

# **MMARAS**

**Metro Manila Accident Reporting and Analysis System**

Traffic Accident Report  
January to December 2009

Produced by the Road Safety Unit (RSU)  
Traffic and Transport Management Office (TTMO)  
Metropolitan Manila Development Authority (MMDA)

## **Introduction**

The Metro Manila Accident Reporting and Analysis System (MMARAS) is operated by the Road Safety Unit (RSU) of the MMDA-Traffic Operations Center (TOC), with the cooperation and assistance of the Traffic Enforcement Group under National Capital Regional Police Office (TEG-NCRPO) Philippine National Police (PNP).

The objective is to compile and maintain an ongoing database of 'Fatal' and 'Non Fatal' including the 'Damage to Property' road accidents, which can indicate areas where safety improvements need to be made. The system will also allow the impact of improvement measures to be monitored.

This report is intended to be a quarterly analysis of 'Fatal', "Non Fatal" and 'Damage to Property' road accidents that have been recorded by the PNP Traffic Accident Investigators for the year 2009. The information is presented in graphical and tabular form, which provides a readily identifiable pattern of accident locations and causation patterns. Annual comparisons of traffic accident statistics are also included in this report.

The Road Safety Unit currently has 9 data researchers who gather traffic accident data from different traffic offices and stations of the Traffic Enforcement Group (TEG-NCRPO) within Metro Manila. Previously, only those incidences involving Fatal and Non Fatal are gathered and encoded at the MMARAS database. But for the year 2005 up to present, we included the Damage to Property incidence so that we can see the significance and the real picture of what really is happening in our roads and also it gives us additional information in analyzing the causes of accident.

Although influx of traffic accident data increases tremendously, the Road Safety Unit managed to store this damage to property incidences to our MMARAS database and now included in the analysis for the formulation of remedial measures that would be introduced on the identified black spots.

The assistance and cooperation of the traffic investigators will be necessary to maintain an accurate record of the facts surrounding every traffic accident within Metro Manila, since a truly significant picture will only develop over time. The work of the Road Safety Unit will be crucial in providing an appropriate directional thrust in the fight to make the roads of Metro Manila a safer place for everyone.

The Metropolitan Road Safety Unit can be contacted for further information or assistance on Tel: 882-4151-57 loc. 297.

## Compilation of January to December Reports for the Year 2009

### Data Sources

Two data sources are available to the RSU:

- Individual report forms for each accident, gathered by Data Researchers Group of the RSU from different stations and Districts Offices of the Traffic Enforcement Group; and
- Clippings of road traffic accident from different newspapers and tabloids that is available at the office of the Public Affairs Service (PAS) of the MMDA.

We cut-off clippings of road traffic accident from different newspapers and tabloids for compilation of the same and reference for under reported incidences. However, only the first are entered into MMARAS, and only these provide the basis for the statistics presented in this report.

### Overall Statistics

**Table 1.** Shows the number of road accident reports gathered and compiled from January to December 2009, classified by month.

Month	Fatal	Non Fatal Injury	Damage	Grand Total
January	22	1155	4222	5399
February	23	912	3452	4387
March	26	1003	3683	4712
April	17	764	3662	4443
May	20	879	4578	5477
June	18	910	4647	5575
July	30	1024	5233	6287
August	25	1108	5253	6386
September	9	899	4919	5827
October	24	1114	5228	6366
November	17	1149	5045	6211
December	46	1372	5207	6625
<b>Grand Total</b>	<b>277</b>	<b>12,289</b>	<b>55,129</b>	<b>67,695</b>

**Table 2.** Shows the number of persons killed and injured in road accident for the months of January to December 2009.

	Central	Eastern	Northern	Southern	Western	Total Persons
Fatal	117	39	40	71	29	296
Non Fatal	4638	2589	2983	3949	831	14,990
<b>Total</b>	<b>4,755</b>	<b>2,628</b>	<b>3,023</b>	<b>4,020</b>	<b>860</b>	<b>15,286</b>

Note that a 'fatal' accident involves at least one person killed, while a 'non-fatal' accident at least one person injured but no fatalities.

**Table 3.** In terms of the number of accidents involved, by accident severity, this translates to:

	<b>Central</b>	<b>Eastern</b>	<b>Northern</b>	<b>Southern</b>	<b>Western</b>	<b>Total</b>
Fatal	114	36	39	61	27	266
Non Fatal	3781	2165	2387	3331	625	12,289
DTP	17536	10150	4855	19070	3518	55,129
<b>Total</b>	<b>21,431</b>	<b>12,351</b>	<b>7,281</b>	<b>22,462</b>	<b>4,170</b>	<b>67,695</b>

DTP – Damage to property

**Table 4.** Below indicates the distribution of accidents by cities and municipalities in Metro Manila from January – December 2009.

<b>City</b>	<b>Fatal</b>	<b>Non Fatal Injury</b>	<b>Damage</b>	<b>Grand Total</b>
Caloocan	18	980	2396	3,394
Las Piñas	13	629	2573	3,215
Makati	10	685	6259	6,954
Malabon	2	239	505	746
Mandaluyong	3	317	2568	2,888
<b>Manila</b>	<b>27</b>	<b>625</b>	<b>3518</b>	<b>4,170</b>
Marikina	23	1162	2111	3,296
Muntinlupa	5	665	2065	2,735
<b>Navotas</b>		<b>156</b>	<b>567</b>	<b>723</b>
Parañaque	12	446	3369	3,827
Pasay	15	396	2768	3,179
Pasig	8	423	3904	4,335
<b>Pateros</b>	<b>1</b>	<b>25</b>	<b>91</b>	<b>117</b>
<b>Quezon</b>	<b>114</b>	<b>3781</b>	<b>17536</b>	<b>21,431</b>
San Juan	2	263	1567	1,832
Taguig	5	485	1945	2,435
Valenzuela	19	1012	1387	2,418
<b>Grand Total</b>	<b>277</b>	<b>12,289</b>	<b>55,129</b>	<b>67,695</b>

On the table no. 4, the municipality of Pateros has the lowest number of incidences for the year 2009 from January to December, followed by Navotas. We can now consider these LGU's to be the safest in Metro Manila in terms of road traffic accident is concerned, since they have lesser recorded fatal and non-fatal incidences in the MMARAS database up to this date. This maybe attributed to the following:

- Small land area within NCR
- No major arterial road compared to other cities
- Not considered as a Central Business Districts (CBD's)
- Minimal road accidents, and/or
- Manageable traffic direction and control

On the other hand, the City of Quezon dominates all the cities and municipalities of Metro Manila in terms of fatal road traffic accident followed by City of Manila. This is because of the following several factors:

- Both are Central Business Districts (CBD's) with high social and economic activity.
- Quezon City has the biggest land area (166.2 sq. km.) among the cities in Metro Manila.
- It is noted that 5 on the 7 major thoroughfares such as EDSA, Commonwealth Ave., Quezon Ave., Roxas Blvd. and Radial Road 10 are located within these cities.

However, problems on road traffic accident in the entire Metropolitan Manila would be given preference by this agency in providing remedial measures on the "blackspots" or accident-prone areas. On this process, traffic accident might be reducing in the future.

## **Known deficiencies**

The concept of collecting traffic accident data was revised by tasking the personnel of the Metropolitan Road Safety Unit - Data Researchers Group to gather and copy all those traffic accidents happened in Metro Manila through the available records of every traffic stations instead of letting the Traffic Accident Investigator make their own traffic accident report and be submitted in this office. This new concept increases the statistics of collected road traffic accident data, especially for the year 2005, 2006, 2007, 2008 and now 2009.

Given the complex mechanism for collecting and gathering of road accident data in Metro Manila, and the relatively large number of Traffic Accident Investigators involved, it is inevitable that there will be some data that is missed from the database and these are those under reported incidences. At the present time, however, there is no firm evidence that large numbers of accidents are being omitted because copied data are based from the records on the log book of every traffic stations where traffic accidents (major or minor) have been logged.

## **Data Analysis**

### **Types of person involved**

The following tables give a breakdown of the number of persons involved in road accidents during the past year, categorized by:

- Drivers : person driving a mechanically propelled vehicle or riding a Pedal cycle
- Passengers : anyone carried-in or on a mechanically propelled vehicle
- Pedestrians : anyone traveling on foot.

### **Fatalities**

<b>District</b>	<b>Drivers Killed</b>	<b>Passengers Killed</b>	<b>Pedestrians Killed</b>	<b>Total Killed</b>
Central	37	14	66	117
Eastern	23	7	9	39
Northern	14	5	21	40
Southern	26	11	34	71
Western	14	5	10	29
<b>Total</b>	<b>114 (38.51%)</b>	<b>42 (14.19%)</b>	<b>140 (47.30%)</b>	<b>296 (100%)</b>

## Injuries

District	Drivers Injured	Passengers Injured	Pedestrians Injured	Total Injured
Central	1689	1545	1404	4,638
Eastern	1263	651	675	2,589
Northern	1114	731	1138	2,983
Southern	1187	1089	1673	3,949
Western	422	275	134	831
<b>Total</b>	<b>5,675 (37.86%)</b>	<b>4,291 (28.62%)</b>	<b>5,024 (33.52%)</b>	<b>14,990 (100%)</b>

A person involved in a road accident may indicate a driver, a passenger or a pedestrian. Of these types of persons involved, we have recorded 140 pedestrians (47.30%), 114 drivers (38.51%) and 42 passengers (14.19%) that have been killed in road accidents since January up to December 2009. Looking into persons injured, 5,675 (37.86%) are drivers, 4,291 (28.62%) passengers and 5,024 (33.52%) pedestrians. The relatively high proportion of driver's and pedestrians killed and injured is a cause for concern.

### Breakdown by time of day

The following table represents the frequency of incidents by time of day. However, there were a number of accidents this year that did not have the time of the incident recorded. These involved nine (9) fatal, three hundred and forty-five (345) non-fatal injury and one thousand-five hundred and sixty (1,560) damage to property accidents.

<b>Time Hour</b>	<b>Fatal</b>	<b>Non Fatal Injury</b>	<b>Damage</b>	<b>Grand Total</b>
0	15	241	729	985
1	16	360	1118	1,494
2	21	324	919	1,264
3	13	249	780	1,042
4	13	303	1131	1,447
5	11	357	1259	1,627
6	16	446	1792	2,254
7	8	649	2572	3,229
8	13	633	2891	3,537
9	8	594	3251	3,853
10	5	622	3732	4,359
11	13	652	3645	4,310
12	16	621	3160	3,797
13	10	477	2589	3,076
14	9	528	3297	3,834
15	7	595	3438	4,040
16	10	564	1263	2,856
17	8	618	2545	3,171
18	4	509	2189	2,702
19	11	545	2530	3,086
20	5	582	2263	2,850
21	13	546	2195	2,754
22	9	493	1765	2,267
23	14	436	1522	1,972
No Time Indicated	9	345	1560	1,914
<b>Grand Total</b>	<b>277</b>	<b>12,289</b>	<b>55,129</b>	<b>67,695 (100%)</b>
<b>Day-time (06:00-17:55)</b>	<b>123 (00.18%)</b>	<b>6,999 (10.34%)</b>	<b>34,175 (50.48%)</b>	<b>42,316 (61.00%)</b>
<b>Night-time (18:00 – 05:55)</b>	<b>154 (00.23%)</b>	<b>5,290 (7.82%)</b>	<b>20,954 (30.95%)</b>	<b>26,398 (39.00%)</b>

Overall, 26,398 or 39% of accidents occurred during the hours of darkness and without time indicated, while the 42,316 or 61% occurred during the daytime. But, it can be observed that most of the accidents occurred at daytime but fatal accidents are considered high during night-time and wee hours in the morning. Drivers, Passengers and Pedestrians are advised to be cautious and attentive during these particular hours.



## Breakdown of vehicle types involved in accidents

The classification of vehicle types within MMARAS is as follows:

- Cycle/Pedicab : human-powered vehicle
- Motorcycle : two-wheeled mechanically propelled Vehicle
- Motor Tricycle : three-wheeled passenger-carrying mechanically propelled vehicle
- Car : privately-owned mechanically propelled vehicle, which included all forms of 'Private use' small passenger-carrying vehicle.
- Jeepney/Taxi/Fx/Bus : mechanically-propelled vehicle which carries passengers on payment of a fee.
- Van : small vehicle for carrying goods
- Truck : large vehicle for carrying goods

The following table indicated the distribution of vehicles involved in accidents from Jan. to December 2009:

Vehicle Type	Fatal	% of Total	Non Fatal Injury	% of Total	Damage to Property	% of Total	Total No. of Vehicles
Cycle-Pedicab	15	3.95%	637	3.31%	445	0.41%	1,097
<b>Motorcycle</b>	<b>113</b>	<b>29.74%</b>	<b>7114</b>	<b>37.00%</b>	<b>7879</b>	<b>7.30%</b>	<b>15,106</b>
Motor Tricycle	9	2.37%	1175	6.11%	1972	1.83%	3,156
<b>Car</b>	<b>82</b>	<b>21.58%</b>	<b>4813</b>	<b>25.03%</b>	<b>57385</b>	<b>53.18%</b>	<b>62,280</b>
Jeepney	34	8.95%	1998	10.39%	8601	7.97%	10,633
Taxi / Fx	6	1.58%	902	4.69%	4851	4.50%	5,759
Bus	20	5.26%	504	2.62%	5255	4.87%	5,779
Van	33	8.68%	1079	5.61%	11358	10.53%	12,470
Truck	58	15.26%	680	3.54%	7076	6.56%	7,814
Train	-	-	-	-	7	0.01%	7
Kuliglig	-	-	2	0.01%	8	0.01%	10
Horse-drawn vehicle	-	-	1	0.01%	1	0.01%	2
Push Cart	-	-	2	0.01%	11	0.01%	13
Heavy Equipment	-	-	3	0.02%	1	0.01%	4
Unknown Vehicle	10	2.63%	316	1.64%	3064	2.84%	3,390
<b>TOTAL</b>	<b>380</b>	<b>100%</b>	<b>19,226</b>	<b>100%</b>	<b>107,914</b>	<b>100%</b>	<b>127,520</b>

On the table shown before this page, motorcycles have the highest fatality accident rate with 113 involved or 29.74% of the total fatal accidents, then followed by cars with 82 total or 21.58% respectively. For non fatal incidents, Motorcycles still have the highest rate with 7,114 or 37% share and followed by cars with 4,813 or 25.03%.

According to the statistics released by the LTO, the distributions of registered vehicles in Metro Manila are:

**Jan. to Oct. 2004**

<b>Motor cycle</b>	<b>Motor Tricycle</b>	<b>Car</b>	<b>Jeepney/ Taxi/FX</b>	<b>Bus</b>	<b>Truck/ Trailers</b>	<b>Total</b>
284,176	Included at MC	989,281	101,577	13,573	70,145	1,458,752
<b>19.5%</b>		67.8%	7.0%	0.9%	4.8%	100%

**Annual 2005**

<b>Motor cycle</b>	<b>Motor Tricycle</b>	<b>Car</b>	<b>Jeepney/ Taxi/FX</b>	<b>Bus</b>	<b>Truck/ Trailers</b>	<b>Total</b>
366,394	Included at MC	569,915	558,639	10,404	75,501	1,580,853
<b>23.18%</b>		36.05%	35.34%	0.65%	4.78%	100%

**Jan. to Aug. 2006**

<b>Motor cycle</b>	<b>Motor Tricycle</b>	<b>Car</b>	<b>Jeepney/ Taxi/FX</b>	<b>Bus</b>	<b>Truck/ Trailers</b>	<b>Total</b>
293,113	Included at MC	430,042	409,066	6,087	60,552	1,198,860
<b>24.45%</b>		<b>35.87%</b>	34.12%	0.51%	5.05%	100%

Accident maps

Maps indicating the location of all accidents during this year are not available because our software (Mapinfo) is already obsolete and it is very difficult to plot the accidents due to un-updated street name and landmarks. The maps will be updated and reproduced once the new GIS software (ArcGIS) will be provided and distributed by the Office of the General Manager for Planning of the MMDA to this Unit.

## Collision Type

**Table 1.** Shows the accident statistics by collision type.

<b>Collision Type</b>	<b>Fatal</b>	<b>Non Fatal</b>	<b>Damage</b>	<b>Total</b>
Angle Impact	-	97	1324	1,421
Head-On	-	17	44	61
<i>Hit and Run (regardless of what collision type)</i>	19	420	2498	2,937
<i>Hit Object (regardless of what object was being hit)</i>	9	98	749	856
Hit Parked Vehicle	-	12	589	601
Hit Pedestrian	110	4105	-	4,215
No Collision Stated (as based in the blotter book)	87	4814	39476	44,377
<i>Other</i>	10	142	161	313
Rear-end	1	99	1680	1,780
<i>Self-Accident</i>	23	315	510	848
Side Swipe	7	1475	5856	7,338
<b>Grand Total</b>	<b>266</b>	<b>11,594</b>	<b>52,887</b>	<b>64,747</b>

**Table 2.** Shows the breakdown of Hit and Run.

<b>Collision Type</b>	<b>Fatal</b>	<b>Non Fatal</b>	<b>Damage</b>	<b>Total</b>
Hit and Run (Angle Impact)	-	1	5	6
Hit and Run (Head-on)	-	-	1	1
Hit and Run (Hit parked vehicle)	-	-	132	132
Hit and Run (Hit Pedestrian)	11	182	-	193
Hit and Run (Hit Veh. + Hit Obj., Barrier-Steel)	-	-	1	1
Hit and Run (No Collision Stated)	7	228	2301	2536
Hit and Run (Other, Hit Veh. + Hit Ped.)	1	5	-	6
Hit and Run (Rear-end)	-	1	20	21
Hit and Run (Side Swipe)	-	3	38	41
<b>Grand Total</b>	<b>19</b>	<b>420</b>	<b>2,498</b>	<b>2,937</b>

**Continuation of Collision Type**

**Table 3.** Shows the breakdown of Hit object collisions.

<b>Collision Type</b>	<b>Fatal</b>	<b>Non Fatal</b>	<b>Damage</b>	<b>Total</b>
Hit object	4	45	320	369
Hit object (Barriers, e.g. concrete, plastic, steel)	1	9	102	112
Hit object (Billboards/Signboards/Signages)	1	1	11	13
Hit object (Cable Wires of PLDT, Meralco, etc.)	-	1	24	25
Hit object (Establishments, e.g. shops, stores, stalls, etc.)	-	1	6	7
Hit object (Fences/Walls, e.g. see-thru, concrete, etc.)	-	5	64	69
Hit object (Gates)	-	1	27	28
Hit object (House, Shanty, Barracks, and the like)	-	2	11	13
Hit object (Islands, e.g. center island, divider, pots and the like)	-	4	20	24
Hit object (Light/Lamp Posts and the like)	-	3	14	17
Hit object (Pavements, e.g. gutter, sidewalk, road)	1	3	10	14
Hit object (Plants/Trees and the like)	-	6	8	14
Hit object (Posts of PLDT, Meralco, MRT, e.g. concrete, steel, wood, other)	2	7	63	72
Hit object (Pumps, e.g. gas nozzle, fire hydrant, etc.)	-	-	9	9
Hit object (Railings, e.g. steel)	-	-	8	8
Hit object (Vertical Clearance)	-	-	8	8
Hit object (Waiting Shed)	-	-	4	4
Hit object (Two or More objects/structures being hit at a time, e.g. Cable Wire & Post, Barrier & Fence, etc.)	-	9	20	29
Hit object (Various Objects, e.g. Door, Glass Panel, Meterbase, Galvanized Iron, Pipe, Stair, Table, etc.)	-	1	20	21
<b>Grand Total</b>	<b>9</b>	<b>98</b>	<b>749</b>	<b>856</b>

**Continuation of Collision Type**

**Table 4.** Shows the breakdown of Other collision or combined collisions.

<b>Collision Type</b>	<b>Fatal</b>	<b>Non Fatal</b>	<b>Damage</b>	<b>Total</b>
Other		1	14	15
Other (Backing Collision)			27	27
Other (Caught in Flood)			18	18
Other (Chain/Multiple Collision)			4	4
Other (Fell on Open Manhole/Drainage/Excavation)			5	5
Other (Hit Animal Crossing)		3	2	5
Other (Hit by a Broken Glass)			1	1
Other (Hit by a Crashed Airplane)		1		1
Other (Hit by a Fallen Debris/Object)			8	8
Other (Hit by a Fallen Object + Hit Parked Vehicle)		1		1
Other (Hit by a Fallen Part of a Tree)			5	5
Other (Hit by a Piece of Wood)			2	2
Other (Hit Object + Hit Parked Vehicle)			4	4
Other (Hit Object + Hit Pedestrian)		7		7
Other (Hit Opened Door of Vehicle)			2	2
Other (Hit Vehicle + Hit Object)		5	8	13
Other (Hit Vehicle + Hit Pedestrian)	8	107		115
Other (Passenger Fell Down)	2	15		17
Other (Run Over an Excavation)			1	1
Other (Stoning or Any Object Throwing Incident)			47	47
Other (Two or More Collision at a Time)		2	13	15
<b>Grand Total</b>	<b>10</b>	<b>142</b>	<b>161</b>	<b>313</b>

**Table 5.** Shows the breakdown of Self-Accident.

<b>Collision Type</b>	<b>Fatal</b>	<b>Non Fatal</b>	<b>Damage</b>	<b>Total</b>
Self-Accident	22	307	506	835
Self-Accident (MC Fell to Pavement)	1	5	1	7
Self-Accident (Guttered)		3	1	4
Self-Accident (Overturned Vehicle)			2	2
<b>Grand Total</b>	<b>23</b>	<b>315</b>	<b>510</b>	<b>848</b>

## Accident Causations

Accident Factors	Fatal	Non Fatal	Damage	Grand Total
Human Error		1	5	6
Human Error (Alcohol suspected)		5	4	9
Human Error (Avoid Hitting Another Vehicle / Lost Control)		1	1	2
Human Error (Avoid Hitting Another Vehicle)		2	1	3
Human Error (Avoid Hitting Astray Animal)	1	1		2
Human Error (Backing Inattentively)		1	11	12
Human Error (Bad overtaking)		21	751	772
Human Error (Bad turning)		1	151	152
Human Error (Disobey sign or traffic lights)		27	267	294
Human Error (Illegal "U" turning)		1		1
Human Error (Inattentive / Too fast)	9	17	43	69
Human Error (Inattentive)	32	2353	80	2465
Human Error (Lost Control / Alcohol suspected)		1		1
Human Error (Lost Control / Fell to Sidewalk)			1	1
Human Error (Lost Control)		2	5	7
Human Error (Lost Control) - due to nearly hit by a truck		1		1
Human Error (Moving Backwards)		1	21	22
Human Error (Moving on Counterflow)		1	1	2
Human Error (Passenger of Veh-1 Step on the Accelerator Hitting Veh-2 to Veh-5)			1	1
Human Error (Tired / Asleep)		1	8	9
Human Error (Too close)	1	248	500	749
Human Error (Too fast / Too close)		27	242	269
Human Error (Too fast)	21	1501	2703	4225
Other (Flooded)			1	1
Other (Wet Road)		1	3	4
Vehicle Defect		1	1	2
Vehicle Defect (Lost Brake)		1	2	3
Vehicle Defect (Mechanical)			2	2
Vehicle Defect (Overheat)			1	1
No Accident Causation Indicated (based on blotter)	213	8072	50323	58608
<b>Grand Total</b>	<b>277</b>	<b>12,289</b>	<b>55,129</b>	<b>67,695</b>

### Top Five (5) Accident Causations

- (1) Too Fast
- (2) Inattentive
- (3) Bad overtaking
- (4) Too Close
- (5) Disobey Sign or Traffic Lights

MMDA has been coming up with solutions to solve the problem in Road Safety, almost all of the Authority's projects are geared towards Public Safety. Pedestrians facilities and signage's are designed to promote safety and convenience, Footbridges has been put up at major choke points where pedestrian volume is high, Sidewalk clearing operations intensified, geometric improvements at accident prone areas undertaken among others. Road Safety is a global concern, and the task to lessen the number of traffic accidents is a high objective but possible with the cooperation and support of the public.

## Accident Prone Stretches

Based on the MMARAS database, by means of cross table querying, there are also numbers of accidents prone stretches in every district. And these stretches are:

<b>District</b>	<b>Location</b>
<b>Northern</b>	
<b>Caloocan</b>	Quirino Highway; Rizal Avenue Extension
<b>Malabon</b>	C-4 Road; Gov. Pascual Ave.; M. H. Del Pilar St.; McArthur Highway
<b>Navotas</b>	Honorio Lopez Blvd., Radial Road 10; Gov. Pascual Ave.; M. Naval St.
<b>Valenzuela</b>	Maysan Road; McArthur Highway
<b>Southern</b>	
<b>Makati</b>	EDSA; Pres. Sergio Osmeña Highway; Buendia Ave.
<b>Las Piñas</b>	Alabang-Zapote Road; Real St.; Marcos Alvarez Ave.
<b>Muntinlupa</b>	West Service Road; National Highway: Alabang-Zapote Road
<b>Parañaque</b>	West Service Road; Roxas Blvd.; Ninoy Aquino Ave.; Dr. A. Santos Ave.
<b>Pasay</b>	EDSA; Buendia Ext.; Roxas Blvd.
<b>Taguig</b>	Carlos P. Garcia Ave. (C-5); M. L. Quezon St.; East Service Road
<b>Pateros</b>	M. Almeda St.; P. Herrera St.
<b>Eastern</b>	
<b>Marikina</b>	Marcos Highway; Sumulong Highway
<b>Mandaluyong</b>	EDSA; Shaw Blvd.
<b>Pasig</b>	Ortigas Ave.; E. Rodriguez Jr. Ave.; Marcos Highway; Julia Vargas
<b>San Juan</b>	Ortigas Ave.; EDSA; Santolan Road; P. Guevarra St.; N. Domingo St.
<b>Western</b>	
<b>Manila</b>	Pres. Sergio Osmeña Highway; Radial Road 10; Roxas Blvd.
<b>Central</b>	
<b>Quezon</b>	Commonwealth Ave.; EDSA; Quirino Highway; Quezon Ave.; Katipunan Ave.

Note:

There are still other accident-prone stretches aside from the above stated stretches.



## **SAFETY MEASURES**

1. Installation of “Pedestrian Footbridges” along Metro Manila’s major thoroughfares or major choke points wherein pedestrian volume is high.
2. Improvement of Sidewalks, to encourage pedestrian to pass thru.
3. Installation of various Traffic Facilities (gantry, signages, barriers, see-thru fence, etc.) to promote safety and convenience.
4. Application of “Lane Markings”, for both vehicles and pedestrians.
5. Installation of “Reflectorized Sash Stickers” on concrete barriers to be easily recognized by motorists especially during night time.
6. Installation of Steel Barriers along the sidewalks to separate vehicles from pedestrians.
7. Strict enforcement of road violations by the various Traffic Enforcement Units.

**Updated (April 29, 2011)**

**Source : Metro Manila Accident Reporting and Analysis System (MMARAS) Database  
RICHARD DOMINGO**