

# ***Design and Development of MIROS Road Accident Analysis and Database System (M-ROADS)***

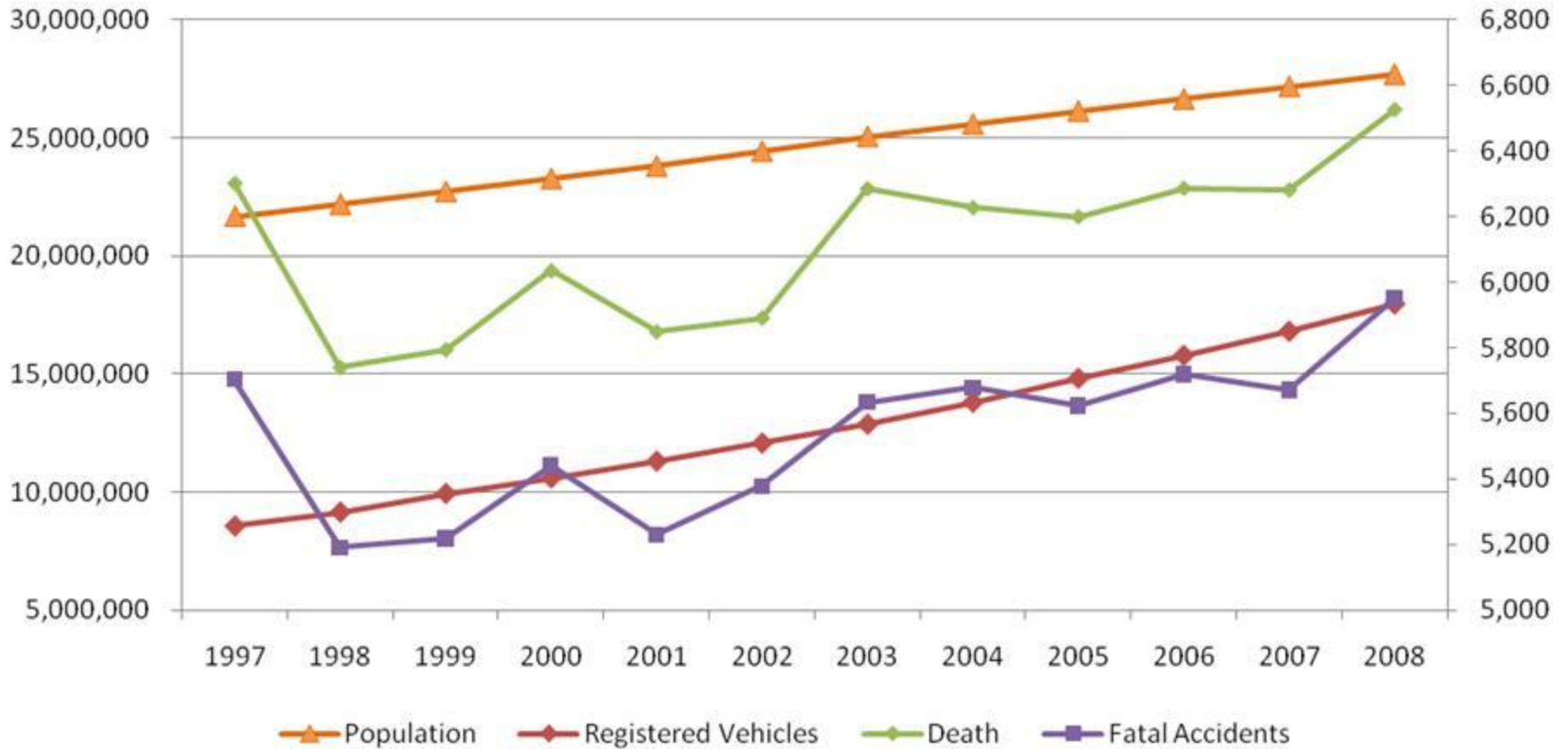


**Hizal Hanis Bin Hashim**

Accident Database System and Analysis Unit (ADSA)  
Road Safety Engineering and Environment Research Centre

# Situation in Malaysia

## Key Road Safety Trend



# ***Accident data collection***

- Accident data collected by traffic police
- Collection through Police Form 27 (POL.27)
- 91 variables are collected consisting information on:-
  - General accident information
  - Vehicle information
  - Driver information
  - Passenger information
  - Pedestrian information
  - Animal involved information
  - Location information



# ***Accident recording system***

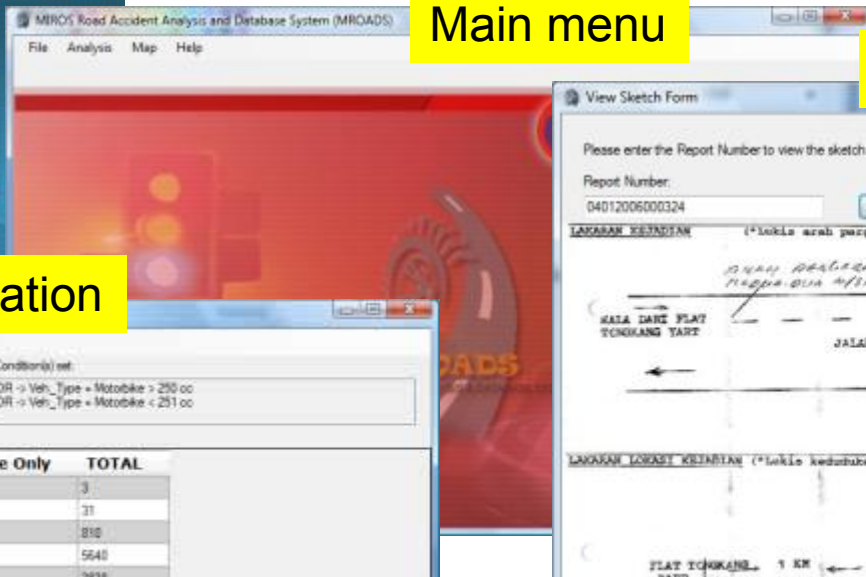
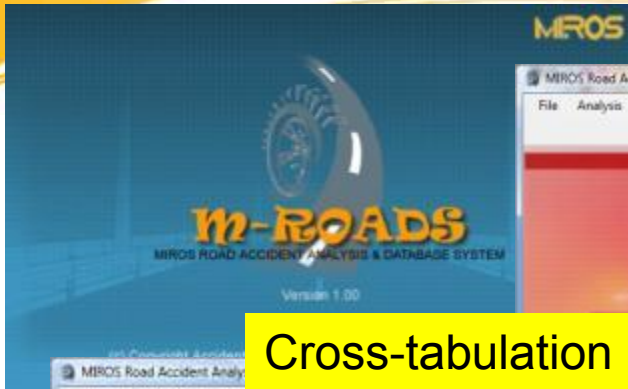
- 1991 – Microcomputer Accident Analysis Package (MAAP)
  - DOS-based
  - Capable of handling medium amount of records
  - Data management and cross-tabulation analysis
- 2006 till Present – Computerised Accident Reporting System (CARS)
  - Data management as well as personnel management
  - Limited variables for cross-tabulation analysis
  - District based and are not centralised

# *Objective and scope*

- To provide government and road safety stakeholders with accurate, continuous and comprehensive information on road crashes
- To increased understanding of the current road safety situation, to plan for appropriate responses and policy, and to evaluate the impact of current and future initiatives
- Only road accident data from RMP is included in the system development

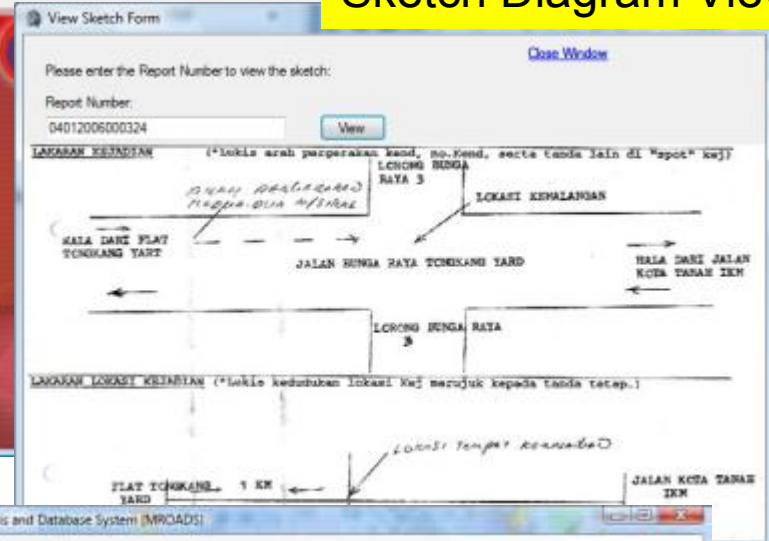
- M** Management (DB and user)
- R** Record maintenance
- O** Cross tabulation
- A** Accident location ranking
- D** Data converter
- S** Set condition

# Results



Main menu

Sketch Diagram View



Cross-tabulation

MIROS Road Accident Analysis and Database System (MROADS)

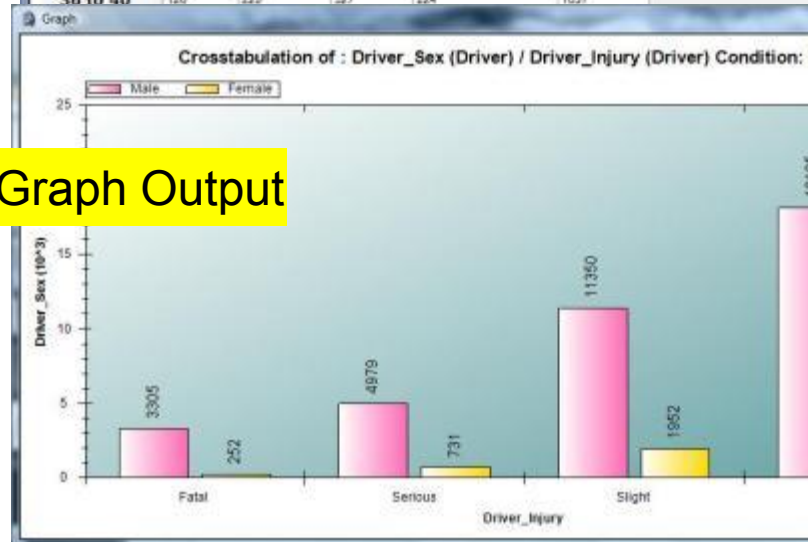
File Analysis Map Help

Crosstabulation

Crosstabulation of : Driver\_Age (Driver) / Driver\_Injury (Driver)

Condition(s) set:  
 OR -> Veh\_Type = Motorcycle > 250 cc  
 OR -> Veh\_Type = Motorcycle < 251 cc

	Fatal	Severe	Slight	Damage Only	TOTAL
1 to 5	0	2	1	3	
6 to 10	0	6	24	1	31
11 to 15	33	238	323	155	810
16 to 20	542	1270	2751	1077	5640
21 to 25	410	765	1936	725	3838
26 to 30	191	357	815	319	1692
31 to 35	133	225	555	227	1140
36 to 40	126	220	527	224	1097



Graph Output

MIROS Road Accident Analysis and Database System (MROADS)

File Analysis Map Help

Condition(s) set:  
 AND -> State = Perak

	Fatal	Hospitalize	Slight	Damage	State	Score
A0190	2	9	15	19	16	97
A0102	2	8	9	35	16	97
Z0011	17	13	31	725	16	941
Z1113	0	0	0	94	16	94
Z0018	0	3	19	43	16	93
Z010	0	0	2	5	16	9
A0179	0	1	0	5	16	9
Z0927	0	0	0	9	16	9
Z1909	0	0	0	9	16	9
A0167	1	0	1	1	16	9
Z0082	0	0	0	9	16	9
Z1203	1	0	0	3	16	9
09	0	1	0	5	16	9
Z0127	0	0	0	9	16	9
16	1	0	1	1	16	9
A0214	0	0	0	9	16	9
A0133	1	0	1	1	16	9
A180	0	0	1	7	16	9

Ranking

User maintenance

Add a new user :

Username : userA  
 Host : %  
 Password : \*\*\*\*\*  
 Retype password : \*\*\*\*\*

Resource Limits  
 Max Queries Per Hour : 0  
 Max Updates Per Hour : 0  
 Max Connections Per Hour : 0  
 Max User Connections : 0

Note: Setting these options to 0 (zero) removes the limit.

Data Structure Administration

Select  Create  Grant  
 Insert  Alter  Super  
 Update  Index  Process  
 Delete  Drop  Reload  
 File  Create temporary tables  Shutdown  
 Show Databases  
 Show view  Lock Tables  
 Create routine  References  
 Alter routine  Replication client  
 Execute  Replication slave  
 Create user

Buttons: Add, Clear, Cancel

# Results

Convert data

Upload data to database

Select database: accidentdata2006

Source file location:

C:\Users\Hizal\Documents\database bd\KLT\TV  
 C:\Users\Hizal\Documents\database bd\KLT\TV  
 C:\Users\Hizal\Documents\database bd\KLT\TV  
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 C:\Users\Hizal\Documents\database bd\KLT\TV

Buttons: OK, Cancel

Mapping by Google

Google Maps interface showing coordinates: **+1° 53' 40.03", +102° 45' 50.59"**

Search by address: [Empty]

Search by Malaysia

Find Address

Buttons: Web, Images, Maps, News, Shopping, Gmail, more

Buttons: Search Maps, Show settings

Buttons: Get Directions, My Maps

Buttons: Print, Send, Link

Buttons: More..., Map, Satellite, Terrain

Buttons: Get directions: To here - From here, Save to My Maps

Buttons: Add a new record to the database

Buttons: Cancel, OK

Convert to MS Excel

MIROS Road Accident Analysis and Database System (M-RADS)

2. Cross-tabulation of - State (General) / Accident\_Severity (General) with Condition: None

Results produced: 15/12/2008 11:52:42 AM from database: accidentdata2006

	Total	Series	Night	Damage Only	TOTAL
5 Labuan	8	20	26	160	314
6 Malak	477	696	2095	12254	13524
7 Perak	694	1067	2515	13117	15493
8 P.Pinang	361	389	1022	22767	12482
9 Kuala Lumpur	261	126	31	4583	4819
10 Selangor	596	1170	2317	7954	8207
11 N. Sembilan	307	594	1149	15184	17270
12 Melaka	221	141	563	9433	10761
13 Johor	540	690	1511	4918	4777
14 Pahang	434	361	707	11790	13228
15 Terengganu	275	447	609	3438	3619
16 Sabah	369	838	1337	4893	7598
17 Sabah	205	305	481	12735	13226
18 Sarawak	124	26	262	8128	8519
19 Perlis	49	207	135	647	1126
20 TOTAL	3794	7024	15299	29176	34613

Add New Record

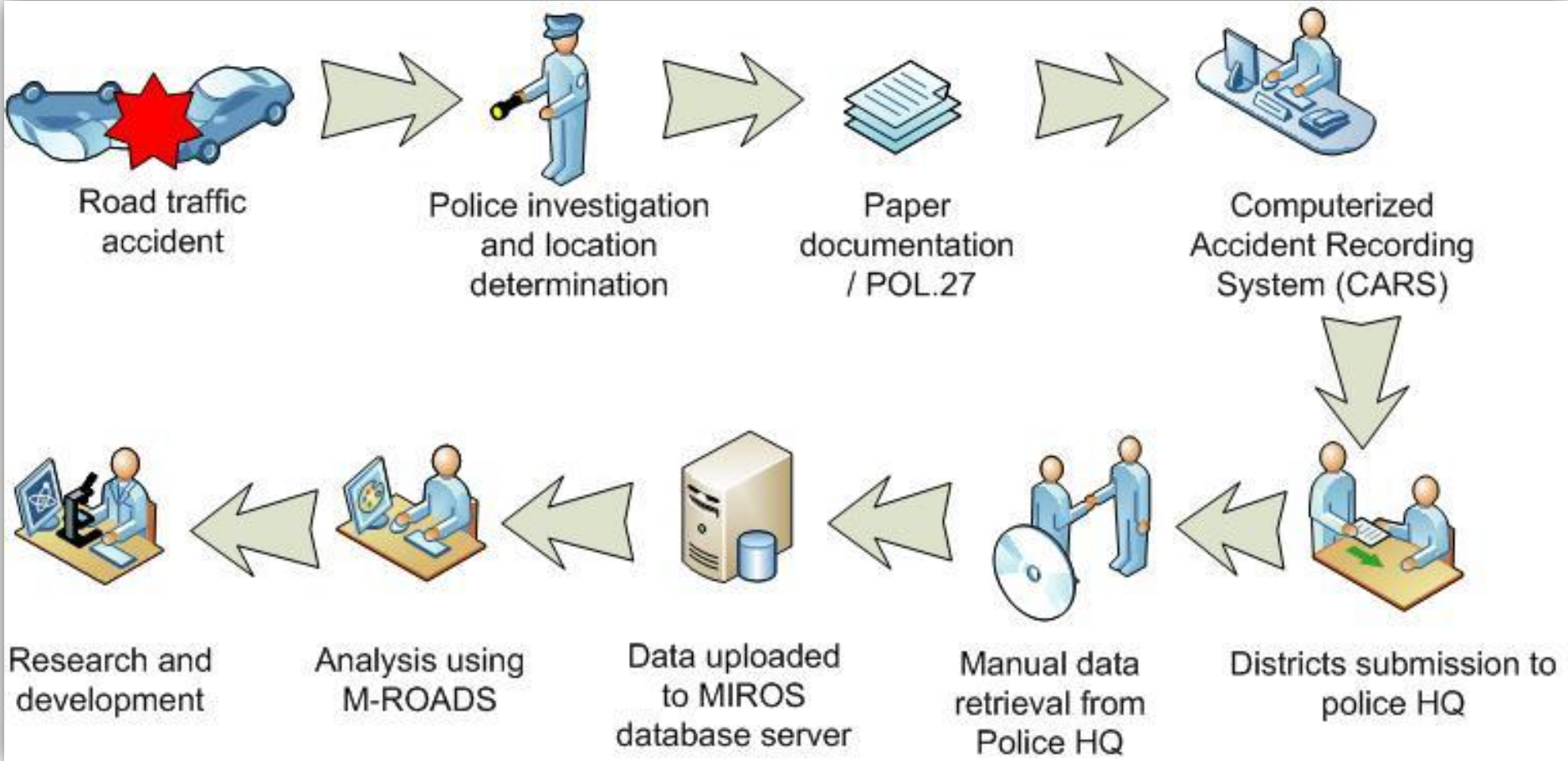
Add a new record to the database

Add New Record: 294

ReportNumber	Value
State	
District_Code	
Police_Station_Number	
Date	
Hour	
Day_OF_Week	
No_Veh_Involved	
No_Veh_Damaged	
No_Drivers_Killed	
No_Drivers_Injured	
No_Passengers_Killed	
No_Passengers_Injured	
No_Pedestrian_Killed	
No_Pedestrian_Injured	
Accident_Severity	
Road_Surface_Type	
Traffic_System	
Road_Geometry	
Quality_Of_Surface	
Road_Condition	
Lane_Marking	
Ill_Run	

Buttons: Add, Cancel

# M-ROADS Process Flow



# *Advantage of M-ROADS*

- Flexible data tabulation
  - All variables collected can be analysed
  - Specific condition
- Black-spot location ranking
  - District
  - Route no
  - Location
  - Coordinate
- Centralized database server
  - Record management

# *Application*

- Road safety target setting
- Hypothesis for road safety research
- Evidence for road safety intervention
- Road safety performance monitoring
- Statistics as requested by Ministers and MPs
- External data request
  - Government agencies
  - Private sector
  - Universities
  - International

# Application - MIROS



Intelligence-based policing by traffic enforcement



Automated Enforcement System (AES)



Community-based program (CBP)



Road safety education (RSE)

# ***Case study: Evidence-based Policing***

- Application of data in planning for enforcement strategy
- Introduced during capacity building course for enforcement personnel in March 2009
- Answers the basic fundamental questions
  - 5 W and 1 H

# 1. Who?

MiROS Road Accident Analysis and Database System (M-ROADS)

File Analysis Map Help

Crosstabulation

Crosstabulation of : Veh\_Type (All Road User) / Injury (All Road User)

Graph!

Condition(s) set:

None

	Fatal	Serious	Slight	Not Injured	TOTAL
Express Bus	18	50	196	252	516
Transit Bus	19	26	221	170	436
Factory Bus	13	7	24	80	124
Mini Bus	3	7	7	38	55
Tour Bus	18	44	29	54	145
School Bus	6	19	60	77	162
4 Wheel Drive	122	186	341	1014	1663
Special Duty	7	2	9	30	48
bullock cart	0	0	2	3	5
Trail	127	72	148	736	1084
Small lorry	30	111	203	753	1160
Motocar/Wagon	1139	1673	3944	12961	19717
Motorbike > 250 cc	2405	4816	10447	3821	21579
Motorbike < 251 cc	205	196	616	111	1128
Taxi	12	16	62	272	362
Trishaw	8	15	38	7	68
Van	114	200	431	906	1751
Rented car	0	0	0	3	3
Bicycle	169	227	588	84	1068
Rigid lorry	154	122	282	1157	1715
Unknown	0	0	0	0	0
* TOTAL	4722	7789	17652	22519	52682

# 2. Why?

MiROS Road Accident Analysis and Database System (M-ROADS)

File Analysis Map Help

Crosstabulation

Crosstabulation of : Collision\_Type (General) / Driver\_Injury (Driver)

Graph!

Condition(s) set:

OR -> Veh\_Type = Motorbike > 250 cc  
OR -> Veh\_Type = Motorbike < 251 cc

	Fatal	Serious	Slight	Not Injured	TOTAL
Head On	429	663	756	349	2197
Rear End	295	595	1370	472	2732
90 Degree	224	653	961	377	2215
Side	447	1254	3269	1138	6108
Side Swipe	198	443	1521	709	2871
Squeeze	8	7	33	13	61
Animal	55	48	229	36	368
Hit object on road	32	23	113	18	186
Hit object off road	32	17	28	15	92
Pedestrian	5	38	163	450	664
Roll Over	9	4	22	9	44
Out of Control	526	262	654	226	1668
Wind Screen Break	1	2	0	0	3
* TOTAL	2261	4049	9118	3816	19244

# 3. What?

MIROS Road Accident Analysis and Database System (M-ROADS)

File Analysis Map Help

Cross-tabulation: Driver\_Fat\_Of\_Body\_Injured (Driver) / Driver\_Injury (Driver)

Condition(s) set:  
OR -> Veh\_Type = Motorbike > 250 cc  
OR -> Veh\_Type = Motorbike < 251 cc

	Fatal	Serious	Slight	Not Injured	TOTAL
▶ Head	129	631	793	227	3030
Neck	111	71	110	22	314
Chest	197	130	177	42	546
Arms	10	601	1948	342	2898
Back	3	34	92	12	141
Hip	6	66	235	36	343
Legs	51	1784	3313	578	6696
Multi	340	637	1635	321	2833
None	18	110	348	1414	1891
• TOTAL	2115	4034	8649	2994	17792

# 4. How?



# 5. Where?

**MROADS** Rank by Location in District

Location	Route No	Frequency
JLN 16 ESTATE SG ERONG ULU BERNAM PERAK	0000	2
KAWASAN PASAR BESAR TK/INTAN.	0000	2
JALAN SUSUR KE JPJ BATU 5	0000	2
KAWASAN KEBUN SUNGAI NIPAH SELEKOH	0000	1
KAWASAN TAMAN PELANGI LANGKAP	0000	1
KM 16 JLN TELUK INTAN - CHENDERONG BALAI	A0016	2
KM 25 JALAN CHUI CHAK LANGKAP	A0120	6
KM 17.5 JALAN T/INTAN - SG LAMPAM	A0122	3
JALAN PADANG TEMBAK	A0147	2
KM 10 JALAN BAGAN DATOH	F0069	3
TANJUNG KERAMAT.	F0070	4
KM 4.5 JALAN KG BAHAGIA.	F0109	2
KM 12 JALAN TK INTAN-KG GAJAH	F0109	2
JALAN WOO SAIK HONG	Z0004	2

# 6. When?

**-Time**  
**-Day**

MIROS Road Accident Analysis and Database System (MROADS)

File Analysis Map Help

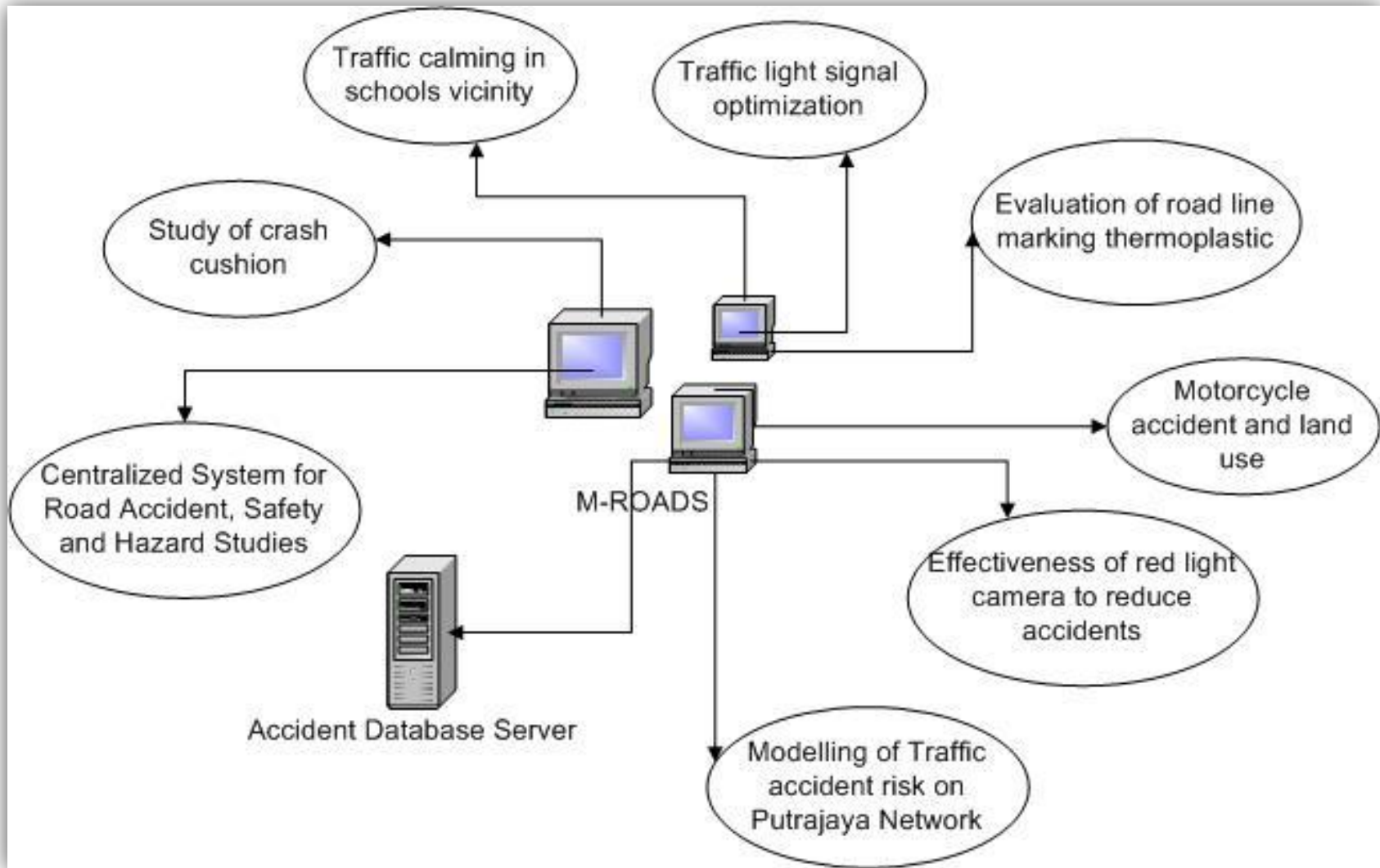
Crosstabulation: Condition(s) set:  
Crosstabulation of: - Hour (General) / Day\_Of\_Week (General)  
Condition(s) set:  
DDR -> Veh\_Type = Motorcycle > 250 cc  
DDR -> Veh\_Type = Motorcycle < 251 cc  
AND -> District\_Code = Hilir Perak

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	TOTAL
0001-0200	1	1	0	1	0	0	0	3
0201-0400	0	0	0	0	0	0	0	0
0401-0600	0	0	0	0	0	3	0	3
0601-0800	0	2	4	0	0	4	0	10
0801-1000	0	2	0	0	3	2	4	11
1001-1200	1	4	0	0	3	5	0	13
1201-1400	2	2	0	4	0	3	3	14
1401-1600	10	4	5	2	8	5	0	34
1601-1800	9	2	1	0	5	3	2	22
1801-2000	2	4	0	4	2	1	3	16
2001-2200	5	6	0	8	12	6	7	32
2201-2400	7	2	0	2	0	3	0	9
+ TOTAL	38	23	10	21	33	29	19	173

# *Case Study summary*

- What is the problem? – Motorcycle
- What is the issue? – Head injury
- How? – Helmet wearing enforcement
- Where to enforce? – Hilir Perak
- Where in Hilir Perak? - Before KM 25, Route A0120  
(refer to map)
- When to enforce?
  - Day – Sunday
  - Time to enforce – From 1400 to 1600

# Application - REER



# ***Achievement***

- Presented at 4<sup>th</sup> IRTAD Conference in Seoul, South Korea
- GRSP Level 3 Professional Development of Traffic Policing
- Presented in HUSM ICT Workshop
- Malaysian International Road Safety Exhibition (MIREX)
- Information and statistics retrieval to support request from various parties in timely manner

# *Future expansion*

Road Traffic Injury (RTI)  
data



Geographical data



Road engineering  
features

# Conclusion

*“Accident data can be used to serve as evidence for planning on road safety programmes and interventions”*

*“Accident data can be used to evaluate road safety situation in the country as well as for performance monitoring”*

# *Thank you*

Email: [hizalhanis@miros.gov.my](mailto:hizalhanis@miros.gov.my)

Phone: +603 – 8924 9200

Malaysian Institute of Road Safety Research (MIROS)