MMARAS

Metro **M**anila **A**ccident **R**ecording and **A**nalysis **S**ystem

Traffic Accident Report
January to December 2010

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 2010. 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 2010

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 2010, classified by month.

Month	Fatal	Non Fatal Injury	Damage	Grand Total
January	33	1266	4780	6,079
February	24	1309	4830	6,163
March	32	1296	5156	6,484
April	31	1185	4821	6,037
May	30	1164	5038	6,232
June	34	1120	4960	6,114
July	42	1298	5643	6,983
August	37	1356	5405	6,798
September	34	1246	5304	6,584
October	27	1299	5516	6,842
November	29	1406	5229	6,664
December	38	1478	5450	6,966
Grand Total	**391**	**15,423**	**62,132**	**77,946**
Ave. Accident Rate Per Day	**1.07 per day**	**42.25 per day**	**170.22 per day**	**213.54 per day**

Table 2. Shows the number of persons killed and injured in road accident for the months of January to December 2010.

	Central	Eastern	Northern	Southern	Western	Total Persons
Fatal	155	55	44	134	31	419
Non Fatal	6175	3145	2720	6205	987	19,232
Total	**6,330**	**3,200**	**2,764**	**6,339**	**1,018**	**19,651**

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:

	Central	Eastern	Northern	Southern	Western	Total
Fatal	144	49	41	126	31	391
Non Fatal	4797	2787	2139	4983	717	15,423
DTP	20578	12139	4713	20606	4096	62,132
Total	**25,519**	**14,975**	**6,893**	**25,715**	**4,844**	**77,946**

DTP – Damage to property

Table 4. Below indicates the distribution of accidents by cities and municipalities in Metro Manila from January – December 2010.

City	Fatal	Non Fatal Injury	Damage	Grand Total
Caloocan	27	1049	2429	3,505
Las Piñas	11	610	4395	5,016
Makati	27	1265	6301	7,593
Malabon	2	215	563	780
Mandaluyong	8	381	3102	3,491
Manila	**31**	**717**	**4096**	**4,844**
Marikina	25	1357	2353	3,735
Muntinlupa	15	919	2649	3,583
Navotas	**1**	**181**	**654**	**836**
Parañaque	21	839	3129	3,989
Pasay	22	528	3220	3,770
Pasig	13	837	5207	6,057
Pateros	**0**	**14**	**34**	**48**
Quezon	**144**	**4797**	**20578**	**25,519**
San Juan	3	212	1477	1,692
Taguig	30	808	2746	3,584
Valenzuela	11	694	1761	2,466
Grand Total	**391**	**15,423**	**62,132**	**77,946**

On the table no. 4, the municipality of Pateros has the lowest number of incidences for the year 2010 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, 2009 and now 2010.

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

District	Drivers Killed	Passengers Killed	Pedestrians Killed	Total Killed
Central	59	26	70	155
Eastern	30	8	17	55
Northern	21	9	14	44
Southern	59	19	56	134
Western	10	3	18	31
Total	**179 (42.72%)**	**65 (15.51%)**	**175 (41.77%)**	**419 (100%)**

Injuries

District	Drivers Injured	Passengers Injured	Pedestrians Injured	Total Injured
Central	2448	2146	1581	6,175
Eastern	1584	795	766	3,145
Northern	976	713	1031	2,720
Southern	2773	1577	1855	6,205
Western	463	374	150	987
Total	**8,244 (42.87%)**	**5,605 (29.14%)**	**5,383 (27.99%)**	**19,232 (100%)**

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 175 pedestrians (41.77%), 179 drivers (42.72%) and 65 passengers (15.51%) that have been killed in road accidents since January up to December 2010. Looking into persons injured, 8,244 (42.87%) are drivers, 5,605 (29.14%) passengers and 5,383 (27.99%) 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 fifteen (15) fatal, five hundred and forty-three (543) non-fatal injury and one thousand and three hundred and thirty-three (1,333) damage to property accidents.

Time Hour	Fatal	Non Fatal Injury	Damage	Grand Total
00:00-00:59	20	251	560	831
01:00-01:59	18	419	1134	1571
02:00-02:59	21	405	1104	1530
03:00-03:59	27	395	1000	1422
04:00-04:59	28	427	1337	1792
05:00-05:59	19	514	1485	2018
06:00-06:59	18	675	2103	2796
07:00-07:59	6	851	3046	3903
08:00-08-59	8	855	3421	4284
09:00-09:59	14	810	3517	4341
10:00-10:59	12	838	4340	5190
11:00-11:59	5	798	4299	5102
12:00-12:59	21	776	3605	4402
13:00-13:59	8	582	2917	3507
14:00-14:59	11	681	3619	4311
15:00-15:59	9	644	3726	4379
16:00-16:59	14	696	3165	3875
17:00-17:59	12	757	2782	3551
18:00-18:59	14	585	2436	3035
19:00-19:59	10	640	2934	3584
20:00-20:59	16	650	2,492	3158
21:00-21:59	19	603	2299	2921
22:00-22:59	21	515	1908	2444
23:00-23:59	25	513	1570	2108
No Time Indicated	15	543	1333	1891
Grand Total	**391**	**15,423**	**62,132**	**77,946 (100%)**
Day-time (06:00-17:55)	**138 (00.18%)**	**8,963 (11.50%)**	**40,540 (52.01%)**	**49,641 (63.69%)**
Night-time (18:00-05:55)	**253 (00.32%)**	**6,460 (08.29%)**	**21,592 (27.70%)**	**28,305 (36.31%)**

Overall, 28,305 or 36.31% of accidents occurred during the hours of darkness and without time indicated, while the 49,641 or 63.69% occurred during daytime. But, it can be observed that eventhough most of the accidents occurred at daytime, 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 by weather condition

Month	Fair Weather	Rainy Weather	Grand Total
January	6,079		6,079
February	6,163		6,163
March	6,484		6,484
April	6,037		6,037
May	6,232		6,232
June	6,112	2	6,114
July	6,966	17	6,983
August	6,762	36	6,798
September	6,456	128	6,584
October	6,707	135	6,842
November	6,581	83	6,664
December	6,915	51	6,966
Grand Total	**77,494**	**452**	**77,946**

Note:
Regardless of what severity

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 2010:

Vehicle Type	Fatal	% of Total	Non Fatal Injury	% of Total	Damage to Property	% of Total	Total No. of Vehicles
Cycle-Pedicab	23	4.06%	774	3.07%	441	0.36%	**1,238**
Motorcycle	***191***	***33.67%***	***9354***	***37.30%***	***8121***	***6.66%***	**17,666**
Motor Tricycle	18	3.17%	1353	5.39%	1850	1.52%	**3,221**
Car	***101***	***17.81%***	***6435***	***25.66%***	***66370***	***54.41%***	**72,906**
Jeepney	46	8.11%	2410	9.61%	8840	7.25%	**11,296**
Taxi / Fx	15	2.65%	1404	5.60%	6508	5.33%	**7,927**
Bus	40	7.05%	809	3.23%	6784	5.56%	**7,633**
Van	30	5.29%	1096	4.37%	10453	10.53%	**11,579**
Truck	79	13.93%	905	3.61%	8504	6.97%	**9,488**
Train	6	1.06%	7	0.03%	8	0.01%	**21**
Kuliglig	-	-	10	0.04%	27	0.02%	**37**
Horse-drawn vehicle	-	-	3	0.01%	5	0.01%	**8**
Push Cart	-	-	3	0.01%	16	0.01%	**19**
Heavy Equipment	1	0.18%	-	-	-	-	**1**
Unknown Vehicle	17	3.00%	513	2.04%	4056	2.84%	**4,586**
TOTAL	**567**	**100%**	**25,076**	**100%**	**121,983**	**100%**	**147,626**

On the table shown before this page, motorcycles have the highest fatality accident rate with 191 involved or 33.67% of the total fatal accidents, then followed by cars with 101 total or 17.81% respectively. For non fatal incidents, Motorcycles still have the highest rate with 9,354 or 37.30% share and followed by cars with 6,435 or 25.66%.

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

Jan. to Oct. 2004

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

Annual 2005

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

Jan. to Aug. 2006

Motor cycle	Motor Tricycle	Car	Jeepney/ Taxi/FX	Bus	Truck/ Trailers	Total
293,113	Included at MC	430,042	409,066	6,087	60,552	1,198,860
24.45%		**35.87%**	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.

Collision Type	Fatal	Non Fatal	Damage	Total
Angle Impact	-	210	957	1,167
Head-On	2	30	44	76
Hit and Run (regardless of what collision type)	*8*	*504*	*3,036*	*3,548*
Hit Object (regardless of what object was being hit)	*18*	*201*	*1,314*	*1,533*
Hit Parked Vehicle	2	16	563	581
Hit Pedestrian	157	4,587	N.A.	4,744
No Collision Stated (as based in the blotter book)	152	7,776	46,361	54,289
Other	*13*	*231*	*301*	*545*
Rear-end	3	171	3,214	3,388
Self-Accident	23	364	549	936
Side Swipe	13	1,333	5,793	7,139
Grand Total	**391**	**15,423**	**62,132**	**77,946**

Table 2. Shows the breakdown of Hit and Run.

Collision Type	Fatal	Non Fatal	Damage	Total
Hit and Run (Angle Impact)	-	2	21	23
Hit and Run (Head-on)	-	-	1	1
Hit and Run (Hit Parked Vehicle)	-	-	158	158
Hit and Run (Hit Pedestrian)	7	219	-	226
Hit and Run (No Collision Stated)	1	268	2,687	2,956
Hit and Run (Rear-end)	-	4	53	57
Hit and Run (Side Swipe)	-	11	113	124
Hit and Run (Side Swipe-Same Direction)	-	-	3	3
Grand Total	**8**	**504**	**3,036**	**3,548**

Continuation of Collision Type

Table 3. Shows the breakdown of Hit object collisions.

Collision Type	Fatal	Non Fatal	Damage	Total
Hit object	7	82	696	785
Hit object (Barriers, e.g. concrete, plastic, steel)	1	19	114	134
Hit object (Base)	-	1	2	3
Hit object (Beam)	-	-	2	2
Hit object (Billboards/Signboards/Signages)	-	4	20	24
Hit object (Bollards)	-	1	6	7
Hit object (Boulder)	-	-	1	1
Hit object (Cable Wires of PLDT, Meralco, etc.)	-	-	31	31
Hit object (Establishments, e.g. shops, stores, stalls, etc.)	1	4	14	19
Hit object (Fences/Walls, e.g. see-thru, concrete, etc.)	2	10	51	63
Hit object (Gates)	-	1	123	124
Hit object (House, Shanty, Barracks, and the like)	-	2	6	8
Hit object (In-Road, Pavement, Gutter, Sidewalk, Center Island, and the like)	4	27	51	82
Hit object (Light/Lamp Posts and the like)	-	3	25	28
Hit object (Plants/Trees and the like)	1	8	11	20
Hit object (Pole)	-	-	4	4
Hit object (Posts of PLDT, Meralco, MRT, e.g. concrete, steel, wood, other)	1	25	86	112
Hit object (Pumps, e.g. gas nozzle, fire hydrant, etc.)	-	-	5	5
Hit object (Railings, e.g. steel)	-	1	9	10
Hit object (Vertical Clearance)	-	-	-	0
Hit object (Waiting Shed)	-	1	2	3
Hit object (Two or More objects/structures being hit at a time, e.g. Cable Wire & Post, Barrier & Fence, etc.)	1	6	21	28
Hit object (Various Objects, e.g. Door, Glass Panel, Meterbase, Galvanized Iron, Pipe, Stair, Table, etc.)	-	6	34	40
Grand Total	**18**	**201**	**1,314**	**1,533**

Continuation of Collision Type

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

Collision Type	Fatal	Non Fatal	Damage	Total
Other	-	5	3	8
Other (a Car Runover a Piece of Stone and Hit the Passing Car)	-	-	1	1
Other (Backing Collision)	-	2	66	68
Other (Chain/Multiple Collision)	1	4	8	13
Other (Fell on Open Manhole/Drainage/Excavation)	-	2	4	6
Other (Fell to Pavement)	-	1	1	2
Other (Hit Stray Animal)	-	2	9	11
Other (Hit by a Fallen Debri/Object)	-	1	25	26
Other (Hit by a Fallen Part of a Tree)	-	-	2	2
Other (Hit by a Piece of Wood)	-	-	1	1
Other (Hit by an opened door of another vehicle)	-	-	1	1
Other (Hit Object + Hit Pedestrian)	-	4	-	4
Other (Hit Vehicle + Hit Object)	-	4	9	13
Other (Hit Vehicle + Hit Pedestrian)	10	193	N.A.	203
Other (Passenger Fell Down)	2	8	-	10
Other (PUJ Passenger Hit the Other Vehicle's Side Mirror by it's Elbow)	-	1	-	1
Other (ramp to a large chunk of stone)	-	-	1	1
Other (Stoning or Any Object Throwing Incident)	-	2	169	171
Other (Tire Exploded)	-	1	-	1
Other (Truck Fell on Erroded Soil)	-	1	-	1
Other (Windshield Suddenly Struck)	-	-	2	2
Grand Total	**13**	**231**	**302**	**546**

Table 4. Shows the breakdown of Side Swipe collisions.

Collision Type	Fatal	Non Fatal	Damage	Total
Side Swipe (No Stated Direction)	13	1,317	5,723	7,053
Side Swipe (Same Direction)	-	13	70	83
Side Swipe (Opposite Direction)	-	3	-	3
Grand Total	**13**	**1,333**	**5,793**	**7,139**

Accident Causations

Accident Factors	Fatal	Non Fatal	Damage	Grand Total
Human Error		37	55	92
Human Error (Alcohol suspected)	1	20	38	59
Human Error (Avoided Hitting Another Vehicle)		1	4	5
Human Error (Avoided Hitting Bicycle)		1		1
Human Error (Avoided Hitting Child)		1	1	2
Human Error (Avoided Hitting Pedestrian Crossing)		1	1	2
Human Error (Backing Inattentively)		1	7	8
Human Error (Bad overtaking)		3	26	29
Human Error (Bad turning)		3	20	23
Human Error (Bad turning-Illegal)		1		1
Human Error (Counterflow)		1		1
Human Error (Counterflow-Intentional)		1		1
Human Error (Disobey sign or traffic lights)		6	18	24
Human Error (Driver Error)	3	337	700	1,040
Human Error (Inattentive / Too fast)	4	41	3	48
Human Error (Inattentive)	32	1742	62	1,836
Human Error (Lost Control / Avoided Hitting Truck)			1	1
Human Error (Lost Control)		12	8	20
Human Error (Speeded-up)	1			1
Human Error (Sudden Stop)		2	1	3
Human Error (Tired / Asleep)			1	1
Human Error (Too close)	1	67	132	200
Human Error (Too fast / Too close)		1	13	14
Human Error (Too fast)	10	455	821	1,286
Other (Cut by a Taxi)			1	1
Other (Slippery Road)		4		4
Other (Tire Exploded)			1	1
Vehicle Defect (Lost Brake)		4	13	17
Vehicle Defect (Mechanical)			2	2
No Accident Causation Indicated (based on blotter)	339	12681	60203	73,223
Grand Total	**391**	**15,423**	**62,132**	**77,946**

Top Five (4) Accident Causations

(1) Inattentive
(2) Too fast
(3) Driver Error / Human Error
(4) Too Close

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:

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