Research Report

OPS BERSEPADU

Conducted over the Chinese New Year Period
from 11 – 25 February 2007

Abdul Rahmat Abdul Manap
Ahmad Azad Ab Rashid
Alvin Poi Wai Hoong
Sharifah Allyana Syed Md Rahim
Zulhaidi Mohd Jawi @ Said
Radin Umar R.S

MIROS

MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH

OPS BERSEPADU

Conducted over the Chinese New Year Period
from 11 – 25 February 2007

Abdul Rahmat Abdul Manap
Ahmad Azad Ab Rashid
Alvin Poi Wai Hoong
Sharifah Allyana Syed Md Rahim
Zulhaidi Mohd Jawi @ Said
Radin Umar R.S

For reference purposes

 MIROS. 2007. OPS Bersepadu Conducted over the Chinese New Year Period
    from 11-25 February 2007. Kuala Lumpur: Malaysian Institute of Road
    Safety Research.

Contents

Abstract

Post investigation of the number of casualties, particularly fatalities among motorcyclists, during *Ops Bersepadu* conducted over the recent Chinese New Year 2007 (CNY 2007) revealed a significant drop in the total number of fatalities and daily rates of fatalities nationwide. This report looks into the effectiveness of the *Ops Bersepadu CNY 2007* in reducing the accident and fatality rates during the festive season. This includes (i) the perception level of being caught, (ii) the perception level of enforcement visibility, (iii) 85th percentile spot speeds, (iv) profile of traffic volume, (v) effectiveness of banning lorries, and (vi) motorcyclist shift to safer modes of transport. A series of surveys on the perception level of being caught was carried out at selected places such as shopping complexes, R&R and petrol stations. Spot speed studies were carried out at 7 different locations along federal roads. Traffic volume and composition were obtained from the Public Works Department and Highway Planning Unit, Ministry of Works Malaysia. The perception level of enforcement visibility was found to be 64.9% while the perception level of being caught was 47.0%. These levels were below the targeted value of 85% and 75% respectively. The 85th percentile speeds of vehicles travelling along the 90 km per hour zones of selected federal roads were found to exceed the 80 km per hour gazetted speed limit. Besides, the telemetric data shows that the percentage of heavy vehicles, which was at an average of 7% before the *Ops*, had dropped to an average of 4% during the *Ops*. This reduction resulted in a 58% drop in the number of accidents involving lorries. Moreover, the percentage of motorcycles also dropped from 25 to 22% during the *Ops*, and this accounted for the significant drop in motorcyclist fatalities. For overall fatalities, the daily average death for 15 days before the *Ops* was 15.1 but dropped to 13.8 during the *Ops*. This study concludes that the *Ops Bersepadu CNY 2007* is commendable for it resulted in fewer deaths compared to normal days.

1. Introduction

The traffic scenario in Malaysia becomes extremely congested during festive seasons, namely Hari Raya Aidilfitri, Chinese New Year (CNY), Christmas and Deepavali. Normally, city dwellers take advantage of the long holidays to visit their hometowns, a tradition fondly referred to as "*balik kampung*". As a consequence, the "*balik kampung*" tradition generates an inevitably high volume of traffic on all highways and major roads nationwide. Usually, the number of deaths per day exceeds the annual daily average during these festive seasons. In 1996, when no integrated intervention strategies were instituted, a total of 321 deaths was recorded during the 15 days of the festive season which resulted in about 21 deaths a day (Radin, 1998). This alarming casualty rate prompted the Government to initiate an integrated road safety programme that included exposure control, crash prevention, injury control and post injury control interventions.

In the year 2006, Malaysia recorded a relatively high number of road accidents (341,232 cases) and fatalities (6,278) with an average of about 17.2 deaths per day. To overcome this problem, an integrated *Ops Bersepadu* for the Chinese New Year Celebration of 2007 was launched by the Ministry of Transport Malaysia in order to further reduce the casualty rate. The *Ops Bersepadu CNY 2007* commenced on 11 February 2007 and ended on 25 February 2007. This report highlights the effectiveness of the intervention strategies and provides feedback and suggestions in response to the whole intervention plan.

2. The Interventions

Prior to the 2007 Chinese New Year celebration, the Ministry of Transport (MOT) prepared a comprehensive intervention plan to be carried out by all agencies during the *Ops* period. The comprehensive plan involved various government agencies namely Polis Diraja Malaysia (PDRM), Jabatan Keselamatan Jalan Raya (JKJR), Jabatan Kerja Raya (JKR), Lembaga Lebuhraya Malaysia (LLM), Kementerian Pengangkutan Malaysia (KPM), Jabatan Pengangkutan Jalan (JPJ), Lembaga Pelesenan Kenderaan Perdagangan (LPKP), Kementerian Kesihatan Malaysia (KKM), Organisasi Bukan Kerajaan (NGO) and the private sector. The four strategies adopted were as follows:

2.1 Exposure Control

This involved:
- Promoting the use of public transportation – adding more seats for buses, trains, and flights.
- Banning lorries and trucks on the festive days – this ban applied to all kinds of lorries and trucks except for critical services such as food delivery, petrol delivery, medical supplies and emergency services.
- Encouraging motorcyclists to opt for safer modes of transport such as public transportation.
- Reducing the degree of peakness – peakness is defined as the density of traffic observed on a day.

2.2 Crash Prevention

This involved:
- Enforcement by Police and JPJ. Apart from the conventional methods, new methods were introduced such as the use of undercover enforcement and unmarked vehicles.

- Campaign through mass media. All media were used to deliver campaigns messages e.g. advertisements aired over television and reporting accidents statistics in newspapers.
- Postponing all construction work. All construction work that interrupted traffic flow was halted on the festive days.
- Reducing speed limit on the 90 km per hour road. The speed limit was reduced to 80 km per hour on the 90 km per hour zones.
- The "take-a-break" programme offered by Petronas. Petronas sponsored free refreshments at its selected petrol stations along the highways.

2.3 Injury Control

This involved:
- Paramedics and injury management. A strategy aimed at ensuring the paramedic team reaches the accident spots immediately.

2.4 Post Injury Control

This involved:
- Trauma management at hospitals – to ensure victims are treated within a hour's interval in the aftermath of an accident.
- Aftercare – to ensure victims recover fully after receiving treatment.

3 . Methodology

Four types of analyses were used to monitor and evaluate the effectiveness of the *Ops Bersepadu CNY 2007*. These are telemetric data plot, cumulative fatality plot, perception study, and speed change analysis. The details of the analysis are as follows:

3.1 Telemetric Data Plot

Telemetric data, provided by JKR, is a compilation of the number of vehicles that had passed through various stations at various locations such as Kangar, Kuala Krai, Merlimau, Kuala Muda, Bera, Setiu, Rompin, Kuala Kangsar, Hulu Terengganu, Baling, Kuala Pilah, Muadzam Shah, Kluang and Kerian.

Vehicles were classified according to their wheel base length and the classifications were termed as LongV (lorries), MiddS1 (cars), MiddS2 (SUV, van, etc.), XtraLV (trucks/trailers) and Mcycle (motorcycles). The total volume of vehicles was counted on a daily basis and the profile of the traffic was observed throughout the campaign. The results show the peakness of the traffic flow and also the percentage of certain types of vehicles compared to the overall volume.

3.2 Cumulative Fatality Plot

The cumulative fatality plot provides an evaluation on the effectiveness of the *Ops* by comparing the projected cumulative mean of fatalities (PCF) during normal days against the actual cumulative number of fatalities (ACF) during the *Ops*. The average value of deaths for 15 days before the *Ops* was used to estimate

the daily increment. The *Ops* can be concluded as effective if the ACF value is proven to be lower than the PCF value.

3.3 Perception Study

New approaches were adopted by the Police Force and the Road Transport Department during the *Ops Sikap XII* to detect errant road users. They involved both overt and covert approaches. While roadblocks and speed checks are two examples of overt methods, the covert method involves the use of unmarked vehicles and the capture of queue jumping offenses on camera. Authorized plain cloth enforcement officers were deployed by JPJ and media assistance was sought to 'inform' the public of the presence of enforcement officers on the road. However, the effectiveness of this method needs to be evaluated as to whether road users' perception of being caught is increased.

Therefore, a series of 8 questionnaire surveys was carried out before and after the launch of the *Ops Sikap XII* to measure changes in perception level of being caught and visibility of enforcement presence. The surveys were conducted at 2 locations, that is, Sungai Buloh Rest Area and Kompleks PKNS to represent samples from federal route road and expressway, respectively. The questionnaire was also used to retrieve information related to their perception of being caught for traffic offences such as over-speeding, beating the red lights and queue jumping.

Two teams were deployed to the above-mentioned locations before the launch of the *Ops Sikap XII*, a few days after the launch of the *Ops Sikap XII* and a few days before the end of the *Ops Sikap XII*. At the Sungai Buloh Rest Area, all who stopped by (drivers or riders) were treated as respondents whereas people at Kompleks PKNS were initially asked whether they were Federal Highway Route II (Petaling Jaya-Klang) users. This was done to ensure that the information provided actually comes from those who

frequently travel along the study locations. At each location, an average of 30 respondents were interviewed.

To simplify the analysis, the data were categorized into 3 levels of perception according to the scores given by the respondents. The categories were low (score 0 - 4), medium (score 5 - 7) and high (score 8 - 10). The percentage of respondents having a high overall perception level of being caught and a high perception level of enforcement activities were compared before and after the launch of the *Ops Sikap XII*. The results of this study are expected to show that the perception level of enforcement activity and perception level of being caught during the *Ops Sikap XII* will be more than 85% and 75% respectively.

3.4 Speed Change Analysis

One of the crash injury reduction strategies implemented during the *Ops* was a reduction in the national speed limit from 90 km per hour to 80 km per hour at all 90 km per hour zones. One way to assess the effectiveness of a national policy on speed limit and enforcement is by establishing the speed trends (Roger *et al.*, 2004). In order to determine the compliance of road users with regard to speed reduction, speed observation had been carried out at 7 spots along 5 federal routes. They were carried out before and after the launch of the *Ops*. The study locations were as follows:

a)   Klang – Kuala Selangor (Federal Route 5)
b)   Lukut – Sepang (Federal Route 5)
c)   Mantin – Seremban (Federal Route 1)
d)   Seremban – Kuala Pilah (Federal Route 51)
e)   Seremban – Lukut (Federal Route 53)
f)   Serendah – Kuala Kubu Bharu (Federal Route 1)
g)   Sungai Buloh – Ijok (Federal Route 54)

These locations were identified based on the criteria of having a 90 km per hour speed limit. The ease of concealing the activity of speed measurement and the ease of drivers freely selecting

their speeds (congestion-free and at straight sections of road) were taken into consideration as well.

The minimum sample size was 100 vehicles with 95% confidence to obtain a certain precision. However, 200 speed measurements were obtained at each location to get more normally distributed data. Hand-held laser metres were used to measure the speed of vehicles.

The data obtained was then classified into speed classes before relevant plots were constructed. From the plots, the 85th percentile speeds were obtained and compared for before and after the launch of the *Ops*. The 85th percentile speed of vehicles was expected to be less than 80 km per hour.

4. Results

4.1 Cumulative Fatality Plot

Figure 1 demonstrates the comparison between overall PCF and ACF. The mean for this analysis is 15.6 fatalities, which is taken from the average of fatalities for 15 days before the launch of the *Ops*. From the graph, it can be seen that while the final value of PCF is recorded as 464, the final value of ACF is 434. This shows that ACF is lower than PCF by 30 fatalities. Therefore, it is concluded that the *Ops* successfully reduced the number of fatalities.
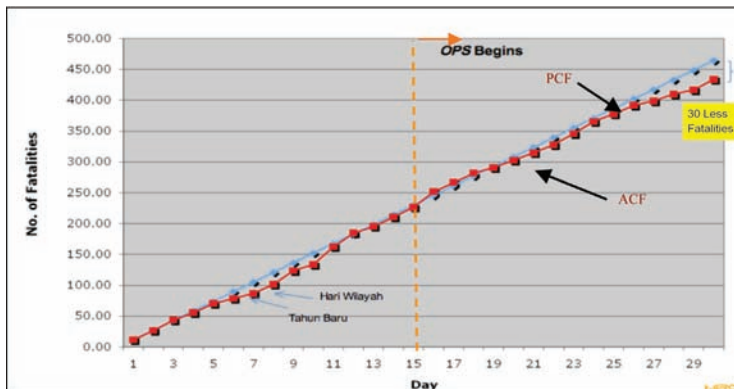

Figure 1 Cumulative plot analysis of overall fatalities during the integrated *OPS Bersepadu CNY 2007*

Figure 2 shows the fatalities involving car occupants and motorcyclists respectively. The final value of ACF for car occupants is 84 fatalities (25% of overall ACF) which is higher than PCF by 2 fatalities.

Figure 3 shows the comparison between ACF and PCF for motorcyclists. Note that the final value of PCF is 278 while the final value of ACF is 260. It is observed that Figure 3 has similarity with Figure 1 in terms of the shape of graph. This is
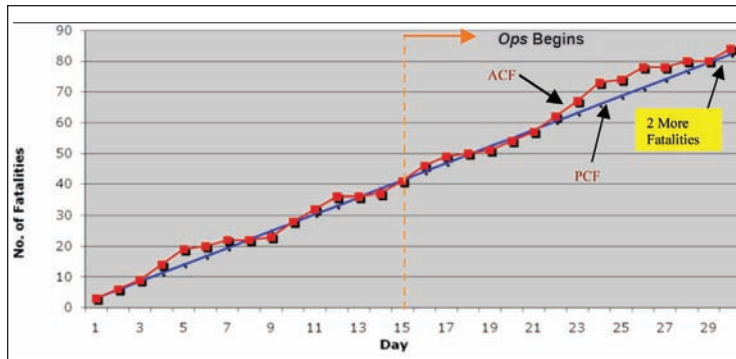
Figure 2 Cumulative plot analysis of car occupant fatalities during the integrated *OPS Bersepadu CNY 2007*
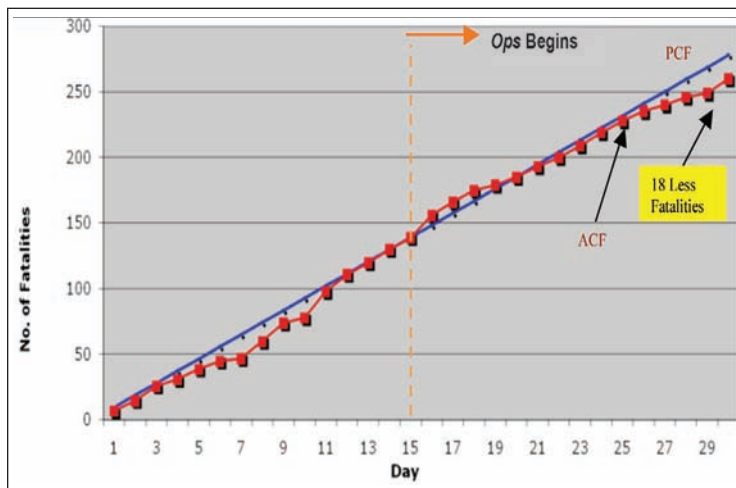

Figure 3 Cumulative plot analysis of motorcyclist fatalities during the integrated *OPS Bersepadu CNY 2007*

due to the fact that motorcyclists contributed more than half of the overall fatalities. Thus, it can be concluded that efforts to reduce the number of deaths among motorcyclists is showing some effects.

4.2 Traffic Profile

Figure 4 shows a slight increase in total volume of vehicles during the weekends before reaching a stable trend towards the end of the *Ops*. While the average volume of vehicles per day is 13,000

on normal weekdays, the number doubles during the festive days. It can also be observed that the car is apparently the major contributor to the overall volume. The highest point recorded was at 19,575, which was on the first day of CNY holidays.

Figure 5 shows the change in percentage of heavy vehicles volume before and during the *Ops*. It is noted that the average percentage of heavy vehicles is 7% of the total volume of vehicles before the *Ops*, dropping to 4% during the *Ops* as proven by Chi-square analysis ($p < 0.001$). This indicates that the strategy of banning lorries (except for lorries undertaking critical services) is effective in reducing accidents involving lorries.
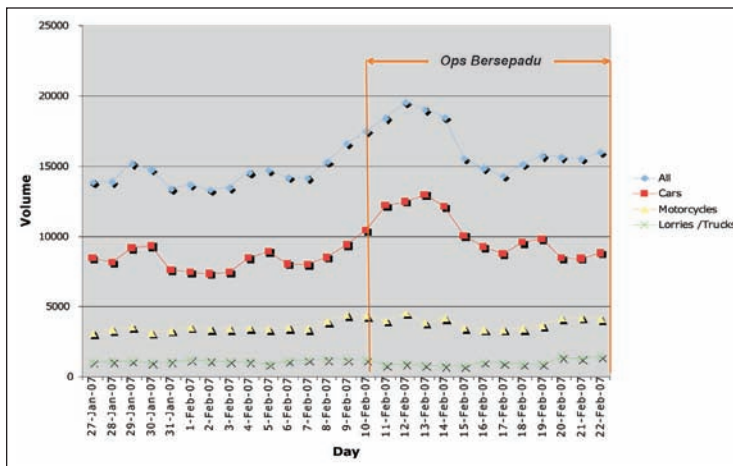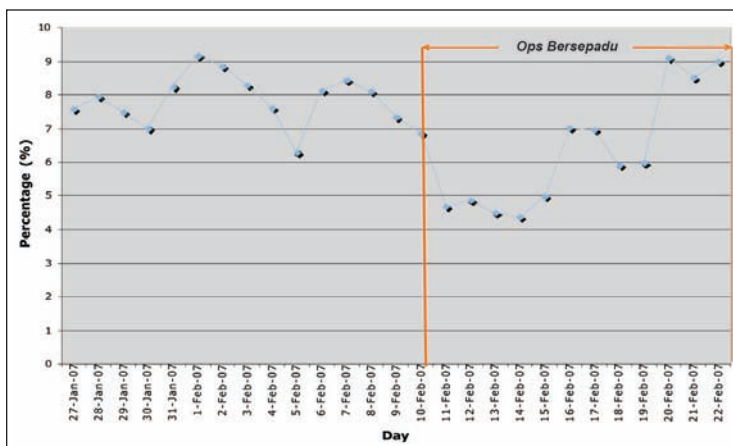

Figure 4 Overall volume

Figure 5 Percentage of heavy vehicles

Table 1 Chi-square analysis of accidents involving lorries

		Period		Total
		Before	After	
TYPE	Other accidents	192	308	500
	Lorry	52	22	74
Total		244	330	574

$(x^2 = 26.8, p = 0.0)$

Figure 6 shows that the percentage of motorcycles fluctuated at an average value of 25% before the *Ops*, dropping to 22% during the *Ops*. Hence, the campaign to encourage road users to use public transport instead of motorcycles is concluded to be effective.
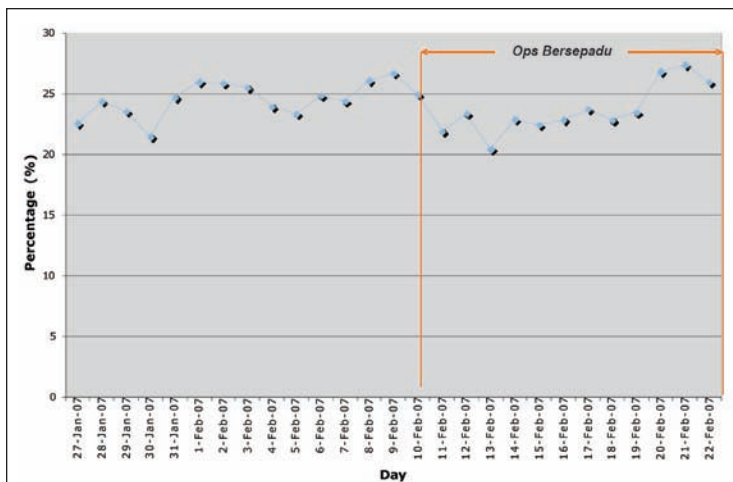

Figure 6 Percentage of motorcycles

4.3 Public Perception Study

The percentage of respondents having an overall high perception level of being caught during the period (week of observation) is shown in Figure 7. It is clearly shown that the percentage had been increasing since the launch of the *Ops Sikap XII*. A little increment from 27% to 27.4% in a few days after the launch
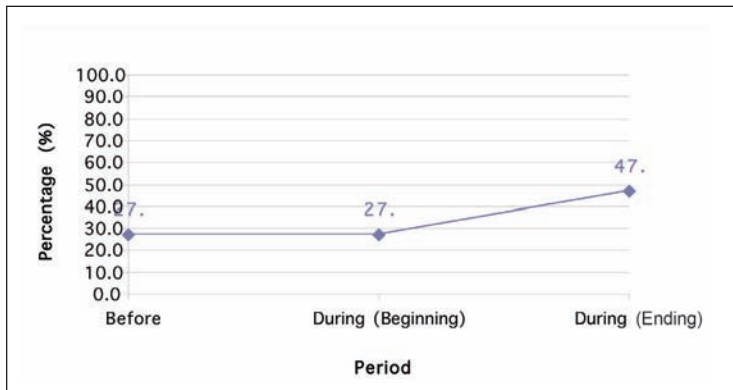
Figure 7 Public perception of being caught (Score 8-10).

suggests that road users were not aware of enforcement activities being carried out. Towards the end of the *Ops Sikap XII*, the percentage increased to 47% indicating that more road users became aware of enforcement activity. However, the percentage is lower compared to the previous *Ops Sikap XI* (54%) as well as the targeted value of 75%. It is to be noted that in order for 85% of road users to comply with this rule, a minimum 75% public perception of being caught is required.

Figure 8 shows the percentage of respondents having a high perception level of being caught for 3 traffic offences, namely speeding, or exceeding the speed limit, beating the red lights and queue jumping. These percentages had been increasing since the launch of the *Ops Sikap XII* except for the percentage of beating the red lights. This might be due to no physical enforcement activity being carried out to apprehend red light runners. Rather, the enforcement activity focused on the problem of speeding.

On the other hand, there are positive signs on the percentages of speeding and queue jumping. The study revealed that the percentage level of being caught for queue jumping increased three-fold towards the end of the *Ops Sikap XII*. This implies that the covert approach is indeed an effective way to discourage road users from jumping the queue. Likewise, the percentage
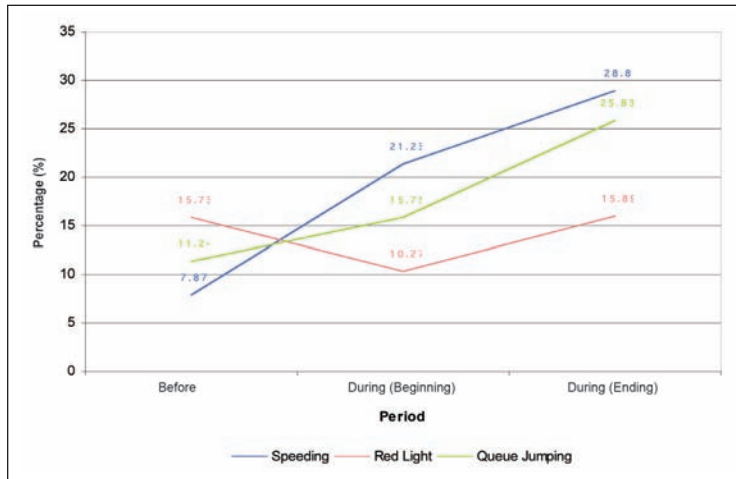
Figure 8 Public perception of being caught for a specific offence

of being caught for speeding increased four-fold towards the end of *Ops Sikap XII* compared to the baseline. Though, this is a positive reflection of the *Ops Sikap XII*, the public perception of being caught still did not reach 75%, as targeted.

Generally, the frequency of enforcement activities influences the perception level of being caught as well as publicity on the campaign. Hence, an attempt to increase the perception level of being caught can only be achieved by a parallel action of enforcement activities and publicity.

Figure 9 shows the percentage perception level of enforcement activities that had been on the increase since the launch of the *Ops Sikap XII*. The graph also shows that the perception value towards the end of the campaign is 64.9%. This value is less than 85% which is the targeted value of this campaign.

4.4 Speed Change Analysis

The purpose of introducing the speed reduction policy is to reduce the number of casualties. It involves reducing the national speed limit from 90 km per hour to 80 km per hour at all
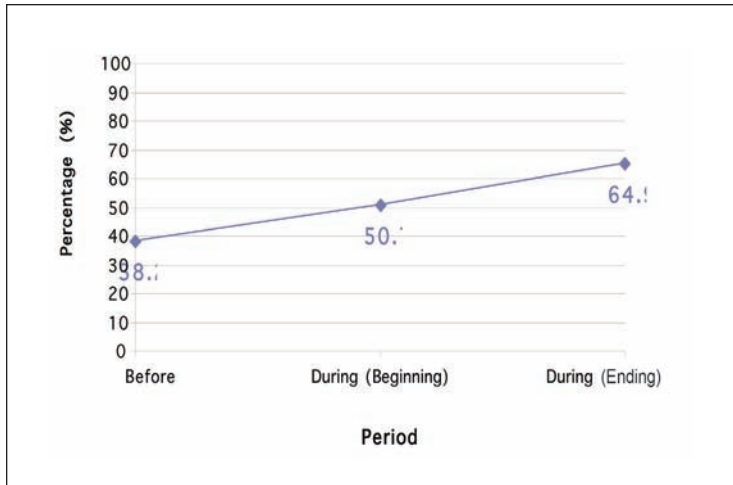
14

Figure 9 Public perception of enforcement activities

90 km per hour sections of federal roads. Table 2 shows the 85th percentile speed at 7 locations in several places in Selangor and Negeri Sembilan. The 85th percentile speeds simply mean the speed at which 85% of the road users are travelling is below this speed. The study was also conducted before the *Ops*, during the initial stage of the *Ops* and toward the end of the *Ops*.

The mean of the 85th percentile for all periods indicates that almost all speeds recorded exceeded the speed limit of 80 km per hour except in Seremban–Kuala Pilah Federal Road. As shown in Table 2, Klang–Kuala Selangor Federal Road has the highest 85th speed percentile recorded which is 100 km per hour. In conclusion, the intervention did effectively reduce the speed of the road users.

The 29% public perception level of being caught for speeding among the road users indicates that most of them were not aware of the speed limit reduction policy. Only 1 person out of 3 believes that he or she would be caught by the enforcement officers for speeding. Again, publicity plays an important role in raising awareness level and the perception level of being caught for speeding.

15

OPS BERSEPADU
Conducted over the Chinese New Year Period from 11 – 25 February 2007

Table 2 85th percentile speed

Locations	Before	At the beginning	Towards the end
Serendah – Kuala Kubu Bharu	89.2	88.5	85.6
Klang – Kuala Selangor	96.8	100.0	99.5
Sungai Buloh – Ijok	86.3	88.8	85.7
Mantin – Seremban	90.2	86.1	91.1
Seremban – Kuala Pilah	79.6	72.5	82.0
Seremban – Lukut	86.9	81.9	86.1
Lukut – Sepang	89.0	82.6	83.8
Mean	88.3	85.8	87.7

5. Conclusion

An analysis of *Ops Bersepadu CNY 2007* was conducted to study the effectiveness of the integrated intervention. The analyses involved telemetric data plot, cumulative fatality plot, perception of being caught and speed change analysis.

1   Based on the telemetric data, it is observed that the daily average volume during the *Ops* is almost twice the daily average volume during normal days. However, the peakness is spread over a larger period due to school holidays, which affords more travelling time alternatives to the road users. Hence the school holidays should coincide with festive seasons in the future. In addition, the campaign to encourage use of public transport instead of motorcycles has resulted in a percentage reduction in motorcycle use. Supported by the cumulative fatality plot, it shows that the policy of reducing the number of motorcycles on the road is indeed effective.

2   The telemetric data also shows that the percentage of heavy vehicles at an average of 7% before the *Ops* had dropped to an average of 4% during the *Ops*. During the same period also, it was found that the percentage of accidents involving heavy vehicles had also dropped approximately by 60%. This indicates that the strategy of banning lorries was efficient in reducing lorry-involved accidents.

3   The overall actual cumulative number of fatalities (ACF) was less than the projected cumulative mean of fatalities (PCF) by 30 deaths during the 15-day period of the *Ops*. However, the ACF for motorcyclists was lower than the PCF by 18 deaths. Therefore the strategy adopted to discourage the use of motorcycles has proven to be effective. The 15.1 daily

average death for 15 days before the *Ops* had dropped to 13.8 during the *Ops*. Since the figure of 13.8 is much lower than the annual daily average of 17.2 deaths per day, it is possible to save 3.4 lives a day or 1,241 lives for this year. Consequently, the total number of deaths for this year is expected to drop to 5,060, which translates to 2.9 deaths per 10,000 vehicles, 18.7 deaths per 100,000 population and 15.6 deaths per billion vehicles kilometre travelled. It is therefore highly recommended that similar interventions are carried out throughout the year.

4   Specifically, the ACF value for car occupants is higher compared to its PCF value. In addition, it is also found that fatality among car occupants increased, reaching 23% at the end of the *Ops*. As shown in the telemetric data, the increasing usage of the car among road users indicates that this mode of transport is becoming more popular for long journeys. Therefore, this problem needs to be considered more seriously.

5   The overall perception level of being caught among road users increased from 27% before the *Ops Sikap XII* to 47% at the end of *Ops Sikap XII*. Further analysis also suggests that the perception of being caught for speeding increased four times during the *Ops Sikap XII*. These figures explain the effectiveness of the police who focused on the problem of speeding and also on the overt approach deploying a-5000 manpower strength. However, the increased perception level still did not reach the expected 75% benchmark. On the other hand, JPJ, with 1200 manpower strength introduced for the first time the covert approach to solving the queue jumping problem. Analysis shows that their approach reaped benefits as this can be proven by a three-fold increase over the baseline perception level of being caught for queue jumping. Nevertheless, it is still below the 75% benchmark. Moreover, the perception level of being caught for beating the red lights showed no change from the baseline due to less physical enforcement on this offence. In order to increase

18

these perception levels up to the benchmark, enforcement activities and publicity should be carried out hand in hand. The implementation of the Automated Enforcement System (AES) that utilizes the latest electronic enforcement system should improve the perception level of being caught among road users.

6   Overall, the 85th percentile speed is more than 80 km per hour in 90 km per hour zone along federal routes. It shows that the speed reduction policy is not working as it should. But a speed reduction policy is undoubtedly a good tool to reduce the number of casualties and that is why it is important to increase the perception level of being caught among road users to the minimum benchmark of 75%. The use of speed cameras at specific locations especially substandard curves is one way to make road users comply with posted speed limits. Again, the AES will also help in increasing the perception level of being caught.

In conclusion, this *Ops Bersepadu CNY 2007* is commendable for it has resulted in fewer deaths compared to normal days and therefore should be continued throughout the year.

References

Roger P. R., Elena S.P., William R.M. (2004). *Traffic Engineering*, 3rd ed. Pearson Education International, 205p.

Radin Umar R.S. (1998). Analisis Keberkesanan Program Keselamatan Bersepadu Semasa Perayaan Berkembar 1998. Universiti Putra Malaysia.

Acknowledgements

First, the authors would like to express their gratitude to the Royal Malaysian Police for supplying the accident data and the Road Safety Department, the Department of Works Malaysia, and the Highway Planning Unit for their invaluable time and effort and the important role they played in shaping the final version of this report.

The authors also wish to thank the following persons for their cooperation and prompt feedback to all requests made: Dr Safry Kamal, Department of Works, Ministry of Works Malaysia; Ir. Suhaimi, Malaysia Highway Authority; and Puan Awariah Idris, PLUS Expressway Berhad. The completion of this report would not have been possible without their full support and determination.