



# 6 Traffic Management

The goal of traffic management keep the traffic on freeways safe and smooth. The statistics of daily average traffic flows passing by toll stations in 2012 suggest a total number of 1,571,000 at an annual growth of 0.4%. When it comes to vehicle types, small vehicles take 84.2% at the highest rate. To secure safe and smooth traffic in peak hours, a number of traffic measures, both in software and in hardware, were implemented in 2012. The statistics and the improvement programs are as follows:

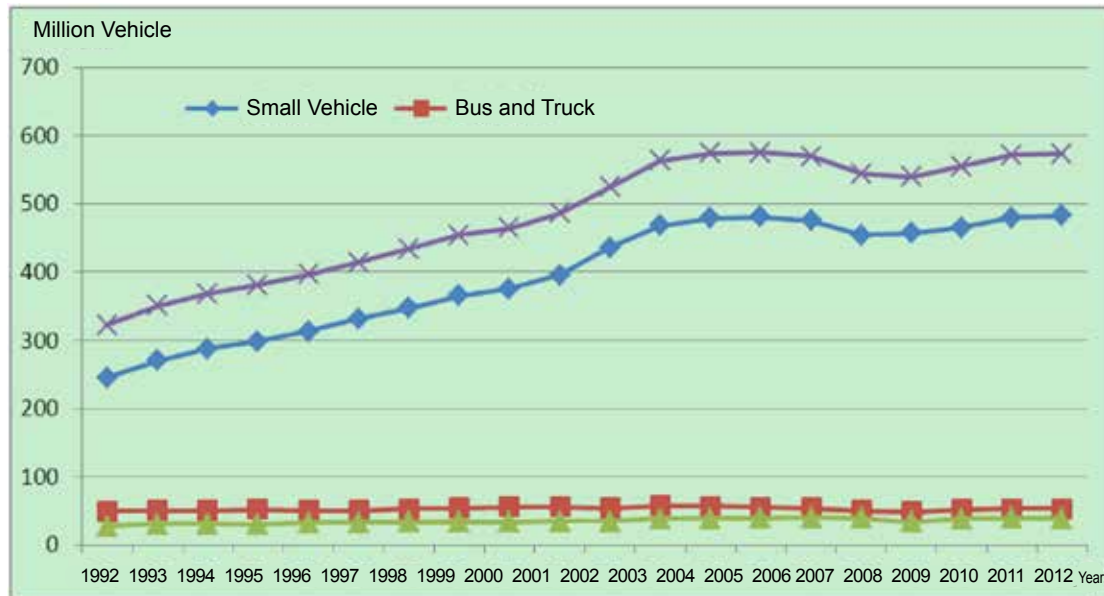
## 1 Historical Traffic Volume

### (1) 2011~2012 Toll Station Traffic Volume

Year	Small Vehicle	Bus and Truck	Tractor Trailer	Total	Annual Growth Rate	MVK
2011	479,549,205	52,564,731	39,114,848	571,228,784	2.91%	28,526.2
2012	482,796,538	52,561,510	38,153,839	573,511,887	0.40%	28,745.4
Total	962,345,743	105,126,241	77,268,687	1,144,740,671	1.67%	57,272



## (2) Historical Traffic Growth Chart



## (3) Million Vehicle-Kilometers (MVK)

As the freeway operations turn further computerized and the infrastructure becomes increasingly developed by 2010, the Million Vehicle-Kilometers estimated based on toll station traffic volume could be computed on section traffic flow data provided by vehicle detectors 2012 Million Vehicle-Kilometers data is given as follows:

Date	National Freeway No. 1	Xiwu Elevated Road	National Freeway No. 2	National Freeway No. 3	National Freeway No. 3A	National Freeway No. 4	National Freeway No. 5	National Freeway No. 6	National Freeway No. 8	National Freeway No. 10	Total
Jan. 2012	1380.3	45.9	56.6	956.8	9.6	22.1	77.4	34.2	15.8	55.2	2654.0
Feb. 2012	1239.3	43.0	56.6	795.9	9.2	19.9	71.5	31.1	13.9	48.4	2328.7
Mar. 2012	1300.1	47.1	63.0	826.8	10.2	21.1	70.9	29.8	14.8	51.1	2434.9
Apr. 2012	1246.2	44.6	61.1	789.3	9.5	20.0	72.6	30.0	14.2	47.5	2335.0
May 2012	1259.2	46.7	62.2	787.7	10.2	20.5	67.6	28.4	14.1	47.1	2343.5
Jun. 2012	1221.7	46.4	62.8	776.4	10.2	19.9	68.9	26.7	12.9	43.1	2289.0
Jul. 2012	1322.1	48.0	66.5	864.9	10.1	21.2	79.0	32.8	14.6	47.9	2507.1
Aug. 2012	1286.6	47.6	63.0	827.9	10.1	20.8	71.1	31.1	13.6	43.0	2414.8
Sep. 2012	1246.1	45.4	62.6	797.2	9.8	20.8	70.4	30.4	13.8	46.0	2342.6
Oct. 2012	1258.3	46.6	69.6	810.0	10.1	21.1	72.5	32.0	14.3	46.8	2381.4
Nov. 2012	1229.1	45.6	64.7	772.9	9.8	20.2	68.2	30.7	13.7	47.0	2301.7
Dec. 2012	1277.0	47.2	67.0	825.7	10.3	20.9	70.2	32.9	13.7	48.0	2412.8
2012 Total	15266.1	554.1	755.5	9831.2	119.3	248.5	860.4	370.2	169.3	571.0	28745.4

## 2 Traffic Accidents Analysis

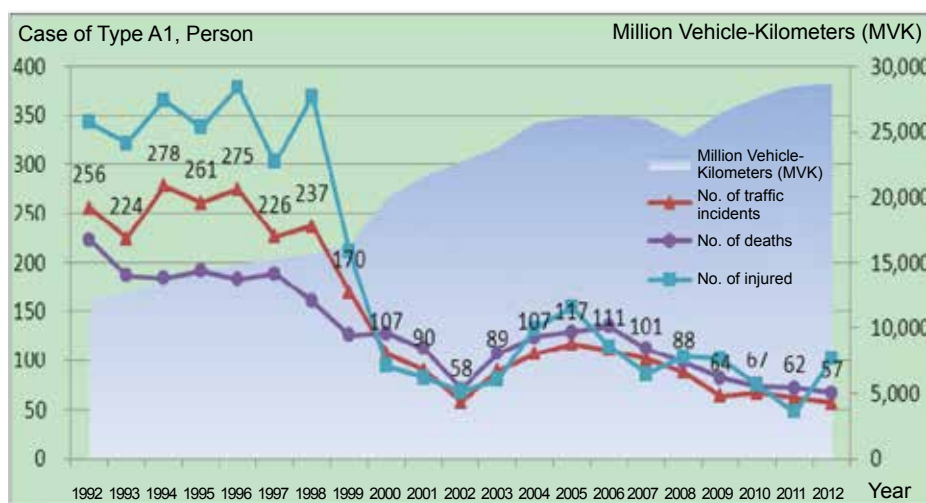
In 2012, there were 58 type A1 traffic accidents in all freeways in Taiwan that cause 68 people dead and 103 injured. The accident rate went at 0.0020 accidents per million vehicle-kilometers (MVK). The death rate was 0.0024 person per MVK and injury rate 0.0017 person per MVK.

According to the analysis of traffic accidents, compared with 2011, the year 2012 saw a decrease of 8.1% in the accident rate, a decrease of 6.9% in the Fatality rate and an increase of 117% in the injury rate. The top causes of traffic accidents were “improper lane-changing” or “Improper direction” accounted for 15 cases (26.3%), followed by “Did not pay attention to the front car” accounted for 13 cases (22.8%). The third is “No security measures adopted in case of mechanical defect” accounted for 7 cases (12.3%). In terms of the vehicle types, bus and tractor-trailer trucks accounted for a relatively high percentage of all accidents.

### (1) 2011~2012 Traffic Accident Statistical Table

Year	Million Vehicle-Kilometers (MVK)	No. of Accident	Accident Rate (Case/MVK)	Fatality (Persons)	Fatality Rate (Person/MVK)	Injury (Persons)	Injury Rate (Person/MVK)
2011	28,526	62	0.0022	72	0.0025	47	0.0016
2012	28,745	57	0.0020	67	0.0023	102	0.0035
Total (Average)	57,271	119	0.0021	139	0.0024	149	0.0026

### (2) Historical Traffic Volume Growth and Number of Type A1 Incidents Chart





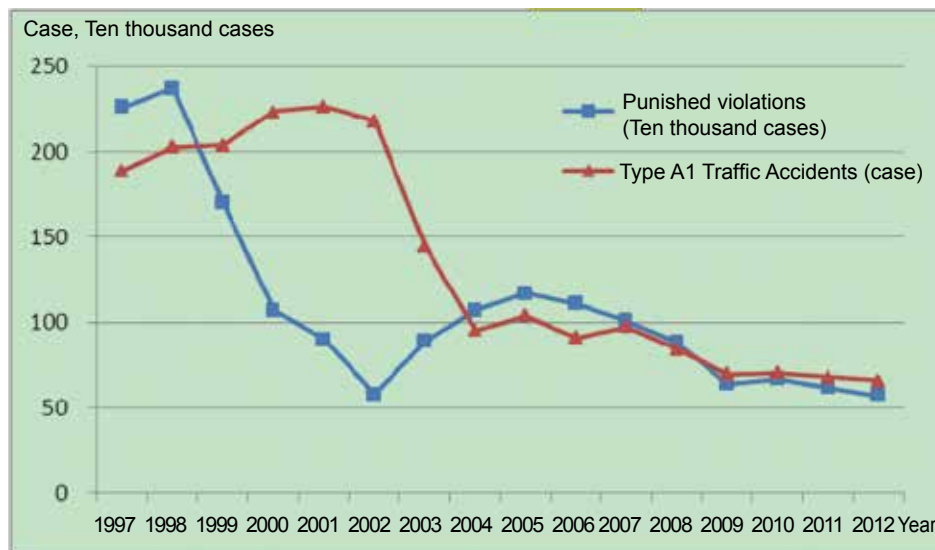
### (3) Cause of Type A1 Traffic Accidents Statistics 2011~2012

Year	Not Keeping a safe driving distance	Defective Tire or wheel off	Speeding	Improper lane-changing or improper direction	Did not pay attention to the front car	Improper Loading	Drunk-driving	Fatigue	Pedestrian Violation	Mechanical Defect	Other	Total
2011	4	6	4	9	9	0	5	1	1	6	17	62
2012	1	4	1	15	13	1	4	0	2	7	9	57
Total	5	10	5	24	22	1	9	1	3	13	26	119

### (4) 2011~2012 Vehicle Types in Type A1 Traffic Accidents Statistical Table

Year	Passenger Car	Light truck	Heavy truck	Tractor Trailer	Bus	Other	Total
2011	30	5	7	12	1	7	62
2012	26	10	3	8	5	5	57
Total	56	15	10	20	6	12	119

### (5) Historical Type A1 Traffic Accidents and punished violations Chart



## 3 Enlightening Measures for Traffic in Consecutive Holidays

### (1) Enlightening Measures for Traffic in Consecutive Holidays 2012

For the sake of smooth traffic on freeways during the 9-day Chinese New Year holidays from Saturday January 21 to Sunday January 29, 2012, ministry of transportation and communication has approved the Suspending toll collection, ramp metering control, High-occupancy vehicle (HOV) control and ramp closure while opening of road shoulders among other measures.

Another traffic-enlightening measure was introduced for the February 28, 2012 Peace Memorial Day holidays. The following table shows the traffic-enlightening programs implemented on different holidays:

Traffic-enlightening measures	Chinese New year holidays	Peace Memorial Day
Suspending toll collection	◎	◎
Ramp Metering Control	◎	◎
High-occupancy vehicle (HOV) Control	◎	—
Entrance Ramp closure	◎	—
Opening of Freeway Shoulders	◎	◎

Remarks: ◎ represents a measure implemented.

## (2) Hosting the “Taking the Taipei-Ilan Highway and Riding Buses for Valuable Prizes” to share the traffic load of National Freeway No. 5

The “Taking the Taipei-Ilan Highway and Riding Buses for Valuable Prizes” hosted for the 3<sup>rd</sup> and 5<sup>th</sup> day of the Chinese New Year holidays 2012 aimed to share the traffic on the National Freeway No. 5. by encouraging the public heading for and coming from Yilan to the buses on the national freeways or take the Provincial Highway No. 9 as an alternative. On February 10, 2012 and witnessed by lawyers, a total of 380 lucky winners were picked at TANFB. The prizes included 15 Tablet PCs, bus tickets for the National Freeway No.5, sauna tickets, discount coupons for highway buses, Traveling Taiwan tourist coupons as well as gift coupons for NT\$5,000, NT\$1,000 and NT\$500 among others.

More than 14,000 post cards were received for the Riding National Freeway Buses Campaign. The “Taking the Taipei-Ilan Highway and Riding Buses for Valuable Prizes” campaign shared some 10% of the northbound traffic flow on the National Freeway No. 5 during rush hours. The fact suggests the campaign did work in sharing the northbound traffic flow on the National Freeway No. 5. On the other hand, before and during the holidays, the campaign drew attention from the media, which made highlighted reports to further enhance the efforts waged by the government in improving its image of enlightening traffic on the National Freeway No. 5.



Take the Bei-Yi (Taipei-Ilan) highway -  
Lotteries issuance place



Publicity slips for the riding buses for  
prizes campaign



Take the Bei-Yi (Taipei-Ilan) highway -  
Lotteries recycling place



Public sweepstakes site

## 4 Improvement of congestion sections of National Freeway

### (1) Adding auxiliary lanes

For the 2-way sections between Donghu and Neihsu on the National Freeway No. 1, an additional lane is provided by regulating the traffic lanes and road shoulder widths. When ready in March 2012, There are remarkable improvements at average travel speed and traffic order on sections in rush hours.



National Freeway No. 1, Donghu Interchange southbound - Before construction



National Freeway No. 1, Donghu Interchange southbound - After construction



National Freeway No. 1, Donghu Interchange northbound - Before construction



National Freeway No. 1, Donghu Interchange northbound - After construction

## (2) Turning Single-Lane Entrance Ramps into Double-Lane Ones

The northbound traffic flow in the Wugu Interchange is contributed by the Xinzhuang and Wugu ramps as well as the Expressway No. 64 viaduct access road. Then the merged flow heads for the National Freeway No. 1 main lanes and the Xizhi-Wugu Elevated Road separately in rush hours on weekdays, the heavy traffic flow causes the congestions on ramps heading north. On July 20, 2012, the single lane on the Wugu ramp heading north to the Xizhi-Wugu Elevated Road was made into 2 lanes as a way to enlighten the traffic jam in rush hours for 1.5 hours.



Before construction



After construction

### (3) Opening of Road Shoulders

The road shoulders for north bound traffic between Puyan System Interchange and Changhua Interchange on National Freeway No. 1 was opened at 14:00~19:00 on Sundays. When the road shoulder is closed, the travel speed drops to under 40km/h forming jams. On May 26, 2012, the open time was extended by another hour, to 14:00~20:00. With the new hours, travel speed after 19:00 on Sundays goes up to over 60km/h.

On the other hand, to enlighten the traffic jams on certain sections, the northbound exit road shoulder at the Kuaiguan Interchange of National Freeway No. 3 was opened for small cars on December 10, 2012 as a way to enlighten the traffic flow. To further smoothen traffic, the National Freeway No. 1 Expressway south-bound road shoulder between Taoyuan Interchange and the Airport system Interchange was opened was opened from 10~14 and 16~19 to 10~19 daily since December 28, 2012.

**National Freeway No. 1, Puyan System Interchange to Changhua Interchange northbound**



Before adjustment



After adjustment



## National Freeway No. 3, northbound Kuaiguan exit-ramp



### 5 Traffic Works

#### (1) Trial Mileage Signboards for CMS, RGS and TTS Gantries

For immediate judgments of locations of traffic updates and the distance from CMS when reading down stream updates displayed on CMS on national freeway mainlines, signboards were installed on CMS, RGS and TTS gantries by our bureau on June 4, 2012 to provide information on gantry locations. It has been well received by the public.



CMS gantry pilot situation



RGS gantry pilot situation



TTS gantry pilot situation



## 6 Encouraging HOV and Mass Transport

### (1) HOV Control for the National Freeway No. 5 Northbound

Effective September 16, 2012, the HOV control was implemented regularly between 14:00~20:00 hours on Sundays at the northbound entrances to the interchanges at Toucheng, Yilan, Luodong and Suao. Results suggest that the practice has effectively diverted the rush hour traffic (14:00~20:00) to 11:00~14:00 and 20:00~23:00, as average travel speed in the Hsuehshan Tunnel during the hours grows from 40km/h to 55km/h and more. Average jam at the entrances to the interchanges are reduced to about 500m and travel time between the local roads before entering into the interchanges to the Nangang System Interchange drops by more than 30 minutes.



Yilan Interchange check the number of the case



New graphical logo

### (2) Buses Allowed to Travel in Priority at the Southbound Entrance to Shiding on National Freeway No. 5

Effective July 21, 2012, a lane was opened for buses at the southbound entrance to Shiding interchange on National Freeway No. 5. On holidays, it may connect the main-line road shoulders and the climbing lanes for buses, making the practice a priority lane for buses. Surveys suggest that travel time for buses is 30 minutes less (50%) than that of small cars. The practice may, in addition to encouraging mass transport, serve as an alternative and environmental access which saves money, physical effort and energy for people going to and from Yilan.



Exclusive lane for buses



Bus lane and regular lane

## 7 Revising Legislation

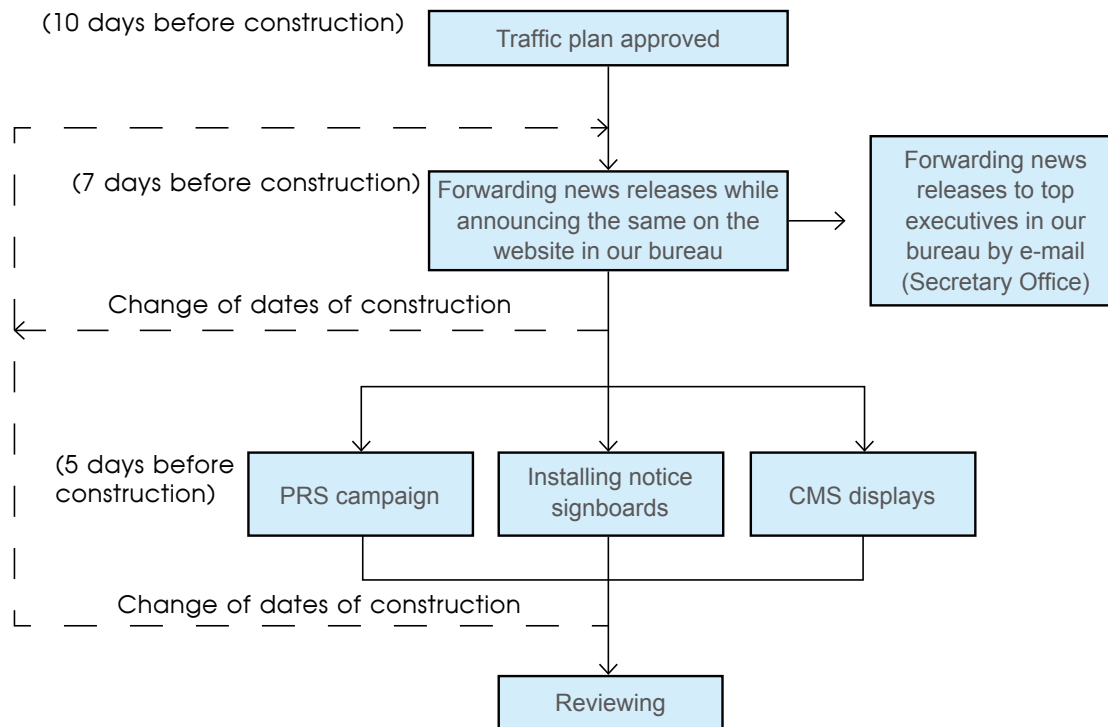
### (1) Revising Campaigning Regulations for Mainline Closing for Construction Works on Freeways

On June 26, 2012, the Campaigning Regulations for Mainline Closing for Construction Works on Freeways were duly revised as follows:

1. Defining construction works for closing one-way or 2-way lanes on main lines.
2. Construction agencies are required to forward news releases to top executives in our bureau by e-mail.
3. Announcing information on construction works in Road Closure Information and Latest News on the website in our bureau.
4. Releasing audio tapes and oral drafts to meet the needs of programs at the Police Radio Service (PRS).
5. Adding CMS campaigning regulations in our bureau while upgrading CMS display frequency in the evening.
6. Adding campaigning reviews and flow process for successful campaigning operations.



### Process for campaigning regulations for mainline closing for construction works on freeways



## (2) Revising Operation Procedures for Removal of Fallen objects on Freeways

On January 31, 2007, the provisional Operation Procedures for Removal of Fallen objects on Freeways were implemented by the regional offices of our bureau. Now, after years of the implementation and discussions with the operating agencies, a revised version of the procedure is released by complying with the Code for Traffic Control for Construction Works and the operating agencies are requested to implement the new version beginning 2013. The revisions are mainly as follows:

1. Adding 1 signing vehicle upstream the spot of fallen objects.
2. For minimum impact on traffic, when fallen objects take only 1 lane, both service vehicles and signing vehicles remain working on the involved lane and, only 2 lanes shall be taken when fallen objects take 2 lanes.
3. Advised by National Police Agency and Directorate General of Highways, engineering rescue vehicles are the only ones allowed to use a buzzer. The vehicles contracted by our bureau for the operations are owned by private

institutions and not registered for rescue works, may not use a buzzer.

4. The service vehicles parking at downstream of the fallen objects as stipulated in the provisional procedure shall park at upstream of the fallen objects.
5. Vehicles shall leave the scene and retry if the works can't be done on safe condition. Before returning back, one signing vehicle may park at the upstream of the fallen objects as warning on the fallen objects.

## 8 Anti-theft Practices for Traffic Control System Cables

Our bureau has been working hard on building the traffic control systems. But we are encountering frequent thefts of cables for the growing price of copper and a large number of traffic control systems fail to serve as they should. The fact does impair traffic information.

From January 2008 to December 2012, our bureau suffered from 731 traffic-control wire cable thefts, of which 306 in 2010 make the highest record. Since the implementation of anti-theft program in 2011, thefts have dropped remarkably as new systems are being installed. The year 2012 saw 22 thefts, and 0 was registered between September and December, setting a sound record. At the same time, a Seminar on Roadside Wire Cable Anti-Theft Practices and Operations was successfully hosted as requested by Ministry of Transportation and Communications in Central Region Engineering Office on November 15, 2012.



Construction works for 2-ton RC manhole covers



Wire Cable Anti-theft Seminar



## 9 Travel Safety Campaign

### (1) Campaigning on Enlightening Freeway Traffic During Lunar Year Holidays 2012

For the Traffic Relieving measures for the Chinese New Year holidays 2012, our bureau, along with private sector, issued 2,400,000 copies of Traffic Network Map for Chinese New Year Holidays 2012 for free release to road users. The map and the relevant measures appeared on major newspapers. On the other hand, 2 campaigning clips appeared on TV and broadcasting networks along with seminars on Traffic-enlightening Measures for Chinese New Year Holidays 2012 in northern, central and southern Taiwan, event attended by broadcasting personnels as part of the effort.



Seminars on Traffic-enlightening Measures for Chinese New Year Holidays 2012



Traffic-enlightening Map for Chinese New Year Holidays 2012 by MOTC

## (2) Campaigning on Safe Driving on Freeways

To further enhance the campaign, 5 themes, namely “Safe Driving in Long Tunnels”, “Using Safety Belt in Rear Seat”, “Please keep in order while driving off the freeways”, “Use turn signal indicator while driving”, “Strict Prohibition of Passing of Main-line Vehicles by accelerating and decelerating Speed lanes”, were incorporated as issues (see Table 1) for the campaign 2012. Our bureau and the regional offices made joint efforts at the same time to highlight the outcome. Each theme campaign lasts 2~4 months, when campaign fabric displays would be available per timetable and updated issues; on the other hand, campaign slogans would appear on the CMS along freeways and the LED displays in the service areas as part of the effort.

**Table 1: Timetable for Safe Driving on Freeways Campaign**

	Campaign theme	Campaign duration
1	Use turn signal indicator while driving	April ~ May 2012
2	Using Safety Belt in Rear Seat	June ~ September 2012
3	Please keep in order while driving off the freeways	
4	Strict Prohibition of Passing of Main-line Vehicles by accelerating and decelerating lanes	
5	Safe Driving in Long Tunnels	October ~ December 2012



Large campaigning signboard for Safe Driving on Freeways



Campaigning brochures for Safe Driving on Freeways



Campaigning Posters for Safe Driving on Freeways

### (3) Production and Airing of Safe Driving on National Freeways Campaigning Movie Clips

As part of the remarks for driving in long tunnels safe driving remind and on the use of the 1968 Customer Service Hotline by road users, movie clips for “Safe driving in Long Tunnels”, “Please keep in order while driving off the freeways” and “1968 Safe Driving Caring” were made via tenders by our bureau for 668 airings on cable TV. On the other hand, cable TV and bus company operators were asked to air the same on charity hours. Further, 1 radio clip (for 30 seconds) on Wrongdoings in Safe Travel on Freeways for airing on broadcast stations in charity hours were made as part of the enhanced education on correct road use.



Campaigning movie clips of Safe Driving on Freeways, Please keep in order while driving off the freeways and 1968 Safe Driving Caring



#### (4) Release of the “Freeway Safety Day” Activities

On 2nd anniversary of the side-slope collapse on April 25, 2010 at 3.1K of Freeway No. 3, our bureau hosted the “Freeway Safety Day” on Wednesday April 25, 2012. The efforts and outcomes of our bureau on safe driving on freeways in the past 2 years were on display featuring Securing Safe Driving Ambient on Freeways, which was highlighted by Bridges, Slopes and Safe Driving as 3 main issues. The event was hosted by the executives in our bureau (Technical Division, Construction Division and Traffic Management Division) as a way to reach agreement of the entire work force in the office. The following table shows the timetable of the release.

**Table 2: Timetable for Release of Freeway Safety Day**

Timetable for Release of Freeway Safety Day		
Morning	Inauguration speeches 【Time:1000-1030】	Theme releases 1.Release each shall be hosted by Technical Division, Construction Division and Traffic Management Division. 2.The hosts shall produce their own subjects, prepare the drafts and interpretations for exchanges and sharing comments with the attendees. 3.The releases shall be developed as: planning/design remarks (30 minutes), outcome of execution (30 minutes) and exchanges and sharing comments (10 minutes) for a total of 70 minutes.
	Theme 1: Safety on bridges 【Time:1040~1150】	
Afternoon	Theme 2: Safety on slopes 【Time:1300~1410】	
	Theme 3: Safe driving 【Time:1430~1540】	

The release event was attended by some 70 including section chiefs and directors as well as section chiefs in Northern Region, Central Region, Southern Region and Widening Construction Office for briefing on the planning/design and execution and other issues with exchanges and sharing comments as a way to reach agreements in our bureau in terms of safe driving on freeways.



Freeway Safety Day release in photos

### (5) Gold Safety Award Ceremony 2012

The Gold Safety Award Ceremony 2012 was held on November 20, 2012 in the GIS Ministry of Transportation and Communication Convention Center. By following the instructions of ministry of transportation and communication and to assure a successful event, our bureau had working teams installed along with contracting the event for planning assuring an impeccable event of caring and glory.

In the beginning, Mr. Chen Chun, Premier of the Executive Yuan, and Mr. Mao Chi-Kuo, Minister of Ministry of Transportation and Communication delivered their welcome speeches while appraising the awardees before awarding the outstanding offices and individuals.



Premier, Minister delivering speeches



The entire event was of sound preparation waged by all agencies and the working teams. The event took place seeing smooth registration, rehearsal, lunch banquet and prize awarding, earning much appraisal by the attendees.



Director General in photo with the staff in our bureau

## 10 Speed Regulation on National Freeways

### (1) National Freeway No. 2

The National Freeway No. 2 widening project was completed on May 31, 2012. After checking the geometric design and upgrading traffic facilities, speed limit from Dayuan to Airport System Interchange, went up from 90km/h to 100km/h from June 1, 2012, and speed limit from Dayuan Interchange to Yingge System Interchange, also went at 100km/h.

## (2) National Freeway No. 4

To meet the expectation and needs of road users, we reviewed the geometric design and upgraded, traffic works of National Freeway No. 4 and made the travel speed limit in all National Freeway No. 4 from 90km/h to 100 km/h effective June 1, 2012.

## (3) National Freeway No. 6

As of National Freeway No. 6 which was not a familiar one to the road users in the beginning and for the sake of safe travel, a maximum travel speed limit was set for 90km/h. As of this day, as National Freeway No. 6 is found in good shape, effective September 1, 2012, maximum travel speed limit on it is upgraded from 90km/h to 100 km/h.

# 11 Others

## (1) A Fire Accident in Hsuehshan Tunnel on May 7, 2012

At 1:24 pm on May 7, 2012, when a van (A) traveling on the outer lane at 26k southbound of the Hsuehshan Tunnel on National Freeway No. 5 slowed down for flat tire, a Kamalan Bus and another van (B) followed. Behind them a Capital Bus failed to take corresponding measures resulting a direct collision from a distance (at lease 300 meters away) to the van (B). The fuel tank of the van (B) exploded to cause immediate fire and engulfed the Capital Bus. The van (B) driver and 1 passengers seated in the front died along with 34 minor and severe injuries.

The accident was immediately notified by the Pinglin Traffic Control Center by following the corresponding procedures along with assigning operations.

All agencies were involved in the very beginning by assigning large number of personnel for rescue. Finally, except for the 2 deaths taking place at the scene, the rest could leave the scene safely. No hardware in the tunnel suffered from severe damage demanding long-time repair works.

After the incident, associated agencies and experts as well as scholars were



invited by Ministry of Transportation and Communication to form a review team. International experts were also invited for a seminar on weakness in the effort. And based on the review reports, improvement plans of short, medium and long time were filed in this office for immediate implementation.

## (2) Freeways in Certain Sections Opened for Traffic of Heavy Motorcycles of 550c.c. and after Three Readings by the Legislative Yuan

On November 8, 2011, the Legislative Yuan approved the opening of certain sections of National Freeways for traffic of heavy motorcycles more than 550c.c. and for implementation on July 1 2012. A trial period was set for National Freeways No. 6, No. 8 and in southern sections on Freeway No.3 Ministry of Transportation and Communication and our bureau repeated evaluations and discussions in past months with the local administrations of Taichung City, Tainan City, Kaohsiung City, Nantou County, Pingtung County as well as National Police Agency, Ministry of the Interior. At this time, all local administrations and most of the population remained conservative and told Ministry of Transportation and Communication for mally that they don't agree with it. Ministry of Transportation and Communication then announced on July 10, 2012 that there are no sections or hours for heavy mortocycles of 550c.c. and heavier riding on the freeway. However, this bureau has been asked by Ministry of Transportation and Communication to keep on reviewing public opinions and, once an agreement is reached, further evaluations would follow for an announcement on the issue.