Risk Targeted Road Policing in New Zealand:
Being Smarter and Safer in Deploying Resources to Reduce Road Trauma

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ABSTRACT

AIM: Being "Smarter and Safer" in deploying resources to reduce road trauma.

CONTENT: Prior to 2001 there was minimal risk targeted road policing in New Zealand (NZ). Most deployment decisions were as a result of anecdotal information; with no real hard data analysis occurring on a regular basis to prove that road policing activity was being undertaken at identified high risk areas. The NZ road toll was at a 10 year average of 558 deaths per annum

The twelve Police District based Road Policing Intelligence Analysts appointed in 2001 are tasked to analyse crash and ticket data to ensure targeted resource allocation.

Analysis of multiple sourced crash data has resulted in the evolution of Risk Targeted Patrol Plans (RTPP's) into CRASH (Crash Risk Analysis by Sectored Highway) books, which profile road sectors and attach risk weightings. CRASH books are a dynamic tool for deploying resources.

CONCLUSION: A new way forward for NZ Road Policing. It is an initiative in the right direction in the deployment of resources at identified high risk times and places to reduce road trauma.

INTRODUCTION

The vast geographic and demographic make up of New Zealand contributes to the many challenges that Police have to deploy the appropriate resources to the appropriate risks at peak risk times.

The basis of this paper is how the Crash Risk Analysis by Sectored Highway (CRASH) book has been developed from its conception, to being an Intelligence product used for deploying resources to reduce road trauma.

The nationwide implementation of CRASH books has contributed to assisting staff that are responsible for deploying resources. These intelligence products follow a national template which has a local perspective added to them. They enable resources to be deployed to the *right* place at the *right* time with an overall objective to reduce crash and crime.

TASMAN POLICE DISTRICT

Geographically the Tasman Police District is unique. Covering 69,239 square kilometres makes it one of New Zealand's largest Police Districts, extending from Haast on the West Coast to Kaikoura on the East Coast of the South Island, encompassing Farewell Spit, Tasman Bay and the Marlborough Sounds. The district is divided into three Police Areas, Marlborough, Nelson Bays and West Coast, with approximately 7500 kilometres of highway. This is broken down to approximately 1635 kilometres of State Highway and the balance is of local highway.

Staff numbers make the Tasman District the smallest resourced Police District in New Zealand with approximately 290 sworn staff. The provisional population count at the last census in March 2006 for the district is 178,600 (Statistics NZ).

Certain places in the district can boast to having the highest number of sunshine hours for the country, and over the summer months the population in these areas increases significantly.

With these demographics, the police in Tasman District need to be smarter in their deployment tactics, with the small number of resources available to cover a large geographical area.

HISTORY

Prior to 2001 there was minimal risk targeted road policing in New Zealand. Most deployment decisions were as a result of anecdotal information; with no real hard data analysis occurring on a regular basis that would suggest that road policing activities were being undertaken at identified high risk areas. Police officers tended to enforce at areas where they knew there was the guarantee that an offence could be detected. This was regardless of whether there was any evidence of poor driver behaviour or a crash history at a particular location or not. The road toll in New Zealand at that time was at a 10 year average of 558 deaths per annum (Ministry of Transport, 2005)

PROGRESS

Since 2001 each of the twelve Police Districts in New Zealand have appointed District Road Policing Intelligence Analysts. Their core function is to analyse crash and ticket data to produce Risk Targeted Patrol Plans (RTPP's). The concept behind RTPP's is to deploy the *right* people to do the *right* thing at the *right* place at the *right* time, with the ultimate goal to reduce road trauma. The analyst's role has subsequently evolved into implementing CRASH books, which have become the main tool to be used in tasking Road Policing resources.

CRASH BOOK

The CRASH Book is the basis of the Risk Targeted Road Policing Model. It is an analytically based document that attempts to provide long-term risk profiles of stretches of roads.

1. Methodology:

The CRASH Book has evolved from several products that divided up the State Highway network into sectors and assigned risk ratings to those sectors. The State Highway and main arterial roads are divided into manageable sections using natural occurring features as boundaries, for example, ridge lines, rivers or major intersections, keeping in line with existing police station boundaries where it is possible. Tasman District sectors average approximately 16 km in length.

Quantitative crash analysis from data collected from the Crash Analysis System (CAS[1]) is completed by analysing the crashes that have occurred in each sector over a five year period to ascertain peak risk time of day and day of week, location within the sector that most of the crashes are occurring, the type of crash, for example, nose to tail in a line of traffic, and the reason for the crash, for example following too close. The sectors are given a risk rating which is mainly determined by the severity of the crashes that occur in the sector. A simplified version of Land Transport New Zealand social cost measure is used, called the star triple five (*555) measure. This measure implies that each injury category is worth five times more than the previous category. These weightings are broken down as follows: A non injury crash has a weighting of 0.2; minor injury crash, 1; serious injury crash, 5; and a fatal crash, 25.

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[1] CAS is a Ministry of Transport / Land Transport New Zealand application that manages, analyses and maps traffic crash and related data.

Manual adjustment of the result of the weighting occurs where qualitative analysis is included. The consideration of seasonal traffic flows, vulnerable road users, road environment, anecdotal information and engineering improvements are blended into the quantitative analysis. If the qualitative information is significant, the weighting is adjusted.

The final ranking is determined by sorting the list of sectors from highest to lowest. The sectors are then divided into four percentile ranges with the top 20% given an extreme rating; 21-50% a high rating; 51-80% a medium rating and the bottom 20% a low rating. Where a sector weighting is almost identical but they have a different priority, the analyst has the option to adjust the priority weighting so that they match.

The risk rating is applied to all sectors. This helps to define those sectors with the highest crash risk. Seasonal analysis has shown that certain sectors are only a high risk at certain times of the year. All sectors are assigned a risk rating even if there was no crash history. These are ranked according to a four-scale rating.

Priority 1 - Extreme crash risk = **RED**
Priority 2 - High crash risk = **YELLOW**
Priority 3 - Medium crash risk = **BLUE**
Priority 4 - Low crash risk = **GREEN**

The symbol will highlight crash risk for each sector. The concept is for it to be instantly recognisable so it is designed to mimic the fire danger indicator boards seen on New Zealand highways.
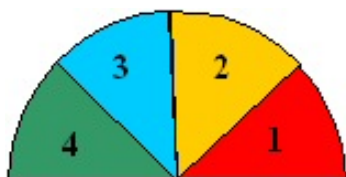

Figure 1: Priority Rating Symbol

Each Police District has been allocated 750 sector numbers that follow the Police Districts consecutively beginning with 1000 in the North Island and finishing with 9999 in the South Island. The District Road Policing Analyst is responsible for maintaining a record of the numbers and how they are allocated to Police areas.

2. Sector Page Design:

The design follows a national guideline. District analysts are able to personalise the template, however information on the sector page must include the following: Sector number, location, priority weighting, length of the sector if it is a linear sector, court code, scene station code, local authority code, risk analysis, details of the crash history over the previous five years, additional intelligence information and a map of the sector.

The risk analysis should outline the peak risk times and predominant type of crash and reason. Additional intelligence should include any other information that can contribute to additional risk and reinforces the qualitative analysis that has been blended into the risk rating. For example a sector may have a small number of crashes on an annual basis and therefore has a low priority weighting, however during the summer period there is a significant increase in the traffic which could change the priority to a medium or high weighting.
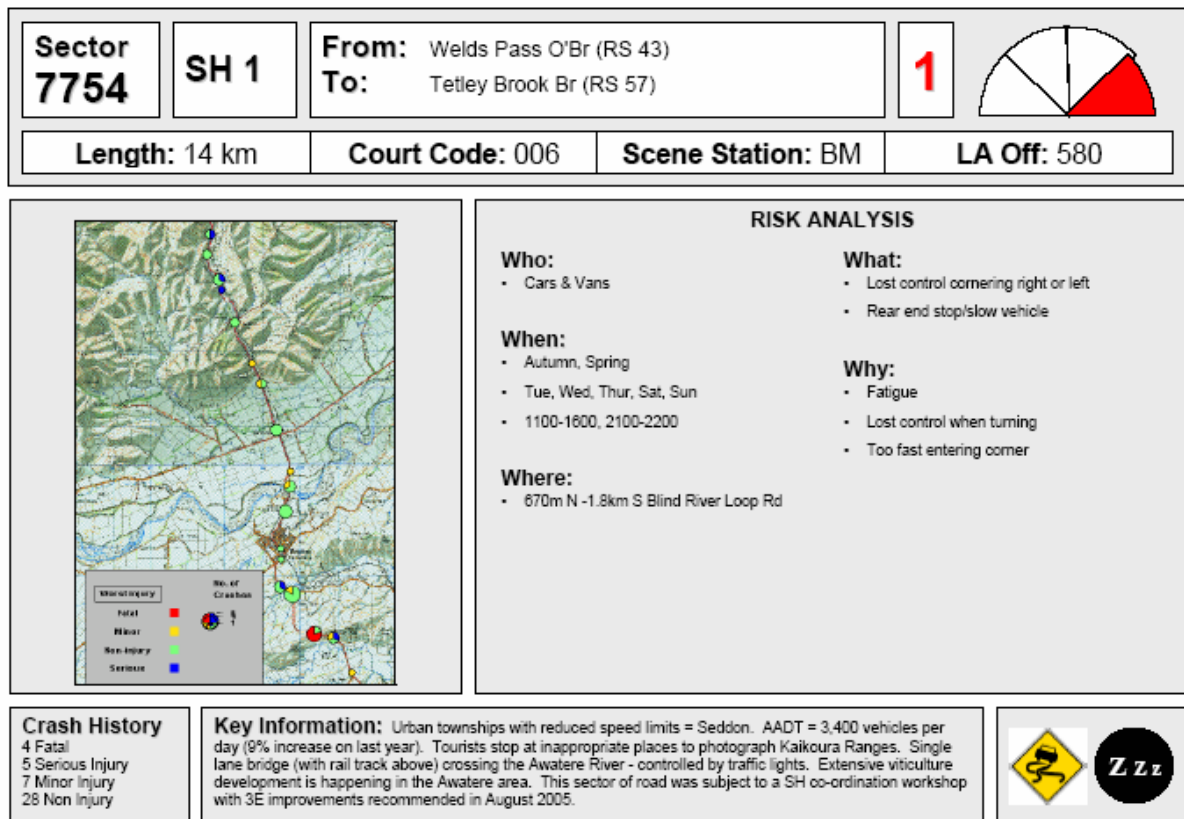
Figure 2: Example of a sector page and analysis

3. Deployment:

The risk rating enables supervisors to assign their staff to those sectors where enforcement can have the best result in reducing crashes and improving driver behaviour. Previously, the identification of risk areas was haphazard and relied on out of date information. The list of sites was quite limited and the nature of the system meant that one site had just as much of a risk rating as another.

Risk rating also allows supervisors to deploy staff to low risk sectors on either side of a high-risk sector. Often it is difficult to safely patrol a high-risk sector due to the narrowness of the road, the tightness of bends or poor visibility. Staff who feel that it is a pointless exercise patrolling low risk sectors can be shown the risks of the sector between and the need to modify the behaviour of drivers before they enter the high-risk sector.

The CRASH book is designed to be a vital tool by which district staff are deployed. Its main purpose is to provide risk information that supervisors can refer to when preparing their taskings. The nature of the CRASH book means that it can be updated regularly and engineering changes can be quickly acknowledged. Staff feedback is a key component of the tasking cycle, both to the supervisor and to the Road Policing Analyst who can reflect staff comments in updates to the book.

Identification of risks promotes staff buy-in. Dedicated Road Policing staff have many years experience in road policing as such, and have opinions as to the best locations to enforce. CRASH books confirm anecdotal views or can be useful in demonstrating to staff that another location may actually be a better spot to enforce and therefore more beneficial in reducing road trauma.

The New Zealand road safety calendar is a planning tool that specifies the main focus of the type of enforcement to be carried out in conjunction with the national advertising program at any time of the year. Supervisors should align their taskings to coincide with the current campaign in the calendar. If the current campaign is speeding then the supervisor can task staff to those sectors in the CRASH book where speed is a major contributor to crashes and trauma.

4. Feedback and Evaluation:

Each staff member delivering Road Policing enforcement is required to write the sector number allocated on all offence notices that they issue and on every Traffic Crash Report that they submit. This enables Intelligence staff to analyse the levels of enforcement in each sector and measure to see if enforcement has had any affect on the crash rate and that the right resources were actually in the right place at the right time.

FUTURE

Highway Patrol staff are currently the main users of the CRASH books that have been developed for the State Highway network. There is a movement towards a rural and urban model, which will encompass all roads within a selected area. This involves dividing the rural and urban areas into sectors and following a similar format as the State Highway CRASH Book. The overall objective is to achieve a 'whole' of policing approach to include crime and crash.

CONCLUSION

The CRASH book greatly assists supervisors and those responsible for tasking resources to be more focused in deploying to risk. This has been a successful initiative for deploying resources at identified high risk times and places to reduce road trauma. The current 10 year average road toll is 468 deaths per annum (Ministry of Transport, 2005). This, compared with the 10 year average in 2001 is a reduction of 90 deaths.

The use of this type of analysis has contributed to the reduction of crashes and hospitalisations in the Tasman Police District. In 2002 the Tasman District was the most unsafe place to drive; now in 2006 it is the safest.

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