

CHAPTER 4

POLICE COMMUNITY BASED PROGRAMS

SUMMARY

Australian and overseas research has shown that the involvement of the community in road safety programs is an important method of reducing the road toll.

The media is an important influence on community behaviour and radio may be the most effective vehicle.

Research on school curricula shows that the design must encompass information besides road rules.

Community action groups have been effective in influencing action against drink driving and in the United States these groups have caused the penalties to be increased.

Diversion programs are another method of dealing with the community and may be run by police or community groups to assist drink drivers and other offenders.

Community reporting is effective in road safety and has been used in the United States to identify defective vehicle design.

AUSTRALIAN RESEARCH

A survey of community attitudes for the Federal Office of Road Safety (Touche Ross, 1986) found that road safety and drink driving were not important issues in the community. However the most frequently cited cause of accidents mentioned by 40% of respondents, was drink driving. Speed was the next most frequently cited reason (20%) and other major causes were careless and negligent driving, inattention and lack of concentration. The community's perception of police enforcement was mainly in terms of speed. Nine out of

ten respondents were predisposed to random breath testing. Fifty per cent of respondents restricted their drinking when driving and the other 50% either did not drink or did not drink and drive.

In New South Wales, the use of the media in reinforcing the RBT program has been reported by Cashmore (1985) to be very successful. It has been found that unless the public knows that an enforcement program is operating there is no wide impact. Negative publicity has also worked to the advantage of law enforcement.

The major goal in drink driving campaigns is knowledge of the drink drive laws, as this is a precondition of deterrence. Australian research has found that recall for advertisements about random breath testing was better for television and newspapers. However radio advertisements which strongly predicted the risk of being caught were the best medium (Cashmore, 1985).

Media exposure is generally secondary to knowing someone who has been tested. However, a secondary effect of prolonged media programs is to create discussion within the community and provide the basis for individuals to influence others.

Community co-operation is very important to road safety in the field of drink driving. Homel and Wilson (1987) say that enforcement is difficult as there are considerable problems of policing the drinking age of 18. In New South Wales illegal purchases of alcohol are currently made by up to 50% of 16 year old boys and 38% of 16 year old girls and publicans have difficulty in recognising age.

UNITED KINGDOM RESEARCH

Dix and Layzell (1983) have commented that the most powerful weapon against irresponsible road user behaviour is public opinion. They recommend that any program of education be aimed not just at road users but at all members of the society and particularly the young.

Research has been undertaken into the development of secondary school curricula. The aim of school curricula was to teach good

driving as a challenge and rewarding in its own right rather than just teaching information on the rules.

Research showed that curriculum content should be as follows (Dix and Layzell, 1983):

11-12 years - knowledge of traffic safety, understanding traffic rules and practices to prevent accidents, motives and road user behaviour in difficult situations, favourable road user habits.

14-16 years - vehicle and driver fitness and accidents, legal and financial aspects of vehicle ownership and its use, action in emergencies.

UNITED STATES RESEARCH

Matthews (1984) says that in the United States, research has shown that it is not cost effective to attempt to increase enforcement action or penalties for drinking drivers. The community systems have to change so that drinking and driving are discouraged. One way of doing this is to ensure that people learn to drink at a different age to learning to drive.

Hamel and Wilson (1987) state that the report of the Presidential Commission on Drunk Driving in 1983 stressed strategies directed at behaviour change.

Diversion Programs:

Ross (1982) says that the Department of Transportation in the United States launched Alcohol Safety Action Projects (ASAP) during the 1970s. These programs utilised existing community agencies and used the legal system to identify and refer problem drinkers for treatment.

Police patrols were increased and the Court's efficiency in processing drink drivers was improved. Penalties were reduced with the provision of treatment as a diversion from offending. These programs increased the probability of apprehension of drinking drivers

by special patrols and increasing police sensitisation to drinking drivers.

Evaluations found that 12 of the 35 individual projects led to declines in night time accidents. Surveys of blood alcohol concentrations among non-accident involved drivers in selected hours were conducted at 27 sites and there was a significant drop in the proportion of illegal blood alcohol concentrations (dropping from 53 to 46 per 1,000 drivers).

Community Action Groups:

Homel and Wilson (1987) say that American research has shown that emotional responses to drink driving are pronounced. MADD (Mothers against Drunk Drivers) and RID (Remove Intoxicated Drivers) have been successful in persuading legislators to pass laws with harsh penalties. Imprisonment for up to three days is mandatory for first offenders in 17 states and 42 states provide mandatory jail terms of 2-60 days for second offenders.

School Driver Education Programs:

Homel and Wilson (1987) say that an evaluation by Robertson in 1981 of the high school driver education program in the United States reported that it increased the number of 16 and 17 year olds licensed but did not reduce the number of accidents per licensed driver with a net result of more accidents.

CHAPTER 5

POLICE OPERATIONS IN OTHER COUNTRIES

SUMMARY

In the United Kingdom warning procedures have been well developed by the police and increase public co-operation.

A case study of Surrey Constabulary has shown that techniques can be used to gain public cooperation through direct police involvement in community education programs.

In this English county police have to combat the problems of huge traffic flows on a new motorway and the dangers of people unaccustomed to motorway driving. Speeding violations are now being seen as an offence which may be best dealt with by camera rather than risking further accidents from high speed chases.

The traffic police have opportunities to specialise in their training through in service courses in various specialties.

In the United States there is a wealth of research on road safety and law enforcement. Evaluative research is used to show the effectiveness of police procedures. The Department of Motor Vehicles in California has shown that working with road users who have repeat violations may be effective in reducing accident rates.

The Californian Highway Patrol has identified methods of observation of drivers which show offending drivers. This practical information on driver behaviour has application to any police force.

The overseas research shows that there is considerable work done on road safety which is useful for comparative research purposes and for practical application to Australian police departments.

INTRODUCTION

The aim of this chapter is to review information from other countries to identify police operations and the components of those operations which increase road safety through deterrence and public co-operation.

UNITED KINGDOM

Traffic Police

In Britain traffic officers have been found to be more specialised in the knowledge of this area and they have more scope to be selective in the offences for which they stop drivers. This means that some offences may receive more attention. The range of regulations is very broad and in Britain it has been found to be useful in having some officers specialise in certain types of regulation and the traffic law. They advise their fellow officers and a method of policing all offences results.

Warnings:

Dix and Layzell (1983) say that when the British police detect an offence a decision is made on whether to intervene and what action to take. The decision on intervention is determined by force directives, road safety campaigns, and the officer's attitude towards particular offences.

Dix and Layzell have found that some officers make the decision as soon as the offender is stopped while others assess it after discussion with the offender. When decisions are made in the latter way discretion is more likely to be used by the officer. By judging the person's attitude, officers determine whether there is need just for a warning or whether a warning would be insufficient to prevent reoffending.

Warnings which were highly personalised and informal were found by police to be the most successful. Reporting offenders however is most successful when it is efficient and impersonal.

The warning process has been found by police to be one where the motorist accepts the officer's advice and there is an appreciative attitude immediately afterwards. These attitudes may last for several months.

However Dix and Layzell (1983) found that the motorist's attitudes towards warning advice was affected by whether he believed records were being kept.

Written warnings were assessed to be probably more effective than informal warnings and as effective as prosecution. They also are better for motorist-police relations and are less costly.

One of the ways in which written warnings work on the motorist is that he is told that his offence will be reported, and for several weeks he waits until the police inform him that they have decided not to prosecute. With written warnings a standard format of words typed as a personal letter was more effective.

Training:

Dix and Layzell (1983) recommended that in police training there are advantages in using experienced traffic officers and emphasis be given to the use of discretion, the communication skills for giving advice and warnings, and the need for awareness of the impressions the individual is making on the road user.

Factors in police/motorist interaction which affected the acceptance of the police were summarised by Dix and Layzell as including the officer's approach in a courteous, positive and businesslike manner, and the use of informal sanctions. Crouching at the driver's level by the car door and not wandering around the car before speaking to the driver or unnecessarily repeating questions were found to be useful techniques.

Blitzes:

Ross (1982) says that the Cheshire Blitz in 1975 was associated with a diminution of serious injury accidents. This blitz tested motorists at six times the national average.

Breath tests were given in all investigations of accidents and traffic law violations during night time hours 9 p.m.-4 a.m.. Accidents were measured for the year 1974 and 1975 and the drop in serious accidents for the month was found to be statistically significant. (Ross controlled the night time group with a sample from 2 p.m.-5 p.m. for one month.)

Matthews (1984) reports that the British police had a Christmas publicity campaign on drink driving where the courts started to send drink drivers to jail. The huge outcry in the media led to an increased public perception of the risk of detection and casualties went down. The number of casualties over the legal drinking limit dropped from 38% to 32%.

Evaluation of Police Operations

Evaluations of police operations have been carried out by the Home Office Scientific Research and Development Branch. It has been found that:

1. Visible policing through cars or motorcycles reduced speeds in the immediate vicinity of the vehicle.
2. Radar (single or double) had lasting effects up to seven days whether concealed or unconcealed.
3. Warning signs on police checking the area for speed reduced speed for the five days they were left in place with or without a police presence. These signs were found to work for up to 12 weeks with only five applications of police radar.

British research on drink driving includes a national data bank at TRRL which receives police records of every accident (Matthews, 1984).

CASE STUDIES OF POLICE OPERATIONS

The following case studies give details of two police forces in the United Kingdom and their road safety operations. While the information from the police is not conclusive in proving methods of reducing road accident statistics, the figures that are provided do show reductions in accidents with specific programs. An overall conclusion that can be derived from the two case studies is that the police use a variety of programs, some directed at enforcement, some at prevention and there is an overall result of increased public co-operation through fear of detection and excellent police/public relations.

Case Study - Surrey Constabulary

Although a comparatively small county, Surrey Constabulary Police area is responsible for 93 miles of motorway including the M25, M3, M23 and A3 as well as 14 miles of trunk roads, 308 miles of A-class roads and 1,873 miles of other roads.

Prior to completion of the orbital M25 motorway it was well documented in Department of Transport statistics that traffic flows in Surrey were double the national average. In addition, the county straddles several busy commuter routes into London. The completion of the M25 in Surrey has generated significant extra traffic on several radial routes (up to 25% increase on the A3 south of the M25 junction).

The M25 has huge traffic flows which have been measured at busy times as up to 156,000 vehicles during a 16-hour period. In such heavy volumes even minor accidents can cause severe congestion which quickly builds back along the motorway, posing a threat to approaching traffic. Serious incidents involving closure of the motorway can mean tail-backs of up to 26 miles causing serious traffic problems throughout the county and in neighbouring areas.

Some accidents on motorways can involve several vehicles and severe damage to the front and rear of vehicles. It has been noted however that these accidents rarely cause serious injury or fatalities

if seatbelts are worn. This is also partially attributed to the improved modern car designs which allow vehicle sections to crumple. However, high speed accidents involving cross-overs or in fog invariably result in fatalities, as illustrated by the tragic 1984 accident at Godstone on the M25 when nine persons perished.

Range Rovers used on the motorway carry full accident signing equipment including flares and are also equipped with "stem lite" mast capable of illuminating accident scenes.

The strategic deployment of these vehicles, particularly at commuter periods, means that broken down or accident damaged vehicles can be quickly removed from the carriageway to the hard shoulder in order that normal traffic flows may be restored.

Deployment:

Police deployment concentrates on patrols to the motorway, to subdivisional areas, and to speed detection using radar, fast cars, across the road devices and unmarked patrol vehicles.

Speeding:

Increased concern at the potential danger when attempts are made to stop high speed offenders has led to a working party being set up by the Association of Chief Police Officers to look at the problem. It is intended that consideration be given to the use of cameras in conjunction with either radar or electronic devices in order that speeding vehicles can be photographed without stopping and summonses subsequently sent to the registered owners of the vehicles. The implementation of such systems has significant advances over current methods by reducing the need for high speed pursuits with the obvious road safety implications.

Dangerous Drivers:

Irresponsible drivers who are speeding can be elusive as they may decide that they can get away from a police car which is on the hard shoulder of the motorway. They also change their behaviour when aware

of a police presence and their dangerous driving remains undetected unless viewed by the crew of an unmarked car.

There is a certain group of drivers who are in the minority but are very dangerous and aggressive in their driving.

Accident Analysis:

In general, accident figures are not always helpful with respect to analysing causation. Actions may be serious accidents, crossover accidents on the motorway or non-motorway accidents where the driver loses control of the vehicle when attempting to negotiate a bend at speed. The result very often is that the vehicle moves to the offside of the road colliding with oncoming traffic, invariably causing fatal or serious injuries. Some accidents involve an anti-social minority whilst others involve a degree of recklessness or can be attributed to the consumption of alcohol. Many more are caused by a momentary lack of concentration on the part of the driver. It is difficult to relate accident reduction to a specific police activity.

Primary Road Safety Objective - Driver Education:

The overall road safety objective of the Traffic Branch is driver education. There are initiatives in the Six Form Colleges and Secondary Schools where officers talk to students on all aspects of driving or motorcycle riding. "Better Driving" talks are run several times a year in each of the three traffic areas and attract about 50 persons to a session. In excess of 1,000 persons may attend during a year. In addition, the branches recently introduced a course of motorway driving lectures on the first Monday of each month to assist vehicle drivers to be competent on the motorway. These lectures are advertised in local media and in addition driving schools in the county are requested to encourage their successful students to attend.

Driver Retraining:

Part of this year's objective is to analyse injury accidents and invite all drivers (including those not presumed to have caused the accident) to come to driver education talks.

Specific Objectives:

1. Reduce Accidents at Black Spots.

The traffic branch has three accident traffic areas whose boundaries are coterminous with the Territorial Divisions. In addition to the central theme of driver education, each traffic area has its own additional objective. One of the areas has the objective of reducing accidents at black spots. This involves identifying the black spot, carefully analysing causation factors and deploying the appropriate resources in an effort to reduce accidents.

2. Reduce Number of Drink Related Accidents on Certain Hours on Certain Days of the Week.

To reduce the number of alcohol related accidents occurring between 8 p.m. and 2 a.m. on Thursdays, Fridays and Saturdays, 1987-88 compared with 1986-87. It has been discovered that drink-related accidents occur over a relatively restricted period of time, usually late evening of Thursday, Friday and Saturday. Patrols are therefore deployed at such times with a specific aim of deterring or detecting the drink driving offender.

3. Defective Vehicles.

The percentage of accidents caused by defective vehicles is not great but recent checks by the eastern traffic area in conjunction with the Department of Transport examiners using mobile testing stations revealed a high number of defective vehicles. Therefore it is considered necessary to concentrate on further checks throughout the year and monitor results.

Relationship with the Media:

There is a positive relationship between the police and the media with regular interviews being given to the BBC, ITV and local radio.

An example of the media program is to use a camera and a traffic officer to show people driving badly on the motorway and the officer's commentary is used to educate the public. Local radio programs may use a police officer highway engineer or magistrate, etc. for a public

"phone-in" on road safety. The overall theme by the police is to have a community approach and try to get co-operation by education in addition to the traditional policing methods of advice, warning and, when necessary, enforcement.

Enforcement:

Police can advise, warn or report the motorist by use of an Extended Fixed Penalty ticket, Vehicle Rectification ticket or a summons. The Extended Fixed Penalty tickets are of two types - Endorsable (£24, \$50 approximately) and Non-endorsable (£12, \$25 approximately). Officers use their discretion and if, for example, a rear light of a vehicle is not working but the vehicle is in good condition then there may be a warning.

Police Training and Morale:

Traffic officers engaged on better driving and motorway lectures are given public speaking courses. Most are highly motivated and often prepare material in their own time. They also have first aid and major incident training. Motivation in traffic work comes in part from seeing the after effects of accidents.

Officers with specific abilities may have the opportunity to specialise further in the following areas of traffic policing:

Lecturing the public.

Accident Investigation.

Tachograph.

Hazardous Chemicals Movements.

Vehicle Examination.

Accident investigation officers have to be trained to a high level and if officers have initiative and a good all round ability they may be nominated for this type of special training.

Case Study - Nottinghamshire Constabulary (Source Nottinghamshire Constabulary, 1987)

"The secret of success is first you have to be active and then convince the public that you are active."

Statement by Assistant Chief Constable Nottinghamshire Constabulary

1. DRINK DRIVING

Nottinghamshire Constabulary operate in an area which has one million people. The police consider that their work is not catching drunks but creating in the mind of the driver the perception that if he is above the limit he has a reasonable chance of being caught. Preventive use of the law is about reducing risks to the road user.

In England and Wales 25% of all accidents show a positive blood alcohol reading in the driver. In Nottinghamshire this figure has been reduced to 6.7%. When there is a campaign, for example in July 1987, this figure was reduced to 3.4%.

Police Operations:

The Traffic Department is responsible for 90% of breath tests given but this department consists of only 9% of the force. The ordinary policeman on the beat is hardly ever involved in this work and often would not be equipped for it, e.g. in giving a breath test.

Nottingham has consistently worked against drink driving and figures (1986) show that one in eight of all breath tests in England and Wales are given in this county.

Drink Driving Campaigns:

For almost a decade Nottinghamshire Constabulary has carried out a Christmas drink driving campaign because of the appalling casualties from drink driving.

Statistics have been compiled using the three preceding "non-campaign" years and comparing that base with the succeeding campaign Christmas fortnights. Statistics for the Christmas fortnight for the three years before the police commenced the Christmas campaigns showed that there has been a reduction in fatalities for that fortnight by 21%, serious injury by 50% and slight injury by 26%. The overall reduction is 32% on all injuries.

At the start of a campaign there is a full month of local publicity. The media are invited and the police have a talk with television, local press and national press and tell them they are having a campaign for the Christmas period and are going to run a publicity campaign before the drink driving campaign commences. The media are invited to accompany the Traffic Department in cars and are present when people are stopped and breathalysed. If the person is negative he has a word with the press and every day there is a human story. The press participates in this as it is very popular and gives the police a very high profile. The public is told that everyone in an accident will be tested whether innocent or not in causing the accident. The drivers will also be tested if stopped for a moving traffic offence.

The police concentrate on half a dozen offences which are known to be the main cause of accidents - speeding, going too fast for the weather or road conditions, too close to vehicle in front, turning right across oncoming traffic and not judging distance of oncoming traffic, lighting defects, going over the continuous white line.

The press are given a theme each year, for example someone who has lost a relative in a recent accident will be the centre of a theme of "the empty chair at the table". Other themes may be someone who has been prosecuted for drink driving for killing someone and the effects on him and his family, his loss of employment, selling his house, etc.

The campaign is "sold" as an attempt by society to reduce accidents and casualties. This is the human side of the campaign. The police release breath test figures daily, broken down under the

three headings giving the total, the total positive and the percentage of positive tests:

1. Suspicion of alcohol.
2. Moving Traffic Offences.
3. Accidents.

A running total is given every day. It has been found that these details must be given daily to maintain interest and more importantly to increase the perception of detection. For example there may be 382 tests in a day and 5,730 for a fortnight which show people the proof of police intentions.

On the opening day of the campaign the public is told that the police will be in a specific area and they are to look and see the traffic cars about. This is high conspicuity. The first half of an evening watch is the preventive half which affects people on their way out to pubs. Then cars are switched to other areas after this in the enforcement period for people coming out of the pubs. This is done for the first few days of the campaign. It is not labour intensive when done well and uses minimum resources to maximum effect. In this way the cost benefits of policing are assured.

"The public is then told - Now it is up to you to find out where we are. Play safe and don't take the risk."

Over the past decade of these Christmas campaigns public opinion has shifted from a position of outright criticism to total support. Social drinking patterns throughout Britain have changed and it is due to the specific enforcement campaigns of some of the police forces which have created in the mind of the driver that he will get caught. The campaigns are backed by an increasingly more positive Government publicity campaign. However positive media campaigns are very limited in their effects if they are not supported by high profile police enforcement.

Training:

Morale is high in the Traffic Department. Officers who are selected have three to four years or more on the beat and show aptitude. They have to reach a certain standard of driving, know the legal aspects. The department teaches its own philosophies. There is some tendency in individuals to have special interests. However the work by the police is not confined to traffic matters. For example, they may be first officers on the scene of a crime and in responding to "999" calls. Traffic are also the first containment fire arms unit. There are three double manned cars and for any firearms incident two of the three cars are sent.

Public Opinion:

In recent years public opinion has swung against the drink driver and a recent national survey has shown that 73% of the public are now against drink driving and in favour of RBT.

The age group which is most against drink driving is the younger group of 18-25. Older people seem more entrenched in their attitudes.

Vehicle Rectification:

Statistics show that 2%-8% of accidents are caused by defective vehicles. The law today is limited as the driver with a defective vehicle can only be summonsed and taken to court and fined or disqualified if there are already enough points against him. This is purely punishment. The Court, as the law stands at present, does not possess the power to order a defendant to get the vehicle repaired and produce it for the Court's inspection.

A scheme designed and initiated by Nottinghamshire Constabulary attempts to change the situation so that the driver does not go to court. He is given an opportunity to put his money into rectifying the vehicle instead of paying court fines. At the time when the defect is discovered by the police officer, the driver is reported for summons and at the same time he is issued with a VDR form which

specifies the defects to be rectified. The driver must have the defects rectified forthwith but is given 14 days to get the paperwork (the certified form) back to Force Headquarters. The scheme has led to a large reduction of people on these offences in court.

Vehicle rectification in Nottinghamshire has led to 76.6% of all vehicles which come to notice being rectified and 4-5% of them are scrapped. This means that old cars are gradually put off the road.

There has been very good co-operation by everyone. For example, in the first quarter of 1987, a total of 5,122 tickets were given for 6,588 defects. Three thousand persons (almost 60%) were cautioned at the scene and told to fix it, and 40% were notified formally to rectify it and report back for inspection. Of this 1,571 were rectified (76.6%) and 4.5% were scrapped. In total only 8% of people had to be prosecuted because they would not do anything.

This scheme has now been adopted by all forces in England and Wales and Scotland and it is a voluntary police practice as it is not covered by statute.

Warnings and Cautions:

Police power of discretion has meant that at the lower end of the offence range more than two people are cautioned, advised or warned for every one person prosecuted.

Young Drivers:

In winter the motorcycle sections have a mobile road show and go to major towns and villages. Young people often start their driving lives on motorcycles, so the police have decided to hire halls and get police cars and motorcycles, and people to talk on insurance and licensing and county council road safety schemes. Youngsters who are considering buying a bike and their parents are invited to talk to professional police motorcyclists and they are directed to courses by voluntary agencies and given information on their insurance needs.

Driver Rectification Course:

Nottinghamshire Constabulary also devised and initiated a Driver Rectification Scheme and is the only force in the United Kingdom to undertake this type of training. There are half a dozen constabulary instructors who are teaching the full range of driving from novice to high speed driving who are used for these courses.

Drivers chosen for the Driver Rectification Course have almost all been involved in accidents and have been judged by the investigating police officer to have been at fault because, for example, they were approaching a junction in a wrong way, not reading signs or other habits which could be trained out. These drivers were told that if they attended the police driving school for one day, at the end of the course they would be cautioned and no criminal action would be taken - this does not preclude civil action.

To date all who have been offered the course have attended and there has been 100% satisfaction with everyone saying they have benefited. The instruction consists of hands on driving and there is no charge. The drivers have to have a driving licence and are covered by police insurance for the day. There is a short lecturette and one instructor is placed with two students. They are taken out for a test without comment and tested later in the day.

The driver rectification course has now been extended to drivers with a bad record and a high number of endorsement points. When they come to notice they can be offered this alternative. There is not such a big group of these - about 50 in the past twelve months.

The aim of the course is to obtain a 25% improvement in driving ability generally and in crucial areas of driving a 40%-50% improvement should be obtained.

It has been found on the driver rectification course that there is a group of people who have the capacity to pass a driving test but who are dangerous on the roads. There may need to be in the future some development of psychological testing to assess this type of

problem. There may need to be a psychological assessment in some cases.

Like Vehicle Rectification, Driver Rectification does not have statutory backing and is based on constitutional powers of discretion of the constable.

High Risk Offenders:

These are people disqualified twice within ten years when on both occasions their alcohol level was 2.5 times the limit. They would be reported to DVLC at Swansea and would be required to satisfy a panel of DVLC doctors that there was no longer any drinking problem and could safely be given back their licence after the period of disqualification.

In the most recent Christmas campaign it was found that almost 11% of those drivers who were positive had previous convictions for drink driving, were at twice the official level, were awaiting trial on a previous offence, or were actually disqualified from driving for previous drink driving at the time of arrest.

The policy of Nottinghamshire Constabulary is now that if anyone has a previous conviction in the last five years, refused a blood test or there is action pending and shows a blood count over 0.05 they are put before the court the next day on a summons and it is asked as a condition of bail that there be no driving until the case is decided. People were in custody overnight and nearly 11% have been remanded to prison until the case was dealt with.

Of the offenders kept in custody and placed before the Court the Magistrates have dealt with them as follows:

65% Bailed with a condition that they do not drive until their trial.

1% Bailed with a condition that they must not visit licensed premises.

11% Remanded in custody to trial.

4% Remanded into police custody for early trial.

18% Bailed without Conditions.

Suspending a driver's licence before trial has been a safety precaution aimed at keeping irresponsible drivers off the road.

Speeding and Persistent Speeding:

Cameras are being assessed as they enable police to catch the persistent speeder on high speed roads such as motorways where it would be dangerous to have high speed pursuits. At peak times it has been found that the three lane dual carriageways are very difficult to deal with as they have a vast influx of cars and lorries travelling at excess speed. This is particularly serious as the highways approach residential areas.

The cameras give a photograph of the car and registration number, date, time down to one hundredth of a second and speed at which the car is going.

These devices are being assessed and cannot be used for prosecution purposes.

Red light violations are a serious problem where motorists "jump" the red lights and apart from being a criminal offence it is highly dangerous. It is estimated that at one particular junction in Nottinghamshire over the past five years over 25% of all accidents on the junction have been caused by "jumping the lights". In this situation cameras photographing the offence and the number plate could assist in reducing the number of accidents.

UNITED STATES

Drink Driving:

In the United States a blood alcohol concentration is specified in the laws of all states. The limit is 0.10% in all but two states where it is 0.08. There is a universal requirement for a driver to

submit to chemical testing for blood alcohol and in 12 states prison is a sanction for a first offence of drinking and driving. Other states have it for second and subsequent offences. Licence suspension is mandatory almost everywhere mostly for second and subsequent offences (Ross, 1982).

Implied consent legislation in California has as a condition of licensing that the person will undergo a blood alcohol test if required and the licence is suspended if refused. This reduces exposure and most drivers obey - it has been found that even if they continue to drive disqualified drivers are much more careful (Matthews, 1984).

Homel and Wilson (1987) have reviewed the drink driving program in the United States and say sobriety checkpoints have been resisted by civil liberties groups. Police have to carry out field sobriety tests and use passive alcohol sensors to side step difficulties in enforcement.

Use of Records:

Matthews (1984) reports that Michigan has two fatalities per 100 million miles which is below the national average. They state this is due to a black spot identification program (MALI) which leads to police stepping up enforcement activities.

Matthews (1984) describes a method of accident analysis within the Department of Transport Washington - road users are classified by type of accident and the attempt is to develop countermeasures for each type. On a national basis the aim is to identify the problem, analyse, identify and test most promising countermeasures.

Matthews (1984) reported that in California the Department of Motor Vehicles found that it was much more effective in reducing accident rates to take remedial action with accident repeaters than traffic rule violators. It was suggested that driver records should record all accidents rather than violations.

The Californian records of accidents contain details of driver, time, injuries, alcohol, physical contributory factors or physical mental disabilities of the driver. People who are involved in more than one accident are called in to discuss their record and discuss how they may have avoided the accidents. Defensive driving is promoted.

An early procedure which was developed by the San Diego City Traffic Engineering Division and police was to analyse accidents and use selective enforcement. The enforcement techniques involved deploying officers where problems were known to exist and requiring officers to concentrate on violations which caused accidents. A collision index was designed which organised accidents into five headings - intersection accident frequency list, intersection accident rate list, intersection alphabetical sequence list, classified street accident rate list, and list of routes with above average accident experience. Information identified on computer was relayed to field officers in the form of a small booklet. The combined police-engineering approach led to a decrease of 44% in the top ten intersections (Bankhead and Herms, 1970).

Police Operations:

Ross (1973) describes a method used by the California Highway Patrol to list standard cues to detect offending drivers:

- High speed.
- Driving in spurts.
- Frequent lane changing at excessive speed.
- Improper passing.
- Overshooting.
- Approaching signals at fast or slow speeds.
- No lights.
- Failing to dim lights.
- Driving in low gears.
- Jerky starting or stopping.
- Driving too close to edge of road.
- Driving with windows down in cold weather.
- Driving or riding with head partly out of the window.

An accident avoidance strategy in California described by Homel and Wilson (1987) evaluated four intervention strategies:

Re-examination.

Accident avoidance session.

Mailed a pamphlet/self-administered test.

Assigned to a no-contact control.

Accident avoidance sessions had the best results, followed by the pamphlet test group. Young women were more responsive to the pamphlet approach than older women and older men were more responsive than younger men. The accident avoidance approach worked equally well with all ages and sexes.

Young Drivers:

Homel and Wilson (1987) conclude that young drivers who have committed less serious traffic offences or have simply had accidents can be dealt with by non-punitive interventions.

Curfews have been used in some states in America and comparisons have been made of accident rates of young teenagers with states without the laws. Homel and Wilson (1987) say that the laws usually limit driving in the late evening and early morning, for example between 11 p.m. and 5 a.m., with some exceptions for work or school.

Curfew laws were seen as very beneficial with a reduction of between 25% and 69% in 16 year old driver accident involvement during curfew hours.

Manpower Deployment:

Homel and Wilson (1987) describe an American approach of using all available resources for enforcement at high accident times and places. This is in contrast to another approach by the US National Safety Council of proportional allocation of manpower where police allocation is proportional to the number of accidents occurring during

that day or shift. Homel and Wilson also cite research that has shown that it is a waste of time to assign any officers to low traffic or low accident times even if it is a high frequency accident location.

Diversion Programs:

Homel and Wilson (1987) have reported evaluation procedures by Peck et al. (1985) which show that in the United States rehabilitation programs in lieu of licence suspension have had negative effects on subsequent violations and accidents. This is because licence suspension reduced the exposure of the individual.

CANADA

Matthews (1984) says that Transport Canada has been concerned that police do not concentrate on road safety, except for speeding, and spend their time on other criminal areas. It has been suggested that if police see drink drivers as criminal then the police may focus more on road safety enforcement.

The accident trends in Canada have been that a drop in gasoline sales in 1983 was accompanied by a 10% reduction in travel distance and a 25% drop in fatalities and serious injuries (Matthews, 1984).

Ross (1982) reports that an enforcement campaign in 1969 found that although there were increases in risk perception of apprehension there were no changes in behaviour indexed by accidents.

Drink Driving:

In the Reducing Impaired Driving in Etobicoke (RIDE) roadblocks were set up in part of Toronto at over 100 locations which were high risk areas associated with drink driving. Police stopped 132,000 cars in 12 months. If alcohol was suspected a test was taken - and slightly more than 1% of drivers stopped were given the test.

The program apprehended only a small proportion of drinking drivers but the goal was deterrence not prosecution. Publicity accompanied the campaign and it was found that perception of risk of apprehension increased but the blood alcohol concentrations among drivers involved in accidents did not vary.

Black Spot Programs:

Homel and Wilson (1987) cite a Canadian study by Hauer and Cooper where the street locations in each police district with the largest number of accidents in the previous 28 days were the target of special enforcement.

The numbers of accidents in locations with many accidents post-enforcement were compared with the expected number of accidents for that period. The expected number was calculated from data for four years using an equation which took account of accident history, seasonal factors and whether or not the location was an intersection or mid-block. It was found that high enforcement led to fewer than expected accidents and effects lasted for over a year before gradually fading.

There were in total 1,800 locations in the area of Metropolitan Toronto which could be the target of increased enforcement.

Homel and Wilson (1987) state that time series estimates such as were used in this research are essential to overcome problems of regression to the mean. Some problems however in picking locations and using some as controls are that no two are really alike. Random allocation can deal with this but a high number of locations are needed.

GERMANY

Matthews (1984), reporting on German policy on drink driving, stated that after 1974 the legal BAC limit in Germany was 0.08 which stopped some people drinking altogether as, for example, one stein of beer could put people over the limit. In addition, drivers involved

in an accident could be penalised if they had a blood alcohol level of over 0.03.

The police enforcement procedures in Germany could not include RBT but could stop a driver for a check and, if he was suspected of drinking, use a breathalyser and later a blood test if the crystals turned green. The blood test was necessary for court evidence.

There were proposals to require drivers convicted of alcohol offences to attend 12 group discussions of 2 hours led by psychologists.

A manual on road accident reporting was used throughout the country and it included a procedure for a location map at each station colour coded for accident location and severity.

SCANDINAVIA

Homel and Wilson (1987) have reported on the Scandinavian literature which shows that these countries have moved from the concept of severity of punishment to the certainty of apprehension.

The use of prisons has been reduced in favour of fines and therapeutic sentences. In Norway the use of RBT brought about a seemingly permanent change in fatalities with a 9% drop.

NEW ZEALAND

Homel and Wilson (1987) report that random stopping has been used in New Zealand since 1984. Roadblocks are used to check licences and equipment and drivers are breath tested if suspected. The impact of the program was evaluated as being significant in the first three months after which effects have been negligible.

THE NETHERLANDS

In The Netherlands which has a population which is similar to that of Australia there is a five year plan 1987-1991 for road safety (Boughton, 1987):

Young pedestrians.

Young cyclists.

Young drivers.

Elderly pedestrians.

Elderly cyclists.

Mopeds.

CHAPTER 6

COST EFFECTIVENESS OF ENFORCEMENT PROCEDURESSUMMARY

Planning, Programming, Budgeting Systems (PPBS) have considerable advantages in the evaluation and costing of law enforcement programs. It is advantageous to road safety to compare costs of law enforcement programs with savings to the community. Figures on costs of road accidents show \$450,000 for a death, \$92,000 for a serious injury and \$10,000 for a minor injury (1988 figures, Federal Office of Road Safety).

The steps in PPBS comprise a statement of objectives, examination of alternatives, development of a program structure with functions, programs, sub-programs and activities, choice of programs, evaluation of alternative means, and an audit.

Apart from equipment used in police operations there is an argument for the assessment of whether the road toll can be reduced effectively by inbuilt measures relating to physical design. For example, there are safety factors in road design, vehicle design and in the control of traffic. These are usually developed at a large cost but are inbuilt safety factors which reduce accidents. Some examples which are receiving attention in Australian and overseas research laboratories are:

Use of traffic flow monitoring and warning systems.

Seat belt design.

Dual carriageways with emergency stopping lanes.

Increase in public transport provision in inner city areas.

Area-wide analysis of road design in high accident rate areas.

Brake and impact absorption systems in trucks.

INTRODUCTION

The aim of this chapter is to describe theoretical methods whereby law enforcement systems can be costed to assist in the evaluation of their effectiveness in road safety. The first part of the chapter describes a systems approach to costing which is an alternative to the static annual budget and allows comparisons between police operational outputs.

In the second part of the chapter mechanical devices are reviewed to identify the use of the physical environment in road design and the design of vehicles and traffic flow systems to increase road safety. When considering the effectiveness of road safety improvement, mechanical systems as well as law enforcement procedures should be considered so as to provide a broader approach to the problem. Costing considerations of both types of road safety measure are important to governments when budget priorities are being decided.

COSTING SYSTEMS

There are two components of research on the costing of law enforcement operations. Firstly there are theoretical structures which can be used to produce cost effectiveness assessments of road safety measures, and secondly research on specific programs.

The program budgeting approach to management has been implemented in Australia over the last decade in a variety of ways. In an early paper discussed below, Hodges (1974) has outlined the benefits to departments of using this system.

Theoretically PPBS is a system which can be applied directly to the management of law enforcement procedures. It provides an accounting system which discourages manipulation by managers and contains a reporting system which allows the police administrator to review his priorities in manpower and resource allocation at any time during the fiscal year. Because of its flexibility PPBS can allow changes in budgeting in response to successful evaluations of road

safety programs and allow the redirection of resources into those areas which are judged to be cost effective.

Effectiveness in road safety may be measured through savings to life and property from a reduction in accident rates, and cost effective police operations.

Road safety is one area of policing where potentially a large economic saving can be achieved for the community by effective policing. Police budgets based on analysis of cost effectiveness in the road safety area may show large savings to the community compared with existing police road safety priorities. However without such comparisons road safety is likely to be lost in the morass of other police objectives.

Planning, Programming, Budgeting Systems

Hodges in 1974 stated that governments do not have the structured framework for decision-making that highly developed information systems provide for large business organisations. Traditional annual budgeting systems of government departments were described as inadequate because, while they emphasise accountability, this emphasis is at the expense of:

1. Management which needs to continually monitor progress and take remedial action; and
2. Planning with rational objective oriented programs.

Hodges recommends that annual budgets be transformed into:

1. Five year projections so that future costs are identified.
2. Items of expenditure grouped into programs (outputs).
3. A comparison of total costs of programs and total benefits. This last procedure helps ensure that each program could not be accomplished more efficiently by alternative means.

A simple explanation of a program budget is that it encourages administrators to specify clearly what their goals are and requires that the use of resources be justified in terms of meeting those goals.

PPBS allows the definition of priorities by categorising costs in terms of broad fields (or programs). Within each program decisions are made on priorities so that sub-programs are balanced to achieve broad objectives.

An application of Hodges's explanation to the road safety area in police budgetary management could be as follows:

Top management determines the objectives and these are formulated into plans for all segments of the police force. Lower level managers form these into sub-objectives.

Each program has a hierarchy of objectives and plans expressing the priorities of top level management and lower level management. For example, a police commissioner attaches greater importance to a reduction in road deaths. This may ultimately result in the Superintendent of Traffic's sub-programs becoming (a) speed reduction enforcement in the metropolitan area and (b) a reduction in the number of drink driving offenders.

STEP 1

A statement of the Program's objectives in order of priority includes:

- (a) Specific information on what management wants to achieve and how much change, e.g. reduction of deaths by 5%.
- (b) Why? For example to stop financial drain on the community.
- (c) For whom? For example so that young men aged 19-24 will have a lower risk of death on the roads in the metropolitan area.

STEP 2

There are ways of measuring the relative effectiveness of various alternative sub-programs to achieve goals. For example, the use of police cars, motorcycles, radar, amphotometers, and camera may be measured by costing manpower levels and equipment against income generated, number of offences detected, and reduction of accidents in the area.

A realistic goal for an effective speed program may be a reduction in the number of drivers exceeding the speed limit by 5 km/h.

These objectives have to be consistent with top police management's broader objective of reducing road deaths.

STEP 3

Once the objectives are established a program structure can be derived with a hierarchy of plans called functions, programs, sub-programs and activities.

Functions are the output of the programs (as described earlier this system emphasises the output).

This structure can also serve as the unit of appropriation, i.e. the programs are allocated funds and only then are allocations made to sub-departments according to the nature and extent of their required participation in the various programs. This forces managers to plan in terms of outputs first and inputs last.

It also provides flexibility for shared budgeting between different sections of the police who co-operate on a program. For example, traffic police may be involved in the major part of the program but funding may also have to go to other sections of the force such as for the detection of stolen vehicles which are known to be involved in a disproportionate number of speeding offences.

Program budgets can be linked to conventional budgets by budget crosswalks or grids where there is a matrix of expenditures with

programs as row headings (with row totals showing total expenditure on each program) and line items as column headings (with column totals showing aggregate expenditures of each line item).

Other information is also available from PPBS procedures: for example, by aggregating specific program line item matrices into function line item matrices. There can also be a plotting of the time dimensions against any level to show a matrix showing program activity by years 1 to 5. This type of data processing is dependent on the amount of data that can be efficiently collected at the activity level.

STEP 4

Evaluation of programs is based on predicting their future social and economic implications and this in turn can re-influence the objectives of the program. For example, where it is realised that further effort in policing a black spot area is going to lead to little or no further change of speeding behaviour, the objective may be altered to looking at the road design in the area with the assistance of local authority engineers and the diversion of these police resources to other tasks.

STEP 5

Once an evaluation of outputs has been made there is a process of choosing between various programs. This is particularly true of law enforcement and road safety as many different types of police activity can have an effect on road user behaviour.

There must also be consideration of the goals of government which are often not as clear as those of private sector industry. Governments are not spending to generate income for themselves. Program budgeting can place alternatives in juxtaposition and compel consideration of relative values by giving an explicit framework to clarify the nature of the choices to be made.

STEP 6

Once programs are chosen there is an evaluation of alternative means of achieving an objective and evaluating the progress of programs. This may, in turn, lead to some reformulation of objectives.

It is possible and highly desirable in PPBS to establish a formal progress reporting system which regularly provides indicators of performance for management at each level of the program structure. For example, each police district returns figures to the traffic superintendent who converts these into a summary for the commissioner.

To develop these systems it is necessary to establish significant and measurable outputs or units of work for the programs, sub-programs and activities.

The traditional accounting system also requires some restructuring so that expenditures can be allocated to the relevant activities as they are incurred and added together to provide program or sub-program totals as well as traditional line item totals at frequent intervals as desired.

Finally, criteria should be established for monitoring performance in terms of each output of work. These criteria need to be result oriented, stable over time and compatible to aggregation. For example, the number of man hours in speed control, the number of offences detected, and the number of accidents for the area over each seven day period may be used.

This process also requires a formal system of collecting data and calculating and reporting these criteria to management. This progress reporting system is important as it needs to be aggregated at each level so that progress is reported constantly to senior management.

The elementary measures it provides are volume indicators which measure the output of the program, sub-program or activity by counting the number of beneficiaries (e.g. projected number of accidents minus actual number of accidents may show 20 fewer accidents in the area).

Another measure is the total volume of the commodity provided which may be total dollar value of all savings.

In addition to volume indicators there are performance indicators which provide approximate measures of effectiveness and efficiency at each level: for example, by comparison with results achieved in previous years, results projected at the time the project was authorised, most recent projections, or results achieved in similar programs elsewhere.

STEP 7

The management audit is used to ascertain how well management at all levels has performed the tasks allocated to it in the program structure and how suitable the structure has itself been for achieving the program objective.

This ensures each activity did attain its intended sub-objective and each sub-objective was necessary for the achievement of a higher objective. For example, the reduction of speed in some police districts may have been found to have no relationship to the overall objective of fewer road deaths so other sub-objectives may be identified in the next program, e.g. to police closer to hotels for drink driving rather than concentrating on daytime speeding on divided highways.

POLICE COSTING IN AUSTRALIA

Random Breath Testing Costing

Cashmore (1985) says that in random breath testing there are four main categories of costing - enforcement with personnel and equipment, publicity, revenue losses to liquor industry and government, and loss in revenue from fines.

An estimate of New South Wales costs in operations in the first two years of operation were 134,000 police hours costing \$1.68 million and using equipment costing \$1.3 million. Advertising cost

\$2.72 million. The liquor industry lost about \$52 million and this meant a fall of \$5 million in liquor licence fees to Government. The net loss in revenue from fines was estimated at \$2.38 million.

On the benefits side the lower court use with the fall in people appearing with PCA charges was estimated at nearly \$250,000. Social and economic costs in terms of lost life of road victims involve the following estimates:

Foregone income.

Losses to family and community for work outside normal working week.

Hospital, medical and rehabilitation costs.

Vehicle damage.

Legal and court costs.

Using 1983 Federal Office of Road Safety estimates of costs of accidents for fatalities, major and minor injuries, Cashmore (1985) estimated that the random breath testing represented in 1983 a saving of \$88.78 million in fatality costs, \$31.8 million in injury costs totalling \$120 million. The 1984 estimates totalled \$98.3 million. The two year cost savings were totalled at \$218.3 million. (The figures were based on pre-random breath testing six year predictions of expected number of fatalities and injuries.)

Recent estimates by the Office of Road Safety (1988b) are that costs for a fatality are \$450,000, \$92,000 for a major injury and \$10,000 for a minor injury.

AMERICAN RESEARCH ON LAW ENFORCEMENT COSTING

Matthews (1984) states that American research suggests that any one countermeasure that could reduce accidents by 10% would be exceptional because roads are already so good. In assessing effects there are major problems because the figures statistically will revert towards the norm so black spot accident areas will tend to revert whatever enforcement is done.

Trilling (1978) comments on the use of an assessment of a marginal return on the national dollar as a criterion of an acceptable level of expenditure on road safety.

Costing of Police Operations:

Hamel and Wilson (1987) describe an American study by Shoup (1973) of cost effectiveness of police enforcement techniques for traffic laws in Los Angeles in 1968-69. An experiment was based on special motorcycle officers using one beat with one visible officer who issued no citations and six beats where standard procedures were used but the number of officers was increased during the experimental period. Accident data, citations, traffic volume and speeds were the major outcome measures and cost estimates were obtained for police enforcement and dollar values put on automobile travel. Dollar estimates on the benefits to be gained from reductions in frequencies of various forms of accidents were also obtained.

The evaluation found warnings reduced accidents by 13%, and officer numbers correlated (0.83) with accident reduction. Analysis of costs showed all beats which involved varying the number of officers showed a negative benefit as the drop in numbers of accidents was outweighed by increased costs.

Police in the United States are being encouraged to look at drink driving as having a high economic cost. It is assessed at costing about \$58 per person in the United States which is twice the per person crime cost (Matthews, 1984).

The cost of drink driving enforcement has also been considered by the Department of Transport in Washington and the implications for police operations are that if the percentage of drivers arrested was doubled it would strain police resources, the Courts and prisons. This cost factor means that the aim has to be to deter them before they offend (Matthews, 1984).

Use of Computers:

Arizona police have direct on-line access to all field personnel for data entry and inquiry with flexible and user friendly software. This system provides combined accident cause and enforcement comparisons for any highway and milepost interval for a variety of time frames. It is thereby possible to determine immediately whether police action is being accomplished in critical areas and in response to the causative factors which can be affected directly by patrols (Matthews, 1984).

Costing of Community Programs:

In the United States the Federal Department of Transport reports that community programs to stop drink driving have to be financially self-sufficient with funds raised by fees, fines and taxes. In New York State each County has to have an alcohol safety plan and this is paid for by revenue from drunk driving fines (Matthews, 1984).

MECHANICAL DEVICES

In addition to law enforcement, road safety is developed through the use of mechanical devices in police operations and the use of design features in vehicles and roads to make the environment safe for the road user.

An overview of mechanical devices is discussed below as any evaluation of the effectiveness of enforcement in road safety may require the assessment of alternative measures. **Physical design** is one of these. Another option in police work is to assess the use of mechanical means to develop more effective enforcement procedures and some discussion of items such as traffic monitoring is therefore included in the review of mechanical devices.

Traffic Monitoring:

Matthews (1984) reports that in Germany there are at some locations induction loops in the road which measure traffic density and speed. When one or the other or both are too high changeable panels light up showing speed limits. Congestion warning systems are used at bottlenecks and these progressively reduce speed limits and warn drivers. These devices have been found to reduce accident rates by 50% and personal injuries by 20%.

Traffic control lights were centrally controlled with induction loops to feedback traffic conditions and allow for green phases for optimum flows. This also enabled control of the roads to give priority in emergencies and other situations. In some cities changeable indicators showed drivers optimum speeds for green lights (Matthews, 1984).

Vehicle Design:

Matthews (1984) reported research by the Michigan Transport Research Institute that accident rates for various types of cars are strongly influenced by the type of people who operate that type of car.

Searles (1985) (cited in Homel and Wilson, 1987) has commented that physical modifications to roads and car design are contributing factors in road safety and are an alternative method of controlling road user behaviour in some instances. An example is the fitting of ignition interlock devices to the cars of convicted drink drivers. The drink driver has to pass a breath test before he can start the car.

Matthews (1984) says that Transport Canada had found that there was at least a 10% reduction in collisions if cars drove with lights on and they were considering making this mandatory. This was seen as a simple cost effective method for cars.

Australia:

Research by Lees (1984) suggests that there is little evidence that the condition of cars on the road causes accidents. When there is a manufacturing fault there is a Recall Code and there is a generally responsible approach to recalls when a defect is discovered. There are problems with modifications for cosmetic changes to a vehicle or to increase engine power, when spare parts are obtained from wreckers' yards and counterfeit parts. A study of vehicles in the Adelaide In-Depth Accident Study 1975-1979 found that of 386 cars three had defects which were major causal factors and two of these defects were tyres.

Britain:

Matthews (1984) reports that the British Department of Transport had found that truck safety had improved markedly in recent years largely because manufacturers voluntarily fitted load sensing valves to brakes of articulated vehicles and improved stability. Anti-lock brakes had become available at a reasonable price and were easy to maintain. One problem however was that the full anti-lock system should be fitted to the tractor as well as trailer and only large companies were fitting these.

In Britain truck accident rates have halved in the 15 years prior to 1984. This has been attributed to the fact that most trucks use the motor way system which is safer than other roads. Also annual inspections of trucks have improved their standards. Front impacts with trucks have been increasing and rear under-runs decreasing. Rear marker plates are being seen as the reason for this decrease (Matthews, 1984).

United States:

The Department of Transportation in Washington has 16 independent test laboratories to do testing and use computer programs to generate priorities for testing by standard and make/model (Matthews, 1984).

Matthews (1984) reports that information from the Ford Motor Company in the United States suggests that the major factor in accident severity is mass, and that speed change during an accident is the major predictor of injury. There is an enormous multiplier with increasing mass. Cars of the same mass have an injury ratio of 1:1 in a head-on accident. With large and small cars where mass is 2:1, injury ratio is 1:8.5. The disparity with trucks is so great that once the truck is over 4.5 tonnes the effect on cars of extra mass is nil. In the United States it has been found that smaller cars get into more serious roll over accidents than big cars. Driving style is thought to be a factor in this as well as structural factors.

Motorcycle Equipment:

Matthews (1984) has found that in Britain research on motor cycle safety suggests that it is better to build safety mechanisms into the motorcycle rather than rely on the person who, for example, may forget his conspicuous clothing.

Road Design:

United States:

Matthews (1984) summarises American research findings which suggest that improving the roads and the road side to make a more forgiving environment is an expensive but more effective way to improve road safety than attempting to change human behaviour.

Homel and Wilson cite research by Searles in 1985 and Trilling in 1978 which stated that better highways save lives. Trilling found that even though improved road design was very expensive, it was still second only to mandatory seat belt wearing laws in terms of saving lives.

Germany:

The German experience with road design has also shown that speed limit should be sign-posted if the design speed is 80 km/h but not if 100 km/h or above. However the design needs to have adequate transitional elements to show the driver the lower speed is appropriate, for example with gentle curves, trees near the road (Matthews, 1984).

Matthews also reports that the German ring roads around towns are most effective in carrying traffic away from the centre but have negative effect on the city environment. The compromise is to have them either in tunnel or on continuous bridging which allows a view across the road. All intersections are grade separated so that the road is no longer a barrier.

Public transport systems which are efficient in the central cities with park and ride facilities and integrated tickets make the change from the car as comfortable as possible. The German view is that a subsidy for public transport is better than providing more roads for the same number of people. In smaller towns as much traffic as possible was directed away from the city centre (Matthews, 1984).

Matthews further states that German research has found that the most effective single thing to do with roads was to replace two-lane single carriageway roads with four-lane two-carriageway roads. There is an argument that this would be cost effective on safety grounds even for low volume traffic. An alternative for very low volume traffic is a suggested three-lane carriageway with an alternating passing lane - this was found to be cheaper than dual carriageways and good for difficult terrain.

In Germany it has been reported that guard rails have still not been designed to cope with the high speeds on autobahns (Matthews, 1984).

Britain:

Matthews (1984) found that in Britain area-wide programs rather than black spot programs were preferred as the latter appear to miss problems. Areas are chosen with 100 injury accidents each year over the past few years and all accidents and traffic flows are plotted. The area is assessed to see if traffic is flowing as intended. Design measures are used to encourage drivers to use streets in accordance with a planned hierarchy - this may involve street closures, turn bans, low cost improvements, and use of arterials and discouragement of use of residential streets.

CHAPTER 7

ENFORCEMENT AS A MEANS OF CHANGING BEHAVIOUR

SUMMARY

Road safety law has been effective in changing behaviour in many ways and those laws which are directed at social traits may be particularly effective in reducing the road toll.

The limitations to the law are found in its failure to address the psychological limitations of some groups in the population. For example, historically, drink driving laws have fluctuated in their effectiveness because public opinion and police enforcement methods have determined the law's success. Most importantly it has been demonstrated in Australia and elsewhere that effective drink driving enforcement depends on a continuing high media profile.

Changes in community attitudes are important in the law enforcement process, and education, training and advertising are all methods of increasing community consciousness of the law and knowledge of expected behaviour on the roads. Part of the co-operation of the community extends to the limitations placed on alcohol availability, the age of consumption and the ways in which advertising is allowed to affect young people. Another community input is in specific programs such as server intervention programs where the liquor industry co-operates in limiting the alcohol intake in public places.

Changes in the individual are more complex than just changing perception of risk. Studies on attitudes to road safety can find a level of awareness of the law and safe behaviour but this does not necessarily correlate with safe behaviour by the individual as a road user.

Some psychological factors which influence behaviour include the use of confirmatory environmental cues of danger, paying specific attention to certain types of warning message and the individual's past experience.

As well as psychological defences which may lead an individual to deny the risk of apprehension by the police or of having an accident, there are perceptual limitations which influence behaviour. In certain groups such as young inexperienced drivers and elderly pedestrians, physical perceptual limitations can create dangerous situations.

The implications of psychological and physical perceptual differences between individuals are that law enforcement has to take account of how to develop preventive programs which will have some meaning to these different groups and result in fewer fatalities and serious injuries.

INTRODUCTION

The aim of this chapter is to take a broad view of enforcement and analyse ways in which enforcement can be a means of changing behaviour. Three levels of behavioural change are described -

1. The potential for the law to be an effective instrument of change.
2. The potential for the community to undergo changes in attitudes towards road safety.
3. The potential for the individual to change his behaviour.

LEGISLATIVE EFFECTIVENESS

Homel and Wilson (1987) describe United States research by Williams and the Insurance Institute for Highway Safety in 1985 which suggested that three law changes were very effective in reducing motor vehicle injuries to teenagers and others involved in their accidents:

Raising minimum drinking age.

Raising minimum licensing age.

Night driving curfews.

Limitations of the Law:

British research has shown some of the limitations in the law, particularly the law relating to drink driving. Homel and Wilson (1987) cite research by Riley which has suggested there should be more publicity to improve knowledge of the effects of alcohol as it had been found that drink drivers had more difficulty in understanding alcohol levels.

It is therefore essential that the law be easily understood by the public. Some laws which require a fine judgement by the individual may not work because certain groups, e.g. the young or the chronic alcoholics, may psychologically not be able to apply a rational judgment to themselves.

Matthews (1984) reports on British findings after the introduction of drink driving laws in 1968 where there was a massive drop in the proportion of fatal accidents with a high BAC. This then was reduced as people saw the risk of being caught was small. In 1982 further legislation made breath tests acceptable in court and a conviction led to arbitrary suspension of licences for a year. Police were reluctant to take strong enforcement action as the legal defences were still unclear. There is provision for persons caught twice with BAC limits over 130 mg within ten years to be deemed problem drinkers and to lose their licences until a doctor certifies the problem is cured. However the risk of these people having an accident is still seen to be very low and most drunk drivers appear to get away with it most of the time.

These findings show the complex interaction between police action, the law and community attitudes. A law can be effective but the effectiveness can change depending on the levels of enforcement and community perception of the risk of apprehension.

One of the questions to be answered in road safety legislation is in situations where the risk of being caught is weighed against an immediate benefit such as getting home or doing a job. Legislation is handicapped through offering sanctions which can only be imposed at a future date.

Common sense is also a factor in law enforcement. Matthews (1984) reports that psychological research used in Germany has shown that there should not be speed limits that drivers do not see as justified.

Transport Canada has found that mass propaganda programs were useful for informing people and maintaining awareness but did not change behaviour. As a result a sustained interest in road safety required continuing publicity and new programs.

These findings suggest that the law is judged by the public on the basis of common sense, and that media publicity is a critical factor in keeping a constant behaviour change in the direction of road safety. Thus it appears that laws are not sufficiently internalised to be continually effective and need to have some continuing conditioning process through the media to ensure public co-operation.

The Police Role in Enforcement:

Some specific priorities for police enforcement of the law have been suggested in research cited by Homel and Wilson (1987):

Priority for police enforcement.

General deterrence of fixed offences using highly visible random stops or publicised and visible patrols.

Targeting offences of drink driving and seat belt offences.

General deterrence of transient offences at signalised intersections. (This is based on the bulk of intersection offences relating to failing to obey a traffic control signal or sign.)

Intersection operations should be sporadic but frequent. Visible patrols or visible mechanical surveillance devices should be accompanied by warning signs which are more cost effective.

General deterrence of transient offences at non-intersection locations. These are in the form of visible and non-visible operations or visible and hidden speed detectors and publicity.

Target offences include crossing double centre lines and exceeding rural speed limits by more than 25 km/h.

Selective detection/apprehension operations at high accident times and locations and on offences linked with accidents. The offences include - drink driving, failing to use seat belt, disobeying traffic control signals, crossing double centre lines, exceeding speed limit by more than 25km/h in rural areas.

Use of personal warning letters as a cost effective way of dealing with offending motorists.

Defensive driving courses and flexible interviews with errant drivers.

Pamphlet self-test treatment as a further alternative to court.

Homel and Wilson (1987) report that the literature on police/motorist relations recommends that:

Senior traffic officers should have an early influence in the training of probationers.

Increased emphasis in early training on the value of discretion in traffic work.

Distinctions between advisory and formal policing roles.

Discussion of effective communication on advice and warnings.

Self-awareness in personal relations.

CHANGES IN COMMUNITY ATTITUDES

There are some aspects of law enforcement which can be effective if there is a co-operative attitude within the community. Programs such as server intervention programs rely on community acceptance of the concept. Education and training of special groups and the use of mass publicity are also methods by which law enforcement can become more effective.

Mosher is cited by Homel and Wilson (1987) as stating:

"If we are to prevent drink-driving, we must do more than threaten, cajole or persuade individuals to act more responsibly. Prevention requires that we act collectively on three fronts. First, we must examine the social and physical environments of drinking and driving behaviour and seek changes which will diminish the likelihood that individuals will combine these two activities. Second, the role of the 'agents' of drinking-driving - alcohol and the automobile - must be examined. Finally, programs aimed at changing behaviour need to be developed in conjunction with the first two sets of strategies."

Co-operation with Drink Driving Laws:

Drink driving campaigns can also be developed by the police to a stage where there is a high level of community co-operation. Law enforcement works in two different ways - deterrence through perception of high risks of drink driving behaviour and co-operation from voluntary decisions by the community not to drink and drive.

Alcohol availability is another measure of community co-operation. Homel and Wilson (1987) cite work by Mosher who described the increase in the availability of alcohol through outlets and its promotion as environmental problems. The location of alcohol outlets, for example at sporting events, needs to be modified. An increase in the real price of alcohol and restriction of its availability to younger people can also reduce risk.

Server Intervention Programs:

A review of server intervention programs by Homel and Wilson (1987) states that the goal of server intervention is to create an environment for drinking that would reduce intoxication and harm to the drinker and others. Server intervention programs focus on the drinking setting involving the drink servers and lessening the risk of driving following heavy drinking episodes.

The literature describes server intervention programs as having the aim of encouraging establishments to control inebriation and under-age drinking and to promote non-alcoholic beverages and food and provide transport for intoxicated customers. The programs cover the

training of staff on the effects of alcohol, legal and moral responsibilities of management and staff and law enforcement issues such as bar fights. Increased profitability and staff morale are built into the program.

Homel and Wilson give an example of an Australian program which was developed in Queensland by the Alcohol and Drug Dependence Services. Citing work by Carvolth in 1985, Homel and Wilson say that the "Patron Care" program's objectives were to develop training programs for hotel staff and channelling problem drinkers from bars into alcohol treatment programs. The key to the operation of this program has been the degree of co-operation by the Health Department and the liquor industry. Some of the practical techniques of the program include:

Advice to servers on techniques for improving the atmosphere.

A change in the demographic mix of patronage to include families, teetotalers, spouses and girlfriends.

Reducing consumption levels by not anticipating service to a regular patron.

Not manoeuvring the buying of drinking rounds.

Refusing service.

Alternative transportation.

Warnings.

Calm methods for dealing with patrons.

Advertising of Alcohol:

Advertising is seen as a major factor in selling alcohol by Homel and Wilson (1987) who criticise the use of fantasies and psychological techniques. The marketing of alcohol in the same way as soft drink means there is an emphasis on availability, competitive prices, sweeter, lighter beverages and lifestyle advertising.

Homel and Wilson (1987) say that American research by Atkin et al. into advertising has found that it stimulates consumption levels leading to heavy drinking and drinking in dangerous situations. Another study found that when Carolina changed legislation on the availability of distilled spirits there were statistically significant increases in alcohol related accidents and single vehicle night time accidents for drivers over 21.

Australia is moving in the direction of alcohol control. Homel and Wilson (1987) say that the Draft National Health Policy on Alcohol in Australia states that there should be controls on availability, price, taxation, advertising and marketing and propose a review of existing laws and regulations affecting the availability of alcohol. It is considered that the present system of industry self-regulation of advertising is not working, and measures should be introduced to reduce the extent to which young people and women are the targets of marketing.

Raising the Minimum Drinking Age:

Raising the minimum drinking age is another method of reducing the risk to young drivers. United States research suggests that drivers aged 18-21 are over-involved in alcohol related accidents and those aged 16-18 are under-involved. United States research in the mid-1980s has shown that there is a reduction in night time fatal accident involvement among the affected age group of between 13 and 21% and the effects over a six year test period appear to be permanent. One study found that the effect of raising the purchase age on night time fatal accidents was proportionally greater for females (26%) compared with males (10%) (Homel and Wilson, 1987).

The United States research experience has been that lower age drinking patterns were related to accidents with significant increases in accident involvement with previously underage drivers who were given the right to drink under the new laws.

Homel and Wilson (1987) summarise Wagenaar's findings on the relationships involved in the minimum drinking age:

Drinking norms, i.e. acceptability of teenage drinking.

Drinking marketing.

Drinking locations.

Alcohol availability.

Wagenaar's empirical work in the United States found that 20% of all alcohol related accidents among young drivers can be prevented through the increase in minimum drinking age from 18 to 21. These conclusions are similar to Canadian work which found that the mean level of consumption and collision rates can be shifted upward or downward with legal controls.

In Australia minimum drinking age has historically been a concern to the community and in South Australia in the late 19th Century it was raised from 12 to 15 and in World War 1 to 21. The age limit was reduced to 20 in 1968 and 18 in 1971. A comparative study of three states (Queensland, South Australia and Western Australia) found that lowering the drinking age adversely affected traffic safety although only in South Australia with the initial reduction from 21 to 20 years was there an increase of about 76% in injury accidents in the 17-20 age group. In all states there were significant effects on injury accidents and sometimes on all reported accidents involving the 17-20 or 16-20 age group. Effects were sustained in South Australia but not Queensland. The recommendations from this research were that the minimum legal drinking age should be 20-21 (Homel and Wilson, 1987).

Education and Training:

Community attitudes and social patterns impact on enforcement and are a factor in determining whether it will be successful. Enforcement of road safety can be assisted through the development of preventive measures such as education and training. These measures

may involve the police and/or community groups who have the objective of increasing driving skills and protecting road users. Some measures may involve programs which the police can run specifically for offenders and in this way attempt to prevent reoffending.

In Australia the Federal Office of Road Safety (1987c) published a number of guidelines for driver training:

Development of safe driving attitudes, the ability to recognise hazards and decision-making skills.

Understanding of road laws and the rationale for the law.

Knowledge of safety related mechanical aspects of the vehicle.

Simple driving skills, and skills for driving in traffic, adverse conditions, and open roads.

Slow speed manoeuvring.

Safe vision habits.

Knowledge of accident causes.

Matthews (1984) reports that in the United States research was to be focused on the driving task. It is claimed that television teaching rather than classroom teaching would be effective.

Hornel and Wilson (1987) cite work by Felson which states that changes in the daily life of the community alter the behaviour patterns, for example young people driving, adolescent activities with peers and parents and shopping and parking patterns.

On this basis the social behaviour of the local community will determine the road safety problems. As such it means that local areas will have their own special social characteristics which need to be identified and secondly that work with the community may also provide alternative patterns of activity and reduce deliberate anti-social road user behaviour.

For example, young people in housing estates may be driving in a dangerous manner. This type of activity can be reduced by the provision of community activities such as the Victorian police

experiments with "Blue Light Discos". A further way of involving the community would be to use the extensive Neighbourhood Watch programs which police have helped to develop throughout Australia. Anti-social car behaviour and local danger spots could be simply built into these programs.

Matthews (1984) reports that public education in Britain was concentrating on radio talk-back programs which kept good driving practice in the public eye.

Matthews (1984) found that driver education could affect behaviour on the roads. In Germany driver education had increased the throughputs of traffic on the roads by over 60% and had encouraged bad drivers to drive more considerately. One of the results was to eliminate drivers of high speed vehicles forcing their way through motorways by flashing lights.

Matthews (1984) says that the German experience is that the most effective medium for public education is television but the cost of television limits the extent to which it can be used. Education which is aimed at changing human behaviour is viewed very sceptically, whatever medium is used.

BEHAVIOUR CHANGE AND THE INDIVIDUAL

The critical factor with the individual and law enforcement is the degree to which the enforcement can actually modify behaviour. Risk perception is one of the psychological factors which have been seen as influencing behaviour. However behavioural modification is much more complex than solely raising the level of risk perception in individuals. The following section describes risk perception as a factor in behaviour and identifies how behaviour can be changed.

Risk Perception

Definition:

Risk perception is a term which is used by social psychologists to describe the individual's understanding of the character and relevance of a potential hazard. It is the degree of awareness about the hazard and knowledge of its pattern of occurrence in space and time, including expectations about its future occurrence.

Perception is basically a process whereby stimuli from the environment are transformed into a cognitive picture. Risk perception can be measured in different ways including the individual's assessment of risk and the decisions he makes in relation to avoidance behaviour.

Research on risk perception has shown that the degree of risk perception measured in the population may have no relationship to people's behaviour. This is because of psychological defence mechanisms that people adopt towards risk which lead them to dismiss future events as having no direct relevance to themselves.

Social science research has found from the study of people's responses to high risk situations that there are a number of different factors which precipitate behaviour:

1. People confronted by an immediate risk will respond to any environmental cues they can see or hear.
2. People often wait for confirmation of the risk from interpersonal conversations rather than relying on the media and 'official warnings'.
3. Characteristics of the warning message are important - clarity, urgency, source, prior warnings which were false.
4. Characteristics of the individual are also important in interpreting the risk:
 - prior experience with the risk.
 - social factors - age, education, influence of significant others, culture, role definition, economic status.

personality factors.
cognitive factors.

It has been found that people respond to environmental cues when they perceive themselves as being under threat. If they have been warned of a threat they tend to look for confirmation or try to find out from others if it is true. Their preconceived ideas about the threat are also a factor and prior experience with the threat helps to determine whether they respond at all to the threat.

The characteristics of the individual include social factors and the influence by others on him. There is some information on the influence of personality factors which are also responsible for different responses to threat. An example of personality variables is the transference of anxiety about an accident onto concern for the safety of others - some people will exhibit this concern whereas some drivers will not.

The personality determines the degree to which people internalise social controls and accept the law on road use. Thus some people will react favourably after the passing of a law, e.g. on seat belts. Others will respond only when there is visible policing or a threat of apprehension. A third type of response is to deny any subjective risk exists. It is this group which is least likely to co-operate with warnings about the risk to others of speed and drink driving or to heed warnings of police action against road offenders.

One of the ways in which people will be seen to handle information differently is through their cognitive functions. These functions can allow them to distort reality and make decisions which do not appear to reflect external threats. Decision-making is influenced by the individual's ability to think probabilistically and bring relevant information to bear on judgements. Some people deal with uncertainty by using the gambler's fallacy with the belief that for example they have just seen a police presence therefore they will not run the risk of another. The individual's decisions are based on the denial of the existence of any threat to himself.

Information on behaviour shows that there are different patterns of response to risk perception. What is important to road safety is how this information can be included in public education and police media releases, and in assessing research findings on the effectiveness of various police methods, e.g. visible vs non-visible policing, blitzes, etc.

Psychological factors are evident not only in the perception of risk but in the analysis of accidents where the human factor becomes the target for all unknown accidents. While human behaviour does provide an unpredictable element it also can be used to explain the unknown factor in an accident. The danger of this approach is that while there is psychological pressure on officials to name a cause of an accident the use of an individual as a scapegoat may be causing a complex interaction of events to be missed.

Physical perception plays a part in assessment of risks. German research (Matthews, 1984) has found, for example, that when conflicting traffic travels at constant speed the other vehicle does not move in the field of view. T-intersections gave an advantage in that the give way rule forces one vehicle to change speed and come to the notice of the other driver. Roundabouts also force drivers to change speed and direction giving drivers more time to see risks.

Another perceptual problem has been the ability of the driver to estimate speed and it depends on angles of view, i.e. head on speeds are difficult to estimate, long periods of driving reduce assessment capacity and if a driver is travelling very fast he finds it difficult to estimate speed. The brain also has limitations in processing information so that when the mental load is high, especially in urban areas, the central field of view dominates and peripheral fields are ignored. In Germany not more than two driver information signs are at any one place and not more than two destinations on any one sign (Matthews, 1984).

Risk perception may be one of the factors creating the high loss of life in young people, especially males aged 15-19. Homel and Wilson (1987) quote statistics of traffic accidents being the largest single cause of death in this age range both in Australia and

overseas. The overall involvement of young drivers is about four times the average for other drivers.

Young people generally have problems in following road laws. Homel and Wilson (1987) state that the United States evidence is that young drivers under 21 are over-represented in speeding violations when rates are adjusted for miles driven and in the number of one-point convictions. This is described as "risk-taking" behaviour and one of the physical causes of accidents.

Part of the problem reported in the United States is inexperience and part is the fact that young drivers drive longer distances, especially at night, than older drivers. Young drivers generally have been found to have lower positive alcohol readings but are more often involved in impaired driving since their lifestyle provides opportunities to combine drinking and driving. However, Homel and Wilson (1987) state that in Australia the impairment pattern is not the same as in the United States and the higher risk appears to be the 20-24 age group.

Some of the factors identified in the literature as creating risks in young drivers (Homel and Wilson, 1987) are:

Amount of driving.

Driving patterns with more recreational driving.

Inexperience.

Use of Alcohol.

Non-use of seat belts.

Risk-taking driving.

Sense of invulnerability.

Peer group pressure.

Some of the recommendations made by Homel and Wilson (1987) are:

Develop a comprehensive national research program on young driver accidents.

RBT.

Penalties and visible enforcement.

Night time curfews.

Raising the licence age with a graduated licence.

Raising the drinking age.

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