CRASH DATA COLLECTION – IS IT TIME FOR A RETHINK OF THE PROCESS?

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ABSTRACT

Fatigue is an insidious killer resulting in many fatal and serious injuries to vehicle occupants on road networks.

Fatigue has on the whole has had disappointing combined stakeholder national strategic emphasis in New Zealand, but for many it continues to emerge as one of the key factors in road crashes. It is presented that the crash database significantly under represents the actual incident of fatigue crashes.

On the positive side there has been many individuals or groups putting effort put into combating this issue throughout the country. What is lacking is a national strategy.

The problem of driver fatigue is much bigger than a lot of people understand. Recent research (Oppenhuis, 2003; Smith, 2006) has presented that fatigue is greatly under reported as a causal factor in crash statistics.

Accurate crash data is essential for the analysis and understanding of causal and contributing factors into road crashes. Without this key data the analysis of locations, causal factors and trends is unable to be accurately determined.

The crash report system that is currently utilised in New Zealand has served us well. New Zealand has had a nation wide systematic process for data collection and analysis for a number of years.

However, this process has been relatively unchanged and it seems that the time is right to review and update the system based on recent research. This particular research has demonstrated that additional data is now required for the identification of issues such as driver fatigue, among others. These issues present difficulties in data collection utilising the current forms.

We have a moral obligation to the population of New Zealand to ensure accurate data s gathered. Improvements to the accurate reporting and analysis of driver fatigue will enhance awareness of the issues and assist in the recognition that a national strategy focused on fatigue is required with actions implemented through the application of the 3 E's – Engineering, Education and Enforcement.

More accurate coding of crashes will lead to better funding targeting.

RECENT RESEARCH INTO FATIGUE IDENTIFICATION

As part of recent research (Smith, 2006) into the influence of terrain on driver fatigue an in depth analysis was also undertaken to identify how readily fatigue as a causative or contributing factor into a crash could be detected.

Fatigue is an insidious killer resulting in many fatal and serious injuries to vehicle occupants on road networks. Fatigue has on the whole had disappointing combined stakeholder national strategic emphasis in New Zealand, but for many it continues to emerge as one of the key factors in road crashes, with general agreement that the official crash database significantly under represents the actual incident of fatigue crashes. On the positive side there has been many individuals or groups

putting effort put into combating this issue throughout the country. What is lacking is a national strategy.

Worldwide there is an increasing recognition that driver fatigue is over represented in road crashes. The understanding of fatigue and of a strategy to combat the issue cannot be realised without a unified approach incorporating Education, Engineering and Enforcement, along with a detailed understanding of the location and cause of driver fatigue related crashes.

Fatigue is progressively being identified as a factor in remote location crashes on the State Highway network in New Zealand. While fatigue has an increasing acknowledgement, it is considered that in addition a high proportion of crashes may not be correctly identified, or not coded as fatigue related, because fatigue factors are not identified during the crash investigation.

Smith's analysis resulted in extensive investigation into the method utilised by the Police for the identification of fatigue by the investigating officer in undertaking the crash investigation, and subsequently the way that fatigue was coded as a factor in a crash.

In the instance of fatigue as a factor, the identification of fatigue as an issue in a crash has been described as difficult due to either lack of evidence, driver reluctance to admit fault or the inability to supply information due to serious or fatal injury.

The issues raised through the research were:

- The accurate identification of fatigue can be hindered by the hyper-stimulation of the driver as a result of the crash.
- The current forms used by the police in New Zealand are predominantly text based. These text based forms have poor guidance for the investigating officer's and are strongly reliant on the driver / occupant / witness to supply a description of events leading to the crash.
- An international review of police crash report forms has highlighted the use of check box and narrative as a mechanism for the collection of data that can be used either directly as an indicator of fatigue, or as an indicator of surrogate measures for fatigue.
- Modifications to the current police report forms through the insertion of additional check box sections for crash details would assist with later analysis of the crash data. These changes would also require the addition of the corresponding fields into the CAS database.

This paper is based on research undertaken for the fulfilment of a Masters of Engineering in Transportation at the University of Canterbury (Smith, 2006). It focuses mainly on the crash analysis part of the research. Unabridged copies of the full research are available from the lead author.

ISSUES FOUND WITH CRASH DATA

Accurate crash data is essential for the analysis and understanding of causal and contributing factors into road crashes. Without this key data the analysis of locations, causal factors and trends is unable to be accurately determined.

Of concern is the issue of crashes currently being coded to other factors. Miscoding can lead to analysis being skewed. This is of particular concern when funding is allocated subsequent to analysis.

The correct coding of crashes (such as fatigue) will allow a better determination of the true cost and the correct allocation of funds.

We have a ***moral obligation*** to the population of New Zealand to ensure accurate data s gathered. Improvements to the accurate reporting and analysis of driver fatigue will enhance awareness of the issues and assist in the recognition that a national strategy focused on fatigue is required with actions implemented through the application of the 3 E's – Engineering, Education and Enforcement.

The following sections identify how crash data is collected both in New Zealand and for selected countries internationally.

CRASH DATA COLLECTION – NEW ZEALAND

The Police Department in New Zealand is the authority tasked with the collection of crash data. The Police have the mandate to investigate all crashes occurring on the road network, regardless of the road controlling authority.

All crashes attended by the police are required to be investigated and fully documented. The investigation looks at location, causal and contributing factors to the crash, liability of the drivers involved and, if required, the nature of the prosecution to be followed.

The ability to identify factors (such as fatigue) as the cause of a crash, and hence be able to establish accurate trends relies on the robust collection of crash data. Any research into fatigue to establish its presence in crashes is highly dependent on accurate assessment by the Police. This in turn leads to proper understanding of its impact and hence the need for governing direction (eg National Strategy).

Essential data to be collected relate to four main fields:

- The location
- The environment
- The vehicle
- The driver

Whilst the above list will not cover every eventuality it does demonstrate that the accurate collection of data involves the detailed analysis of a wide range of issues. The investigating officer(s) at the scene is / are generally tasked with obtaining this data.

Police Traffic Crash Report (TCR) Forms

Discussions with the police reveal that the current practice in New Zealand requires the attending officer(s) to fill out one of two crash report forms. These are an injury and fatal crash traffic report (POL 565) and a non-injury traffic crash report (VTCR). The use of standardised forms ensures a degree of consistency in data collection. However, this can also result in Police (those less experienced) not thinking beyond what the forms request.

In reviewing the police forms it is noted that the current forms in New Zealand are predominantly text based for the collection of crash causation and contributing data. The current New Zealand forms follow the standard general format. A summary of the details collected for each form is given in Table 1 below.

Table 1: Police Traffic Crash Report Form Details

Form		POL 565	VTCR
Field		Description	Description
1		Location Identification	Location Identification
2		Crash day / time / Officer details	Crash day / time / Officer details
3		Vehicle 1 details including damage	Vehicle 1 details
4		Driver 1 details including injury / alcohol	Driver 1 details
5		Driver 1 interview notes	Police Code details
6		Driver 1 Offence details	Vehicle 2 details
7		Ranking officer check details	Driver 2 details
8		Vehicle 2 details including damage	Police Code details
9		Driver 2 details including injury / alcohol	Road / weather details
10		Driver 2 interview notes	Crash Diagram
11		Driver 2 Offence details	
12		Accident diagram (sketch plan)	
13		What happened (text)	
14		Objects struck (text)	
15		Why accident happened (Text: driver factors, road factors, vehicle factors, other factors)	
16		Road / weather details	
17		Other persons involved details	
18		Independent witness details and interview notes	
19		Next of kin details	
20		Special Projects	

The attending officer(s) is/are required to describe what has happened and what factor's were associated with the crash. The data collected by the police is required to be such that an independent person can derive sufficient information for the coding of the crash into the Ministry of Transport (MoT) Crash Analysis System (CAS) database. From this text based narrative, office staff trained in crash coding review the data and determines causation and contributing factors.

Crash Location Accuracy

Land Transport NZ identifies crash location within the CAS system through a Geocoding process. This process will locate the crash from a description specified by the attending police officer(s). This process of site identification has inherent deficiencies such as:

- The greater the distance from a known landmark, the less accurate the location fixing will be,
- Police officers frequently estimate, rather than measure, the crash site location relative to a landmark,
- CAS is reliant on the road controlling authorities supplying accurate road centreline data in a timely manner.

The issue of crash location is more essential when linked to the analysis of surrogate measures. In this instance it is often the combination of location and factors that will determine if there is a strong indication of the crash being fatigue related.

Crash Coding

All crashes recorded by the Police in New Zealand are sent to the Land Transport NZ regional offices for analysis and coding for factors.

This crash coding relies on individuals reading the text based information from the Police crash reports and assigning pre-determined factors to the crash. This process looks at causal and contributing factors for the environment, driver and vehicle. It is recognised that there can be more than one causal or contributing factors in a crash, requiring multi-coding of crash factors.

Discussions with Land Transport NZ on coding practices indicated that there was a change in policy for the coding of crashes in 1999 / 2000. Prior to 2000 only injury crashes were coded. Following 2000, all crashes (injury or non-injury) were coded. As a result, a substantive analysis can be undertaken only on injury crash records for the time period prior to 2000.

In the context of this research it is important to define the difference between the cause of a crash and contributing to a crash. **Cause** is defined as the event, or condition, that is responsible for an action or result. **Contributing** is defined as tending to bring about, or being partly responsible for, an event or action. In the context of a crash it can be stated that there are a number of contributing factors (events, actions) that would lead to the cause (responsible action) and final injury outcome of a crash.

Discussions also indicate that while there is a national standard for the input of these factors, there is a Regional difference in the application of policy with respect to the extent of codes applied to a crash.

These differences range from the coding of a single dominant factor to a crash, being that this is the main cause of the crash, to the multi-coding of crash factors. This regional variation of process is inconsistent with the national objective of consistent, accurate and robust data for later analysis.

The following sections review each process, with comments on its suitability for later crash analysis.

Single Coding

The case presented for single coding of a crash hinge on the issue of ascribing only one main causative factor for the crash. This is reliant on the preconception that all crashes have a single causative factor. It is understood that a crash can have many contributing factors (ie wet / dark etc)

This preconception ignores the role that often minor factors have in the cause of the crash. Where there is strong evidence of a single cause, then this preconception may hold true. However, it is well understood that crashes are often caused by a succession of factors.

An argument often presented for the single coding of crashes is that issue of multi-coding effectively allows for “double dipping” of crash causes. Effectively, that thought is that the crash can be counted twice in the overall crash statistics.

Single coding of crashes restricts the ability of the post analysis to identify emerging or underlying trends for a given crash location or route length. These latter issues are heavily reliant of the ability of the analyst to undertake a review of all factors associated with the crash, and to determine issues and treatments. This is severely hampered with single coding. Often the process of single coding requires further in-depth analysis of the original crash report forms to obtain additional information, a lengthy and costly process. This can be further hampered in New Zealand by the issues of the Privacy of Information Act, where limited access is given to the original crash report forms.

Multi-Coding

Multi-coding allows researchers to review all crash data and determine underlying factors. This process allows for the identification of emerging trends in minor factors that would be otherwise hidden by the single code process.

It is reliant on the experience and expertise of the researcher to determine the suitability of a single factor to the research or analysis that is undertaken.

While multi-coding does not clearly identify between primary and secondary causative factors, it does allow the researcher to study the interrelationship between all of the factors.

This lack of consistency severely diminishes the ability of the analysts to accurately determine both the extents of causation factors in a crash, and the interrelationship between these factors.

SURROGATE MEASURES

Despite the large body of crash data research, absolute numbers of crashes and crash rates are still difficult to predict accurately. This has led to increased interest over time in obtaining ***surrogate measures*** that reflect the increased probability of higher than recorded crash cause for a network or road section.

A brief test was undertaken to interrogate the CAS database to establish if surrogate measures can be coded in relation to fatigue crashes and their spatial location with respect to terrain type.

A review of the search features and data coding within the database revealed that most of the standard surrogate measures for fatigue were unable to be isolated. The most important surrogate measures are:

- Vehicle ran off road and/or collided with another vehicle or object
- Absence of skid marks or braking
- Driver saw the point of run-off or the object hit prior to the crash
- Witnesses reported lane drift prior to the crash
- Single vehicle

Data selection was undertaken within CAS for all single vehicle crashes within the database, excluding those coded as fatigue related, for an isolated section of State Highway in North Canterbury. This selection resulted in a listing of 623 individual crashes. A review of the crash cause codes revealed that although fatigue was specifically excluded, a limited number of crashes had fatigue as a secondary contributing factor. A brief check was undertaken on isolated crash locations and it was revealed that these crashes were in the original selection list. Thus there was a potential duplication of fatigue data within the surrogate measure analysis.

Given the poor results for the initial analysis of the data it was considered that the identification of fatigue driver related crashes by surrogate measures within the general user environment of CAS was not effective.

SUMMARY OF FINDINGS – NEW ZEALAND FORMS

In the research undertaken the following findings are noted:

- While standardised forms are used, many fields are considered "optional",
- Text based data allows for free description, but lacks guidance for the investigating officer(s),
- No specific prompt exists for the consideration of fatigue,
- Heavily reliant on police interpretation of factors. The police skills can range from "Expert" to "Novice",
- **No ability to code surrogate measures.**

CRASH DATA COLLECTION – INTERNATIONAL

To better understand the process of data collection a review of current practices was undertaken (in particular fatigue and surrogate measures) with various police agencies throughout the USA, Australia and the UK.

Direct contact was made with the police departments of Colorado and Maine (USA), New South Wales Police, Queensland Police & Victoria Police (Australia).

Indirect contact was made through the Internet and e-mail with Pennsylvania, North Carolina and Oklahoma police departments (USA) for their reporting process.

All organisations were asked a series of questions relating to the process of data collection at the crash scene, the type and nature of the forms used and the post crash coding process.

Data Collection Processes

In general it was found that crash reporting was developed and undertaken on a state by state basis for both Australia and USA, rather than a national process as used in New Zealand. Each of the international organisations contacted has developed their own data collection and post analysis processes.

A wide variance was found in the processes applied by differing states. These varied from a paperless system in Queensland, Australia, to an in-depth reporting form process in Colorado, USA.

All of the USA police departments utilised a standard data collection form for obtaining crash data within each of their respective states. These forms were often found to be extensive and in general ensured that a consistent result in data collection was obtained. This data was then fed into a centralised state wide database for later retrieval and analysis, similar in process to that of the New Zealand CAS system.

Of note for Australia was the tendency to move to a paperless reporting system. This required each police officer to collect their own data in the field and then enter it directly into the centralised database. This entry was done at the station and as such was sometimes well after the event.

From the investigations made it is determined that this paperless process was open ended and provided little guidance for the investigating officer.

The section below outlines the processes and the crash data collection forms for each individual agency investigated.

USA Police Report Forms

Crash data collection is determined by each State via the use of standard forms, systems and databases. While there is no single central crash analysis database for the whole of the country an overview analysis of crash data is undertaken by the National Highway Traffic Safety Administration (NHTSA) for a national assessment of traffic safety. The development of a state-wide system can be effectively established in both Australia and the USA since each state has a sufficiently large population to allow a robust system to be developed.

It should be noted that while each system is robust, the determination of national issues, and hence national targeted campaigns is often difficult due to incompatibility of systems.

Colorado

The forms are highly generic with little room for interpretation of cause outside those already predefined. The process relies on predefined fields that will assist with the determination of many causative factors.

The forms comprises of a standardised Traffic Accident Report Form (DR 447) with supplemental forms for the investigation of a fatal crash (DR 447B) and a heavy vehicle crash (DR 447A). The forms used allow for the identification of numerous factors relating to the crash being investigated. The preliminary form (DR 447) is predominantly of check box construction with an overlay sheet for key factors. The forms make specific reference to identifiers of a fatigue crash within the checklist. Section R of the preliminary form specifically references fatigue factors as possible Human Contributing Factors to the crash.

Forms DR 447A and DR 447B are of predetermined numeric code construction with good narrative for each code given on the form itself. However this does not allow for the interpretation of issues outside that already defined.

The form process is well defined with an extensive instruction manual supplied for training and future reference.

Analysis can be undertaken using surrogate measures to predict true crash rates.

Maine

Again, the forms are highly generic with little room for interpretation of cause outside those already predefined. The process relies on predefined fields that will assist with the determination of many causative factors.

The forms comprise of a standardised Traffic Accident Report Form (P3-32003-06) with supplemental forms for the investigation of a fatal crash and a heavy vehicle crash. The forms used allow for the identification of numerous factors relating to the crash being investigated. The form (P3-32003-06) is predominantly of check box and numeric code construction with an overlay sheet for key factors. The form makes specific reference to identifiers of a fatigue crash within the checklist. The section of the form relating to the physical conditions of the driver specifically references fatigue factors as possible Human Contributing Factors to the crash.

As with the Colorado form, this does not allow for the interpretation of issues outside that already defined.

The form process is well defined with an extensive instruction manual supplied for training and future reference.

Analysis can be undertaken using surrogate measures to predict true crash rates.

North Carolina

As for Colorado and Maine, the forms are highly generic again with little room for interpretation of cause outside those already predefined. The process relies on predefined fields that will assist with the determination of many causative factors.

The forms comprise of a standardised Traffic Accident Report Form (DMV-349) with supplemental forms for the investigation of a fatal crash. The forms used allow for the identification of numerous factors relating to the crash being investigated. The form (DMV-349) is predominantly of check box and numeric code construction with an additional sheet defining codes used. The forms make specific reference to identifiers of a fatigue crash within the code reference. Section 2 (Physical Condition) of the form specifically references fatigue factors as possible Human Contributing Factors to the crash.

As with the Colorado form the use of predefined code construction does not allow for the interpretation of issues outside that already defined.

The form process is well defined with an extensive instruction manual supplied for training.

Details collected in North Carolina are input into the Highway Safety Information Management System (HSIMS) for later analysis.

Analysis can be undertaken using surrogate measures to predict true crash rates.

Australia Police Report Forms

As with the USA, data collection in Australia is determined by each State viae use of standard forms, systems and databases. While there is no single central crash analysis database for the whole of the country the Australian Transport Safety Bureau (ATSB), Australian Road Research Board (ARRB) and Transport Accident Commission (TAC) undertake an analysis of all crash data for all states for traffic safety.

New South Wales

The NSW police have used the P4 Collision Report, but its use was discontinued in July 1997. Following this date the system requires the investigating officer to enter information directly into COPS (Computerised Operational Policing System) through a terminal at the police station. This relies on the investigating officer taking down statements of fact and looks at factors such as alcohol only. Currently there are no standardised forms in use in NSW.

New officers are recommended not to use the training "*cheat sheet",* but are encouraged to collect own notes free of restraints imposed by a prompt sheet. In the past the COPS system has had a dedicated window for the input of fatigue-related details, but this is understood to be now off line. The data is sent to the Intel Section of the police for review and RTA for analysis.

A study into identification of speed and fatigue related crashes in police reported mass-crash data in Australia Diamantopoulou et al (2003) revealed that behavioural causal factors were in fact not identified as part of the normal crash investigation. Specifically it was found that in-depth crash investigation was designed to examine the relationships between vehicle defects and road safety.

In the report "Road Traffic Accidents In New South Wales 1997" (RTA, 1999) a special note is made on the issue of data inconsistency. Of note is the comment:

"Due to the introduction by police of the paperless system described above, there may be inconsistencies in the reporting of some data fields. In particular, the assignment of an unknown value has markedly increased in frequency for a number of fields and decreased in others. Care should therefore be taken when making comparisons with data from previous years."

Analysis can not be undertaken using surrogate measures due to lack of identification of crash cause factors.

Queensland / Victoria

Enquiries were made with both the Queensland and Victoria Police requesting access to an example of the forms used for recording crash data. Discussions with the relevant Head Offices of the Police indicated that they were unable to release a copy of the form at this time. Therefore, it is unsure if the forms contain any reference to fatigue in its construction.

For Queensland, crash data collected is entered into the central crash database Road Traffic Crash System (RTCS) and is coded for causative factors. Of note is the fact that this data entry is undertaken by a third party to avoid political agendas. This database is accessible and searchable via the "WebCrash" web portal.

For Victoria, the Transport Accident Commission who are involved in promoting road safety in Victoria reviews the crash statistics.

UK Police Report Forms

As with the USA, each region determines data collection in the UK or region cluster in respect of standard forms, systems and databases. While there has not historically been a single central crash analysis database, a recent project for the development of a National Road Collision and Statistical database has been instigated. This process will enable the Department for Transport (DfT) and the Department for Transport Local Government and the Regions (DTLR) to undertake an analysis of crash data for all regions and the whole of the country.

Individual police forces and local authorities require road accident statistics to support their own road safety policy programmes. The collection process and data collected vary in local authority and police force areas, reflecting different local road safety requirements and circumstances. However, each local area is required to report the same set of crash records for national purposes and to transmit them to central government. These are popularly known as STATS19 records, named after the code number of the collection form.

In the proposal for the "2002 Quality Review of Road Accident Injury Statistics" (DTLR, 2002) the following point is noted:

"*The proposed national collection system can provide a very large sample of causation analysis to support road safety publicity. At a local level the issue is whether local causation analysis from the harmonised national collection system, linked to STATS19 information about vehicle, driver, and accident type and place, can effectively guide local police enforcement activity and local authority road accident prevention schemes. Some local authorities claim that this is not the case, and that existing local collection systems are more effective*."

A review of the Collision Reporting Project indicates that the system has the ability to identify fatigue related crashes through the reporting and analysis features, and the use of surrogate measures.

SUMMARY OF FINDINGS – INTERNATIONAL FORMS

In the research undertaken the following findings are noted:

- Most States / regions utilise a standardised form,
- The forms identify specific fields for later analysis
- Fatigue is specifically coded within the forms,
- Most forms utilise extensive text and check box construction,
- Many forms have factor overlay sheets for additional coding,
- The RTA (Australia) expresses concerns in the inconsistency of robust data in paperless (no prompt) reporting,
- **Many forms allow surrogate measures to be identified.**

PROPOSED FORM USE / DESIGN

The aim of the following section is to outline issues with form design and use that may have an overall influence in the final form. There is no “ideal” form proposed, rather the aim is to provoke thought for its future development through the example of other forms used.

Of key consideration when reviewing the process of data collection (and hence form design) are the issues of:

- Form complexity (and hence ease of use),
- Subjective nature of data, and
- Legal considerations of data collected.

In general, it could be argued that the more data to be collected, the more complex a form will be. The current forms as described above are predominantly text based in the recording of many fields. This allows the investigating office to record the facts in a free manner. However, as a result of this research it has been found that the quality of data has varied greatly, with the common standard being quite brief and non-descriptive.

The use of free text fields does not place an emphasis on the collection of “good” data. More over, it can be argued that free text fields are seen to be “optional”.

On the other hand the use of tick box construction can be described as too prescriptive, not allowing the recording of data that fits outside of those items identified. This lack of freedom may also restrict the collection of “good” data.

A key consideration in the collection of data is the time taken by the investigating officer(s) to gather and record effective data. If the forms used are too onerous then, in today’s climate of less than ideal Police numbers, this may be an unfair burden on Police time. Again, if the task becomes too onerous, then the quality of data may diminish. It is essential that the forms used are both functional for the collection of data and effective for the investigating officer.

An area that has been raised in discussions with the Police is the issue that the collection of some data may be inadmissible due to the subjective nature of the determination. This is especially true for the issue of fatigue. As, unlike alcohol or other substances, there is no physical driver measure for fatigue. In fact, it is presented that the mere nature of a crash will eliminate any evidence of fatigue due to the driver being hyperstimulated.

Lastly, the forms used in the collection of crash data should be constructed in such a manner that it protects the legal rights of those collecting data for subsequent use for prosecutions, charges and analysis. Again, the identification of fatigue as an item may allow challenge in court where the investigating officer(s) could be questioned on their ability to determine this factor, given no precise measure.

To eliminate possible pitfalls, it is recommended that surrogate data be collected, which on its own would not place a legal burden on data collection. However, for later analytical purposes this surrogate data could be used as indicators to the cause.

Obviously, a well designed form would take into consideration all of the above considerations and a happy medium is reached that will generally fulfill the objectives of all aspects.

A standardised form was considered as an example of how both narrative and text based information could be collected, while still ensuring that the form is usable from an operational point of view. In this review it was considered that the modifications would essentially be limited to Fields 14, 15 and 16 of the POL 565 form. These modifications would allow the inclusion of fields for surrogate measures.

In General, many international authorities utilise a code overlay sheet for their investigation forms. This form allows the insertion of key data on the right and left margins of the sheets used, through the use of detail boxes to be read while coding. This form is presented in detail in Appendix 1.

Of key consideration is the modification of the current form to allow factor boxes to be utilised. It is envisaged that these boxes would identify keys factor headings and the detail descriptions can be added to as identification fields develop.

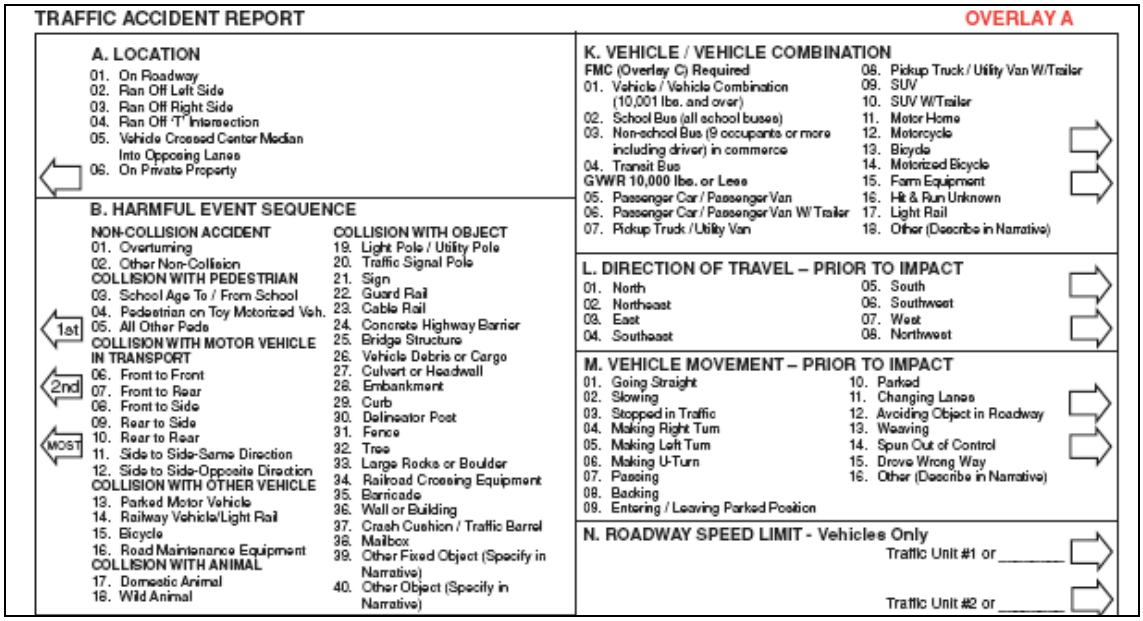

Figure 1: Crash Report Overlay Sheet

Further development will be required following considerations of database construction and legal issues.

FATIGUE ANALYSIS

In undertaking analysis of fatigue as an issue care is required to ensure the robustness of the data. Currently the New Zealand process can only analysis those crashes where the Police have given a good lead to driver fatigue being an issue. These crashes could be regarded as “Definite”.

Through the use of surrogate measures, the analysts could also gain an indication of those crashes that are “Highly Probable”, based on well established relationships as described in international research.

This process would improve the identification of driver fatigue related locations.

CONCLUSIONS

The crash report system that is currently utilised in New Zealand has served us well. New Zealand has had a nation wide systematic process for data collection and analysis for a number of years. However, this process has been relatively unchanged and it seems that the time is right to review and update the system based on this research and research by others which will also seek to update the system.

Recent research has demonstrated that additional data is now required for the identification of issues such as driver fatigue. These issues present difficulties in data collection utilising the current forms.

It is important to note that any adjustment that results from more accurate reporting (as per international research) will result in a) a redistribution of crash factors and b) surrogate measures assisting to improve reporting. Moreover is the consideration that crashes currently being coded to other factors, and hence the money may currently be spent in areas that would show a poor return. The correct coding of crashes to fatigue will allow a better determination of the true cost and the correct allocation of funds.

Standardisation to a multi coding process throughout New Zealand would allow the researchers to undertake a more in depth analysis of crash data.

RECOMMENDATIONS

The following recommendations are offered as a guide overarched by a national strategy.

- Undertake a formal review of the New Zealand Police crash report form for the inclusion of fatigue related fields that allow for robust data collection.
- Develop research into the ability of the crash database to allow the identification and selection of crashes based on surrogate measures (e.g. single vehicle loss of control, lack of brake marks, high speed impact with roadside object).
- Robust data collection will allow the further development of the process to Identify high risk zones and the elimination of lateral hazards or the placement of side protection to ensure that the environment is more forgiving to errant vehicles can be implemented by engineering measures.

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AUTHOR BIOGRAPHIES

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is a senior transportation engineer with 20 years experience in traffic control, safety inspections, safety audits, SMS, Crash Reduction Studies, traffic engineering, maintenance contract administration and construction projects. Mike has assisted LTNZ in the development of 14 Safety Management Systems for local authorities throughout New Zealand. He has an intimate knowledge of the constraints that are placed on such a diverse topographical environment and the demands of the road network. He is a MWH national advisor and Knowledge Leader for Safety Management Systems, Safety Inspections, Safety Deficiency Database’s and Temporary Traffic Management. He has recently completed Master of Engineering in Transportation at Canterbury University where he undertook research into multiple aspects of fatigue driver crashes, with the key focus being the role terrain and geometry plays.

Marten Oppenhuis

is MWH (NZ) Ltd National Transportation Technical Manager. Marten has specialist knowledge in relation to road safety, capital projects and economics. He is an experienced Safety Auditor and has recently managed a review on behalf of Transfund NZ of the Safety Audit procedures and policy culminating in the release of the Nov 2004 Guideline. Marten had a prime involvement in the development of the Safety Management System (SMS) currently operating on state highways and subsequently has extended this knowledge more recently to other NZ RCA’s for whom SMS is a key Road Safety Strategy 2010 platform. He chaired an international workshop (Bangkok) on Road Safety Audit in 2003. Marten has been a strong advocate for research into the incidence of driver fatigue in New Zealand, and the application of practical solutions to solve the problem. Marten has provided Mike guidance as a mentor in his recent research into fatigue.

Glen Koorey

Prior to joining Canterbury University as a lecturer in 2004, Glen worked for 10 years as a highways/transportation engineer and traffic researcher for Opus International Consultants Ltd. His wide-ranging research experience includes considerable work on the safety, design and operation of rural two-lane highways, with studies on road geometry and crashes, speed profiles, and overtaking demand to name a few. Glen also has a keen research interest in sustainable transportation and in particular cycle planning and design. He is currently completing PhD research investigating rural road safety performance measures and the use of road safety models. Glen was Mike’s supervisor for the recent research into fatigue.