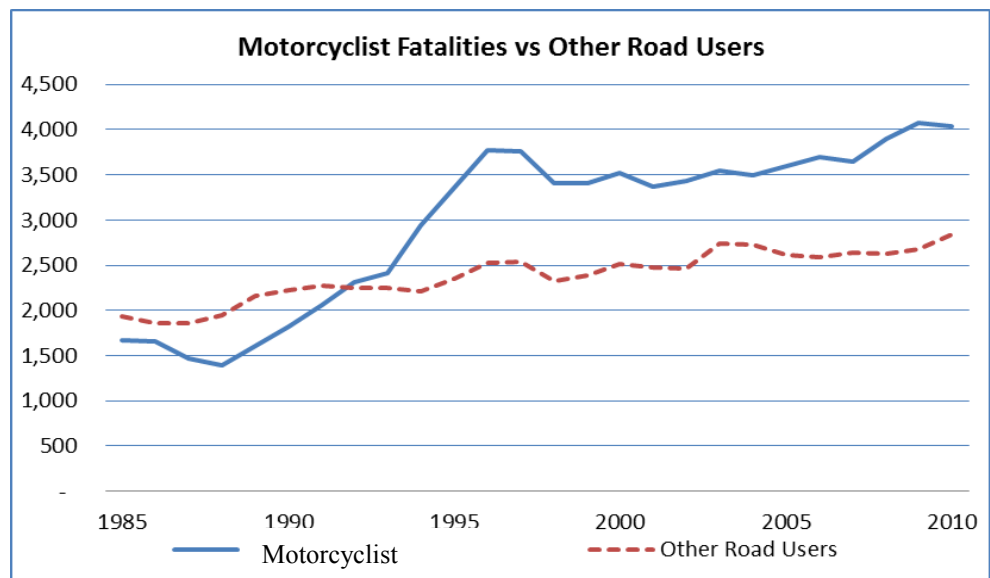- Biggest reduction 2000-2001 : 4%

- Average increment yearly : 2%

Figure 1: Motorcyclist Fatalities vs Other Road Users

Figure 1 above shows the trend analysis of motorcyclists and other road user's fatalities for the last thirty years. In the early 80's, up to year 1992, other road users fatalities is always more than motorcyclists. Motorcyclists' fatalities started with 1200 fatalities annually, while other road users have passed 2000 fatalities. A big jump was observed for motorcyclist, for three consecutive years; 1993-1994 (from 2,416 to 2,946), 1994 (2,946) - 1995 (3,362), and 1995 (3,362) - 1996 (3,778) with 22%, 12% and 14% increment respectively. Following the last ten year trend (2000-2010), the biggest jump was in 2007 (3,646) – 2008 (3,898), almost 7% increment, and the biggest reduction was in year 2000 (3,591) – 2001 (3,693), by 4%. Annually, the number of fatalities among motorcyclist has an average of 2% increment for the last ten years.

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Motorcycle Accidents Facts

Table 1: Motorcycle Accidents Fact

Years	New Registered Motorcycle (accumulative) (A)	No. of Motorcycle Accidents (B)	% (B/A)	No. of Rider Fatalities (C)	No. of Rider Casualties* (D)	% (C/D)	No. of Pillion Fatalities (E)	No. of Pillion Casualties* (F)	% (E/F)
2000	5, 356, 604	79,816	1.490	3,118	30,109	10.356	401	3,542	11.321
2001	5, 609, 351	85,761	1.529	2,971	30,348	9.790	398	3,279	12.138
2002	5, 842, 617	86,834	1.486	3,034	29,201	10.390	395	3,450	11.449
2003	6, 164, 958	95,545	1.550	3,166	30,832	10.269	382	3,416	11.183
2004	6, 572, 366	99,227	1.510	3,101	32,023	9.684	399	3,704	10.772
2005	7, 008, 051	97,072	1.385	3,181	27,445	11.590	410	3,777	10.855
2006	7, 458, 128	104,382	1.400	3,243	19,394	16.722	450	3,017	14.915
2007	7, 943, 364	111,958	1.409	3,197	18,151	17.613	449	3,124	14.373
2008	8, 487, 451	111,819	1.317	3,459	14,074	24.577	439	2,527	17.372
2009	8, 940, 230	113,962	1.275	3,640	13,561	26.842	430	2,250	19.111
2010	9, 441, 907	120,156	1.273	3,614	12,112	29.838	422	1,936	21.798

Source: PDRM road accident annual statistic reports
*including death

Each year, the number of registered motorcycles continue to grow rapidly, and each year at least 1% of them get involved in road accidents. The percentage is small, but the numbers are big enough to bring huge losses to the economic output of the country. Out of the 1% of motorcycle involved in road accidents, more than 10,000 riders and pillions are injured and killed every year. Recent statistics (2010) indicate the number of casualties is at least 14,000 including fatal cases. Generally, this shows that the number of casualties is actually decreasing.

Unfortunately, out of the total casualties, a bigger percentage of killed and seriously injured (KSI) pillions and riders have been observed for the same period. As seen from the chart (Figure 2), the proportion of fatalities, and seriously injured were small in the early year 2000, but the proportion gets bigger as the time approach 2010. From year 2000 to 2005, the KSI is only about 30% of total casualties. However, in the year 2006 to 2010, the proportion of KSI increases dramatically to more than 50% of total casualties in 2010.
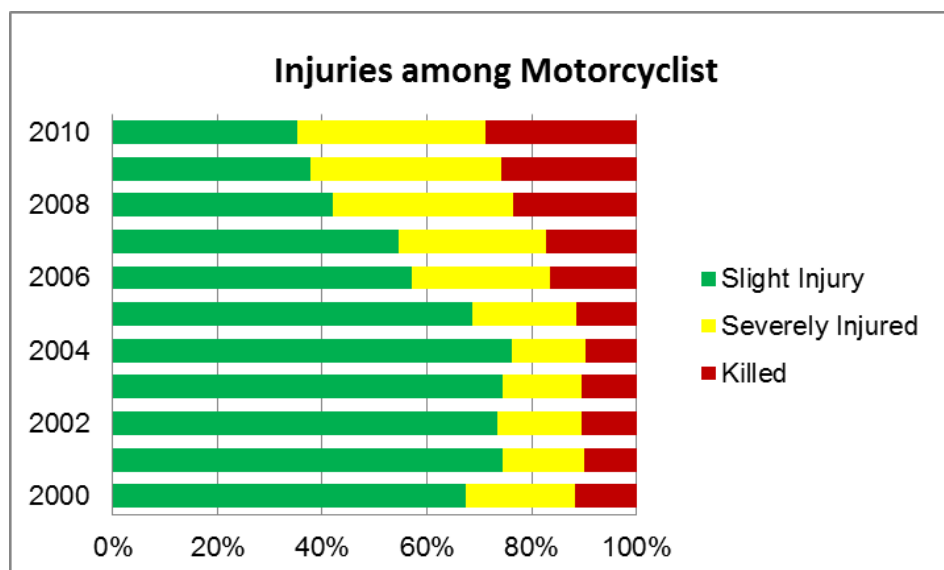

Figure 2: Motorcycle Accidents Fact

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Table 2: Motorcycle Accidents—Road Geometry and Time

Years	No. of Motorcyclist Accidents by Road Geometry				No. of Motorcycle Accidents by Hours	
	Straight	Bend	Cross Junction	T/Y Junction	Day (0601-1800)	Night (1801-0600)
2000	2415	652	195	490	1752	1589
2001	2107	578	201	458	1553	1503
2002	2123	550	190	483	1662	1492
2003	1994	472	156	422	1592	1517
2004	1939	462	163	385	574	528
2005	2295	544	167	463	1836	1679
2006	2121	468	351	430	1804	1611
2007	2392	528	173	494	1866	1749
2008	2607	591	181	556	2081	1882
2009	2930	558	192	444	1463	2728

Source: PDRM road accident annual statistic reports

Analyzing motorcycle road accidents by road geometry, the top four are straight road, curved road, T/Y junction and cross junction. More road accidents are recorded on straight roads compared to curved roads. Comparing road accidents at junctions, T/Y junctions have more frequent accidents compared to cross junctions. However, there is not much difference between the number of accidents that occurred during daytime compared to accidents that occurred during night time. Mann-Whitney U test (Z value = -0.605, p-value = 0.545 > 0.05) showed that there is no significant difference between the number of accidents that occurred during night time and daytime, even though the number of night time accidents are slightly higher than daytime.

Rider Fatalities—Age Characteristics

5 points of summary:

1. *Minimum – the lowest value*
2. *Maximum – the highest value*
3. *Median (middle point) – middle after being sorted from lowest to highest*
4. *First quartile (25% cut off) – number that splits the lowest 25% of the sample from the highest 75%*
5. *Third quartile (75% cut off)) – number that splits the lowest 75% of the sample from the highest 25%*

The five point summary is often neglected, as it does not appear frequently in scientific publications. However, it summarizes the data well and is easily understood.

For example, the above is the five point summary of the age of riders who were killed in road accidents in 2009.

Bear in mind that this figure is obtained from MROADS and is used as the sample. As reported by PDRM, total riders killed in 2009 are 3,640. Records available in MROADS used as the sample is 2,899 rider fatalities.

The mean age is 36 years old. However, this mean age is highly influenced by extreme values and does not serve as a good central tendency measure. Therefore, as a measure of central tendency, the median is used. Out of 2,899 who was killed as motorcycle rider, 25% of them are aged 20 and below. More over 50% of the rider who died on the road are aged 29 and below; of which 25% is contributed by riders aged 20 – 29.

Another 25% lies in a wider range of age (30-50 years old), while the last quartile are above 50 years old.

Statistics Rider (2009)		
age_rider		
N	Valid	2899
	Missing	0
Mean		36.01
Median		29.00
Std. Deviation		18.92
Range		87.00
Minimum		8.00
Maximum		95.00
Percentiles	25	20.00
	50	29.00
	75	50.00

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Pillion Fatalities—Age Characteristics

For pillions, there are 430 fatalities in 2009. 400 records were obtained from MROADS as the sample. The mean age of pillion is 28 years old. 50% of the pillion killed were aged 21 and below and this was indicated as the median value.

The first quartile (25%) are pillions aged 16 and below, and pillions aged 17-21 contributed to another 25% (second quartile). A wider range was observed for the third quartile (aged 22- 38 years old). The last 25% of pillion who were killed was above the age of 38. By using five point summary, it does give an insight of where the solution lies.

For example, if interventions are suited to focus on riders aged 21 years old and below, 50% of the problem can already be eliminated. It is different from looking just at frequencies by age group, because frequencies only tell us which age group has the highest and the lowest statistics without indicating the quartile. Repeating the same for a smaller group of road users will definitely give more insights and probably will result in a paradigm change.

Statistics Pillion (2009)		
age pillion		
N	Valid	400
	Missing	0
Mean		28.07
Median		21.50
Std. Deviation		18.16
Range		80.00
Minimum		1.00
Maximum		81.00
Percentiles	25	16.00
	50	21.50
	75	38.00

Land Use and Motorcycle Killed and Serious Injuries

SELANGOR				
YEARS	2006	2007	2008	2009
ACCIDENTS	16628	12710	17203	15637
FATALITIES	355	363	356	389

Figure 3: Land Use and Motorcycle Killed and Seriously Injuries *(m-KSI)*

Statistics from PDRM show that at least 15% of total motorcycle fatalities in the country occurred in Selangor, the most developed state after the capital city of Kuala Lumpur in 2006 until 2009.

Focusing on motorcyclists killed and seriously injured *(m-KSI)* in Selangor, for year 2007 and 2008, data illustrates the highest m-KSI is in the district of Klang, followed by Petaling Jaya.
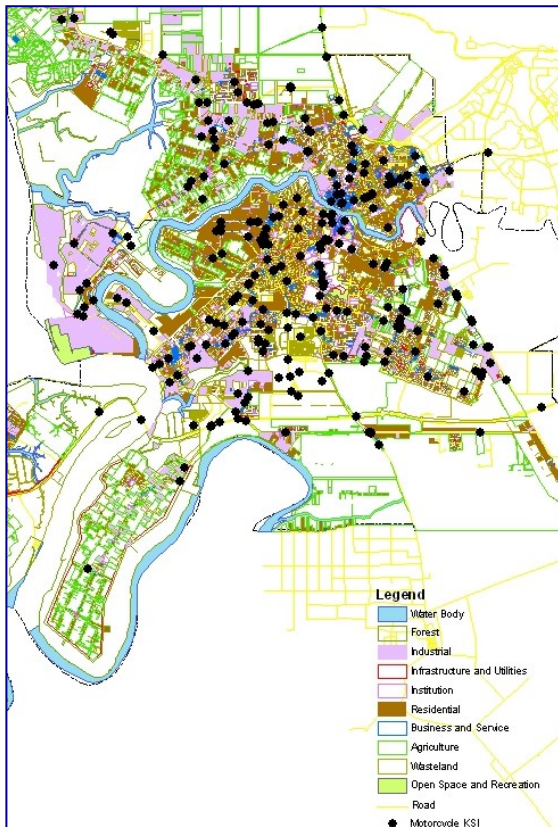
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Figure 4: Klang District *m-KSI*

Table 3: Selangor *m-KSI*

LOCATION	2007 m-KSI	LOCATION	2008 m-KSI
Klang	260	Klang	336
Petaling Jaya	242	Petaling Jaya	257
Selayang	156	Sabak Bernam	167
Sabak Bernam	147	Banting	162
K.Kubu Bahru	141	K.Kubu Bahru	118
Banting	138	Shah Alam	99
Shah Alam	110	Selayang	86

A case study in the district of Klang has been conducted to see the interaction of land use and motorcycle accidents. Results show that more m-KSI occurred at land use that attract or generate traffic such as residential and industrial areas. Residential areas have more m-KSI (32%), followed by industrial areas (19%), business and service areas (12%), institutional areas (9%), vacant lands (9%), agriculture (5%) and others (3%). Results also show a higher percentage of m-KSI (11%) was observed in a mixed land use area, such as residential areas which is located adjacent to school and industrial areas.

List of Publications

Assessment of Child Helmet Efficacy for Motorcycle Use in Malaysia
S.V Wong, H Azhar and A Yahaya .

Evaluation of Exclusive Motorcycle Lane (Emcl): A Preliminary Finding on Compliancy
Muhammad Marizwan bin Abdul Manan and Syed Tajul Malik bin Syed Tajul Arif

Fatal Motorcycle Crashes in Urban Area: A Review of Injury Severity and Crash Factor
Abdul Rahmat AM and Nurul Kharmila A MD

Identifying the Profile of High-Risk Motorists Among the Youth: Implications For Road Safety Campaigns in Malaysia
Yusof Ghani , Hasrina Mustafa, Adnan Hussein, Maslina Musa, Norliana Ali Haidzir, Kamaliah Siarap and Bong Wan Zhu

Land Use-Motorcycle Accidents Modelling: Methodology and Data Collection
Azzuhana Roslan, Rohayu Sarani, Sharifah Allyana Syed Mohd. Rahim, Jamilah Mohd. Marjan

Motorcycle Riders' Perspectives on Road Safety and Driving Institution Curriculum
Nizamuddin b. Zainuddin, Abdul Rahim b. Mohd. Saad, Norita bt. Deraman and Zahari Mohamad

Use of Instrumented Motorcycle to Study Riding Behaviours of Malaysian Novice Motorcyclists,
Mohd Khairul Alhapiz Ibrahim and Abdullah Sukardi (2011), European Journal of Scientific Research, Vol 49, No 4.

Disclaimer

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