MONASH University
Accident Research Centre

DATA SYSTEMS STUDY

RECOMMENDATIONS FOR THE ESTABLISHMENT OF IMPROVED AND MORE TIMELY ACCIDENT DATA SYSTEMS

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EXECUTIVE SUMMARY

There is a variety of information collected by a range of organisations, primarily for their own purposes, which is relevant to roads, traffic and safety in Victoria. Thus, there are a number of different samples of information on the performance of road users which are available from different databases. This report examines the potential for improving the timeliness, quality and level of integration of data available to administrators, practitioners and researchers.

A set of general principles which an improved data system should comply with were formulated;

- the system must recognise the specific needs of the various organisations contributing to it, but should devise ways for some organisations to utilise information collected by others
- accidents reported by police who have attended the scene represent the best overall source of general information on road accidents
- an integrated data system may have to satisfy competing objectives
- information should be of sufficient detail to service the different applications to which the data will be put.

Information on casualty accidents should form the core of the system and thus be reliable and comprehensive. Information on property damage only (PDO) accidents may not need to be as detailed, may not need to be as timely and could be limited to a proportion of total PDO accidents.

Where timeliness of accident data is concerned, the following suggestions have been made;

- strategies to increase the reporting rate in the Police system have been described (page 6)
- the replacement of paper forms through the equipping of police with the technological means for direct, on-site data entry was suggested (page 6)
- potential improvements to the report form were outlined and it was recommended that the form be reviewed to improve timeliness without compromising utility (pages 6-8)
- given the relatively high proportion of accidents reported by drivers attending a Police station, a simplified form, to be filled in by the driver and possibly designed for machine reading, was recommended to reduce Police workload(page 8)
- as police will remain in the front line of reporting, strategies for promoting the importance of this function were suggested (page 9)
- access to the Police tape be made available, given sufficient quality, to allow basic road safety questions to be answered more rapidly (page 9)
- DCA coding should be simplified for property damage accidents to expedite data enhancement and this system be made available to insurance companies (pages 10-11)
- processing priority should always be given to casualty accidents and non-road accidents should not attract processing resources (page 10)

Where the integration of data systems is concerned, the following suggestions have been made;

- integration through matching/merging is facilitated by a similar record structure across systems, a set of matching variables and a set of agreed matching rules (these are being developed in a separate project) and obtaining common variables from the same source (pages 12-13)

- a pilot project be undertaken to determine the precise procedures, costs and usefulness of property damage accident data collected from insurance companies, taking into account the holding organisation's commercial and legal obligations (pages 13-14)

- reconciliation of locational systems should proceed at the data level, given available resources, prior to a move to a common, digitised mapping system in the future (page 15)

- methods to improve the efficiency and timeliness of obtaining blood alcohol concentration data for fatal and injured drivers should be developed (page 16)

Where quality control is concerned, the following suggestions have been made;

- strategies to increase police attendance at casualty accidents should be investigated (page 17-18)

- formal feedback loops should be established to enable changes made to records are communicated to the other elements of the system and ensure consistent datafiles (page 19)

The report concluded by identifying the aim and work required within the four modules which comprise the improved data system, namely;

- the improved timeliness of data and the earlier provision of access

- the matching/merging of enhanced Police accident and TAC data

- the generation of an independent, expanded property damage only file to supplement the matched RC/TAC casualty accident file

- the linking of accident and non-accident RC databases by locational information.

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MONASH UNIVERSITY ACCIDENT RESEARCH CENTRE

DATA SYSTEMS STUDY

1.0 INTRODUCTION

There is a variety of information collected by a range of organisations primarily for their own purposes, which is relevant to roads, traffic and safety in Victoria; for example, Police collect data on all casualty and some property damage road accidents which is used for statistical and enforcement purposes. This information is also used in road safety research and traffic engineering safety analysis by the Roads Corporation (RC), while the Transport Accident Commission (TAC) collect information on people seeking compensation for injuries as a result of road accidents. Traffic and road data are collected by the RC, public hospitals provide information on road accident admissions to a central database and records of vehicles towed away are maintained by the Tow Truck Allocation Scheme. The insurance industry processes information on claims for vehicle damage through comprehensive insurance. Thus, there are a number of different samples of information on the performance of road users which are available from different databases, this differentiation reflecting the dedicated, independent uses to which specific data sets are applied.

This report examines the potential for improving the timeliness, quality and level of integration of data available to administrators, practitioners and researchers.

2.0 AIMS OF THIS STUDY

The aim of this study is to improve the targetting of road accident and injury countermeasures by improving the quality and timeliness of accident data bases available to the Roads Corporation, the Transport Accident Commission, the Police and other users.

It seeks to achieve this aim by addressing the following activities;

(a) Make recommendations for the establishment of improved and more timely accident data systems. These should;

- take into account the needs of all users (Police, TAC, insurance companies and Roads Corporation road safety and traffic management)
- devise means of gaining access to the various systems at appropriate levels, with due regard to legal and commercial confidentiality requirements
- identify the changes necessary to ensure compatibility of data
- assess the opportunities for networking

(b) Using best available data, refine the targets for countermeasures by separate analyses of the following groups:

- deaths
- injuries requiring hospital admission
- all casualties reported to the Police
- TAC claims
- injuries treated at hospital accident and emergency departments
- property damage only accidents

(c) Seek to obtain better/additional data in each of the above categories where there is a deficiency and identify anomalies between different data sets.

Identify the advantages of merging data sets.

This progress report deals with Item (a) above.

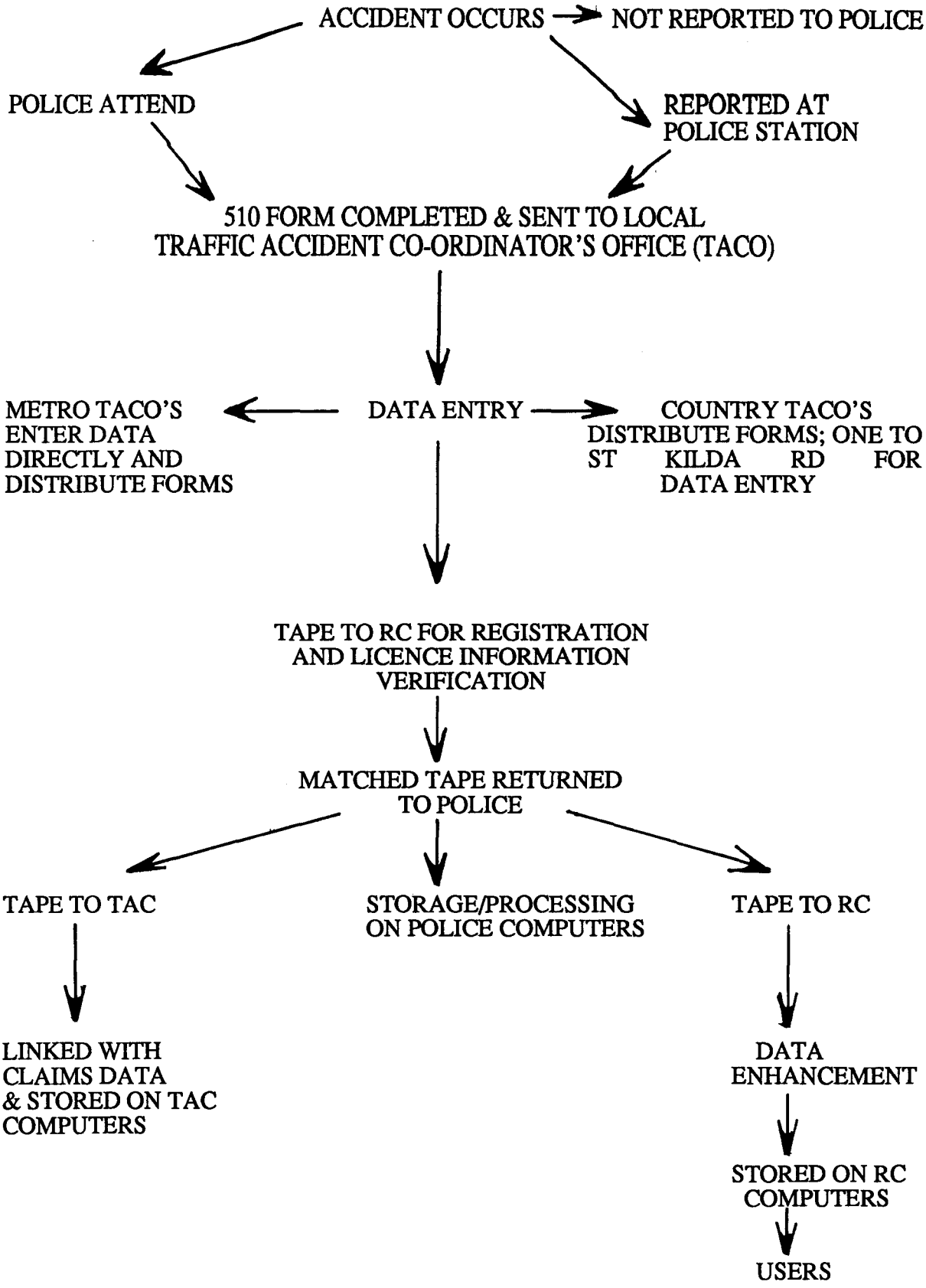
3.0 EXISTING DATA SYSTEMS AND NEEDS

Various items of accident data are needed by the Police, Roads Corporation and Transport Accident Commission for different purposes related to their ongoing activities. A summary of these needs is given in Appendix A. These information items are collected on the Police Accident Report Form and in some cases are augmented by additional information collected from other sources. Figure 1 provides a schematic representation of the existing information flow.

Other organisations collect information about certain subsets of road accidents of interest to them. These are summarised in Appendix B.

FIGURE 1

TRAFFIC ACCIDENT INFORMATION SYSTEM



4.0 PRINCIPLES OF AN IMPROVED DATA SYSTEM

An improved data system should be consistent with, and recognise, the set of general principles listed below;

- proposals for an improved data system must recognise the specific needs of the various organisations contributing to it, but should devise ways for some organisations to utilise information collected by others.

- accidents reported by police who have attended the scene represent the best overall source of general information on road accidents as the collection process is direct, objective,professional and available on a local basis. This can be augmented by specific items from other sources as needed.

- an integrated data system may have to satisfy competing objectives, i.e. performance on one dimension (e.g. timeliness) may not be able to be optimised because of other objectives. These objectives should be recognised and the best compromise between them achieved.

- an integrated data system does not necessarily mean comparable levels of detail on accidents from all sources, but information should be of sufficient detail to service the different applications to which the data will be put. Within a data source, there may well be a hierarchy of detail.

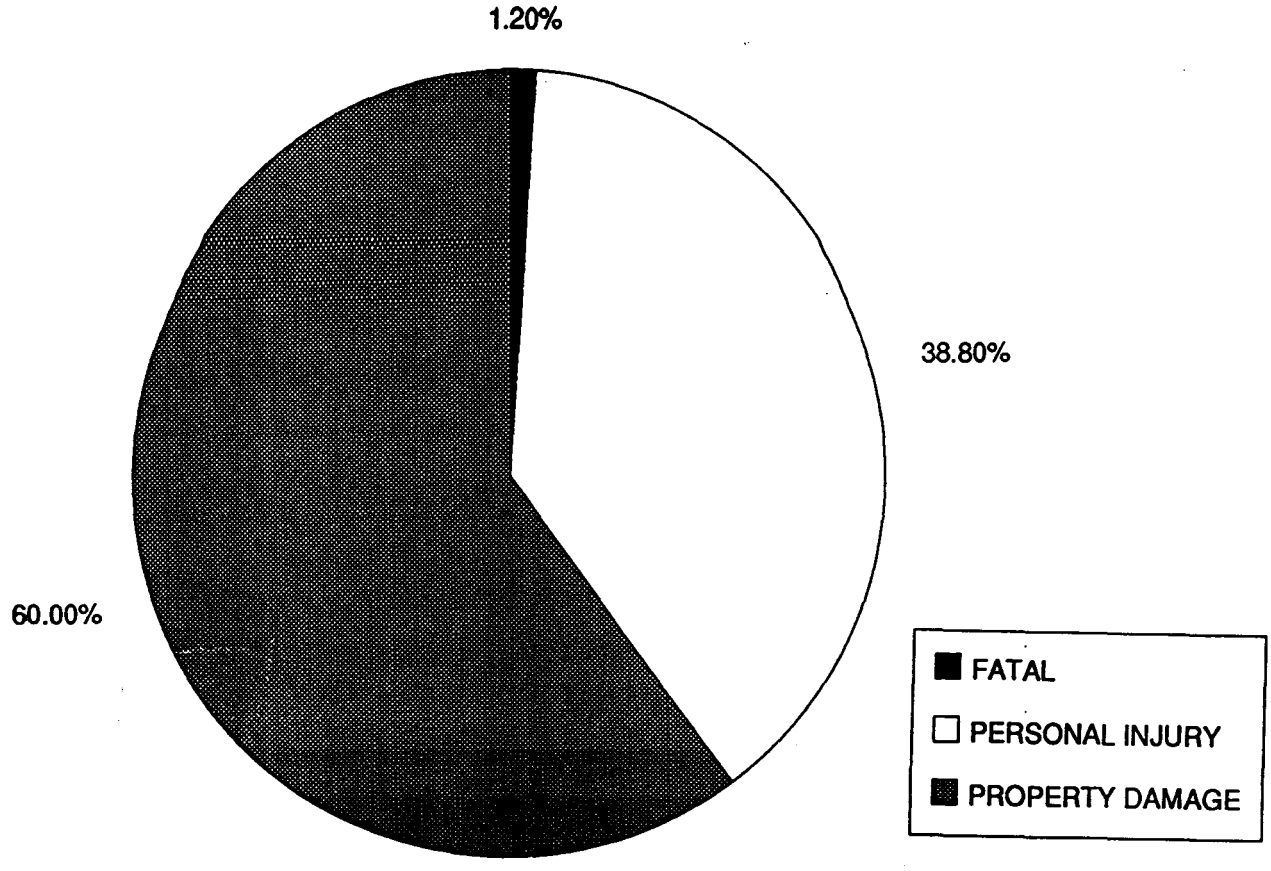
In addition to the above general principles, there is a need to decide on the relative importance of information on casualty accidents and property damage accidents. It is suggested that the following guidelines be adopted;

- information on all casualty accidents (i.e. accidents in which at least one person is injured and requires medical treatment) should form the core of the system. As such, this information should be timely, reliable and comprehensive.

- information on property damage accidents may not need to include as much detail as for casualty accidents, may not need to be processed as quickly and, because of the large numbers involved, may be collected on a proportion of total PDO accidents.

5.0 TIMELINESS OF ACCIDENT DATA

Traditionally, community attention on road safety levels has been focussed on the number of fatalities and, to a lesser extent, on fatality rates (persons killed per 10,000 registered vehicles). While fatal accidents and fatalities are the most dramatic and telling indicator of road safety in both public health and transport performance terms, it should be remembered that fatal accidents represent a very small proportion of police reported accidents, as shown below;



The major reporting advantage that fatal accidents hold over less severe accidents is that of timeliness. Police attend every fatal accident and a brief report is telexed to Police Headquarters within hours of the event via a standard report form containing a limited number of data items (the Fatal Collision Report Form). This provides an excellent system for reporting fatal accidents. Another advantage of using fatalities for comparison purposes is that the criteria for reporting do not vary from State to State or with time, which has been shown to be the case with injury accidents.

As with any frequency statistic, it is known that the fatality count has variability, i.e. it can "hover" around the "true" figure without necessarily representing a significant change in the level of safety. The degree of variability generally reduces with increasing size of the data set (which also improves the chances of detecting real changes). Thus, it is important from both a technical and policy viewpoint to supplement fatality data with timely information on less severe accidents to provide a prompt, more reliable indicator of safety levels.

There are a number of factors mitigating against data timeliness; these issues are described, together with possible solutions, in the following sections (Appendix C describes another strategy which, while it appears to be worthy of support in principle, may be difficult to translate into practice).

5.1 Issues in the Police System

(i) Analysis of Time Lags

An investigation was undertaken to estimate how long it takes for all accident reports to reach the Police computer system.

As Appendix D shows, the number of reported injuries in a given month grows by some 10 per cent in the metropolitan area and 6 per cent in country districts in the five month period commencing some 30 days after the end of the month. The figures for major injury accidents were similar, being 7% for the metropolitan area and 9% in country districts. While the figures indicate that the large majority are reported by the end of the following month, the continued reporting and processing of accidents some six months (and probably later) after occurrence presents problems for a timely accident data system. The report in Appendix D has been discussed with the Assistant Commissioner (Traffic), Mr R Anstee, and he has agreed to investigate what can be done to improve timeliness.

While a possible form design solution is described in part (iii) of this section, it may be considered desirable to handle part of the problem in the following way;

- reinforce the existing requirement that a report of all injury accidents be made by the individual police member by the end of the shift, even if the report is incomplete and full details are provided by a follow-up report. A better result may be obtained by actively enforcing a more realistic reporting requirement

- reinforce the need for prompt data input of all injury accident reports

- to allow for accidents which are reported to Police some time after the accident and a small number which may be delayed in the system, a statistical solution could be devised in which weighting factors are applied to scale up the number of accidents in the system (at the end of the current month or at the end of the previous month) to an estimated total. The actual total, achieved after all reported accidents have been placed in the system, could be used to provide ongoing quality control over the weighting process.

  Given that the primary purpose of this exercise is to provide a contrast to fatality data, and that reporting lags prove to be reasonably stable over time (allowing prediction with some degree of confidence), this technique has the potential to provide an acceptable solution in the short term. If it is intended to disaggregate available accident data, checks would need to be made that there are no significant biases in the accidents which are reported sooner relative to those which are reported later.

(ii) Review of Data Items

Inclusion of this issue is predicated on the assumption that a simpler accident reporting task will expedite both completion of the form and computerisation of same. This could also be assisted through direct on-site data entry, replacing paper forms with an electronic version, e.g. a hand held data encoder. The most appropriate technological solution should be identified and phased in.

This task can take a variety of forms;

- ideally, consideration should be given to deletion of data items which can be obtained through links with other databases rather than relying on direct collection by Police personnel. It is possible to get vehicle details, including trailer (make, year of manufacture, colour, expiry date, and type of trailer) from accessing the vehicle database through registration number, at least for those registered in Victoria.

  Given the importance of this item in matching RC with TAC data, it seems sensible to place much greater emphasis on accurately collecting only a few bits of information and adding any other relevant information through electronic means. Similarly, the drivers' licence number could be used to obtain expiry date, type, category and status from the RC database.

  Reducing the initial data entry task has the added potential advantage of allowing the punching and verification of data to minimise the mispunching of data.

  In virtually all of such cases, it is emphasised that the specific data items are not required for either initial analyses or for general road safety program research and development purposes. One of the hallmarks of an integrated data system is the extent to which it is compiled electronically rather than through the duplication of manual data handling.

- some items should be simplified and/or obtained through other sources in order to improve reliability. A prime example in this category would be traffic control which, on the form, can be coded as one of 16 possible values. Yet, the only values which could not theoretically be obtained from a road inventory are whether traffic signals were flashing or out of order and whether flags were displayed at a school crossing. In a sample of personal injury accidents recently viewed, one specific intersection had this item coded as follows;

.	Unknown,	25/05/84, 22/09/84
.	Give way sign,	08/03/85, 25/05/85, 04/06/85
.	Unknown,	02/07/85
.	Give way sign,	04/07/85
.	Unknown,	05/01/86
.	Give way sign,	29/03/86, 17/07/86, 30/05/87, 08/06/87
.	Stop-go lights,	25/06/87
.	Give way sign,	16/10/87
.	Ped crossing,	16/04/88

. Stop-go lights, 26/07/88

. No control, 05/02/89

- Police usually provide a DCA code (which comprises a major part of the data enhancement process done by the Roads Corporation). A small sample of recent forms (60) indicated that this was considered incorrect by RC and amended in about 20% of cases. If this is the usual "error" rate, perhaps such duplication should be avoided, or the Police needs might be met by using a simplified, more rapidly assigned classification of accident type (see page 10). It should be noted that most changes involved re-allocation within a DCA column; it can be assumed, therefore, that a streamlined classification system would be accurately completed by the Police.

- some data items are difficult to obtain accurately unless the Police member was at the scene. As these are mainly required for enforcement purposes (e.g. were prescribed (vehicle) lamps lit or tow truck registration number), consideration could be given to only filling them in when police attend the scene.

There are other potential improvements to the form which could improve the timeliness and accuracy of data when it is initially collected. The above examples are meant to provide an indication of ways in which this could be done. It is recommended that the accident report form be reviewed to ascertain the extent to which timeliness benefits and workload reduction for the Police could be achieved without compromising the consistency or utility of accident data.

(iii)Form Completion Not at the Scene for PDO Accidents

Of all accident reports in the formal accident reporting system, Police attended 62% of PDO in 1988. Thus, a large number of PDO accident reports result from the participant(s) attending a Police Station. This process has the disadvantage of being less accurate as it relies on indirect means of data collection. Furthermore, collection of some items is time consuming as it requires the Police member to follow-up details from a number of persons and possibly from the scene.

In cases where the Police member does not attend the scene of a PDO accident but fills in the information provided by the person reporting it (usually the driver), consideration should be given to asking the driver to fill in the form and possibly make a declaration in the presence of the Police member that it is a true record. The Police member, after checking that all items have been completed, could then sign the form as a witness to the declaration. It is understood that this procedure would not be suitable in those cases where Police wished to use the form as the basis for prosecution. Automated procedures may need to be introduced to match multiple reports of the one accident.

It may be desirable that a different form could be used for this purpose with some items of doubtful value, if not collected by the member at the scene, omitted. Also, being a form for office use rather than at the scene, it could be designed for machine reading, wherever possible.

(iv) Promotion of Report Completion

Irrespective of whether police have attended an accident or not, completion of forms must still compete with the entire range of tasks which must be undertaken by individual police officers. In these circumstances, it is not unreasonable to conclude that completion of accident report forms sometimes receives low priority. Indeed, many of the above suggestions have been proposed with the aim of lessening the load on police personnel.

Nevertheless, police will remain in the front line of accident reporting. There may be a need to promote this function by;

- emphasising the importance of prompt accident data reporting and the very important role that police play in furnishing data

- providing feedback on the uses to which accident data has been put

There may be a need to also provide feedback to each Police district on the number of accident forms received each month which were more than 30 days after the accident date.

5.2 Issues in the Roads Corporation System

(i) Access to the Police Tape

Currently, access to road accident data by RC staff and the public runs a few months behind real time. There are two main facets to the processing undertaken by the Roads Corporation;

- both automated (through edit check programs) and manual quality control

- data enhancement, primarily through location coding and accident classification (DCA)

The first is an issue for further investigation (a small study to determine the extent of changes by comparing a completed month from Police and RC systems on a variable by variable basis is underway). The second point is primarily a function for traffic engineering safety purposes and, as such, the need for timely, enhanced data, while still important, is secondary to the urgent need for basic information on accident frequencies.

It is therefore recommended that access to the Police tape be made available to interested staff prior to enhancement, subject to a sufficient level of quality in order for basic questions on road safety levels to be answered in a more timely fashion. This could be achieved through the development of a suite of Datatrieve programs generating a standard set of analysis files, perhaps stored in the computer accounts of those users most likely to need access to such files. Alternatively, a more flexible outcome could be achieved by developing a user-friendly, front-end menu in which the user could determine the type and content of analysis file to be derived from the relational files.

The data enhancement process is of importance for traffic engineering safety work, but is not needed for much of the time critical countermeasure evaluation and assessment of road safety levels.

(ii) Dual System Processing

The primary emphasis on timeliness should be on supplementing fatal accident information with comparable information on personal injury accidents (PDO accidents are generally thought to represent a separate data set and have their greatest application on a site specific basis).

Given this, processing priority should be given to personal injury accidents. This could be achieved by an initial sort of the Police tape to separate personal injury from PDO accidents.

(iii) Simplification of Definition for Classifying Accidents (DCA) Coding

If there are insufficient staff to enhance all accident forms quickly, a simplified system should be considered.

It has been noted that some 60% of reported accidents enhanced by the RC relate to PDO accidents. Given this, and the potential application of DCA codes, it is recommended that a two stage process be implemented to accelerate the availability of the enhanced accident file. This process involves;

- all accidents processed by the Police to receive a simplified DCA group code to cover the basic accident types. In most road safety analyses, the 100 codes of the DCA variable have generally been compressed into 14 groups, namely;
  - pedestrian accident (RUMs* 0-9)
  - bicyclist accident (RUMs 10-19)
  - cross traffic accident (RUMs 20-29)
  - right turn against accident (RUM 31)
  - intersection rear end accident (RUMs 33, 35, 37)
  - intersection same street accident (RUMs 30, 32, 34, 36, 38, 39)
  - manoeuvring accident (RUMs 40-49, 60-69)
  - midblock rear end accident (RUMs 51, 59)
  - struck object on path accident (RUMs 50, 52-58, 92, 97)
  - off carriageway accident (RUMs 71, 73, 81, 83)
  - off carriageway - struck object accident (RUMs 72, 74, 82, 84)
  - out of control accident (RUMs 76, 86)
  - midblock head on accident (RUMs 77, 85, 88, 89)
  - other accident (RUMs 70, 80, 90, 91, 93-96, 98, 99)

* the Road User Movement (RUM) code has been shown because it is understood that most Police still think in these terms.

For most purposes, this more than suffices, especially where PDO accidents are concerned (it should be noted that for most road user safety research or evaluation exercises, PDO accidents are deleted from the analysis).

A further point in support of this approach is that expanded links with the insurance industry in an integrated data system might be easier if only general accident classifications were required. The use of PDO accidents for traffic engineering safety purposes tends to be primarily to assist in developing appropriate treatments at problem locations, although they could also be used in identifying locations for further investigation. If further information on accident classification sub-types for PDO accidents is required, this information could be retrieved manually; only a relatively small proportion of all PDO accident forms are thus ever likely to be used (although consideration should be given to storage of narrative/diagrams in a more readily accessible form than the current microfilm system). The preparation of detailed collision diagrams usually involves the retrieval of forms.

- Personal injury accidents should continue to receive the detailed DCA coding at time of enhancement. This has the advantage of providing greater insight into specific accident types which is required for both the satisfaction of ad hoc requests (do a greater proportion of elderly pedestrians get hit on the far side of the road than, say, teenage pedestrians involved in casualty accidents) and also supports generic research on specific accident type/environment interactions across the road system (for example, in assessing the safety benefits of dedicated right turn lanes, it would be important to discriminate amongst rear end accidents to identify those in which the lead vehicle was in the process of turning right).

Given the 1.5 : 1 PDO to personal injury accident ratio, the suggested approach has the potential to significantly improve timely availability of enhanced data and reduce the staff resources involved, without materially reducing the utility of the data.

(iv) Deletion of Non-Road Accidents

Every accident which appears on the Police tape is processed by the RC, regardless of whether it satisfies the criteria for a road accident or not. Thus, accidents in car parks or other private property will be featured in the file for a variety of reasons.

There is a specific variable coded by the Roads Corporation, "ABS code", which signifies whether the particular accident is considered to meet the national definition of a road accident and is to be included in the Victorian data forwarded to the Australian Bureau of Statistics for inclusion in national figures. As such accidents apparently do not feature in any application of RC accident data, a decision could be taken to reduce processing time by deleting them from the enhanced data file. This would have saved the processing of approximately 400 accidents in 1988 which were classified as 'ABS - no'.

5.3 Other Issues

There are a couple of other issues which fall outside the Police/RC system which are of relevance to the timeliness issue. These are discussed briefly below.

(i) Legislation

There is a nominal statutory time limit of 12 months from the date of the accident to lodge a TAC claim. There does not appear to be a time limit for reporting an accident to the Police.

Thus, the system has built in lags which are there for equity purposes but which work against the timeliness objective. While it has not been possible to determine the major reasons for the very late input into the Police computer system of some report forms, it is likely that very late notification of an accident plays a role.

Consideration should be given to requiring injury accidents to be reported to the Police within, say, 30 days of the accident. It should be noted that the Police and the TAC are not in favour of such a time limit, but perhaps a three month limit could be supported.

(ii) Other Data Bases

The issue of other data bases is considered to be of relevance to both the integration of data systems and timeliness. Where timeliness is concerned, both the Hospital Morbidity File and data from the Tow Truck Allocation Scheme have been used to generate predictive models of accident frequencies which can be available within about a month of the accident (Haque and Le, 1988). This provides valuable comparative data: the continuation of such work is supported, even if the timeliness of police reported accident data can be improved. The data are, however, of little use for other analyses because the description of accident circumstances are not available and location (if any) are poor.

6.0 INTEGRATION OF DATA SYSTEMS

There are a number of issues of relevance to the possible integration of data systems; these are briefly described below.

6.1 Database Structure

Integration through matching/merging selected data items from different data bases is facilitated by;

. A similar record structure

Ideally, storage of data in equivalent or similar formats would be desirable in that it minimises the processing required prior to integration. If there are hardware or software constraints on record formats within an organisation, the existence of common, unique variable values within linked records should provide the required flexibility.

To illustrate this point, RC data is stored in an accident-based format (from which vehicle based or person based records can be derived), TAC data is claimant (person) based while SIO data is vehicle based. Merging of data requires a common format; as fixed length accident based records allow the greatest flexibility, this should perhaps become the standard to aim for.

. Matching variables

To attach data from one system to data relating to the same event from another system, a set of agreed matching variables and a set of matching rules are needed. These variables, alone or in combination, should ideally provide unique identification of matched record(s).

Matching rules are currently being developed as part of the RC/TAC data matching/merging project. The process by which this is being done is set out in the project specification which is presented in Appendix E.

. Data Sources

The potential for matching data from different data bases is increased if the common variables are obtained from the same source. While location coding is the most obvious example for linking of insurance data on PDO accidents to police reported accidents (location coding is discussed below), it has also been noted that TAC build their database from information supplied by the claimant rather than from the police accident report form. While this may be necessary in the short term (given time lags in the receipt of report forms), the substitution of police reported (and verified) values in subsequent updates of the file would facilitiate processing. The TAC might wish to save resources devoted to coding by accepting some items, such as DCA code, from the enhanced Police tape.

6.2 Property Damage Only Accidents

Most property damage only (PDO) accidents are not reported to the Police and hence are not included in the existing accident data system. Based on a sample study of their claims for six municipalities in the eastern metropolitan area (Sanderson and Hoque, 1987), the RACV have estimated that in 1985 there were about 11 PDO accidents for each reported casualty accident, which is about 7-8 times greater than the current RC ratio (in 1988, there were 30,635 PDO accidents and 20405 casualty accidents processed by the RC). Costs associated with PDO accidents were estimated to represent some 50% of the cost of all road accidents.

If the primary aim of the accident data system is to reduce the number and severity of casualty accidents, then the processing of an increased number of PDO accidents would be a low priority. However, details of the PDO accidents at a specific location are important in devising appropriate road and traffic engineering treatments. General information on PDO accidents is also important if there is to be a program aimed at reducing them, because they are significantly different to casualty accidents and will not necessarily be efficiently reduced by countermeasures directed at the more severe crashes.

Hence, there would be advantages to both the insurance companies and the RC if details of PDO accidents were made available for inclusion in the accident data system. If only two relatively large companies agreed to participate, this should provide a sufficiently large proportion of total PDO accidents to be useful for most purposes. With three or more companies, the data could be published in aggregated form without enabling any one company to deduce accurate details about any other company's claims.

Preliminary discussions have been held with both the SIO and the RACV to determine the feasibility of such an approach. Both organisations are sympathetic to making insurance claim data available for incorporation into an integrated data system, but it is obvious that there are substantial problems to overcome in the short to medium term. This issue is best dealt with through a prospective pilot study to assess viability (which is likely to vary between companies) under the guidance of a working party with representatives from RC, MUARC and participating insurance companies.

It is clear that the incorporation of insurance company data will need to be a multi stage process. In the short term, it would appear that the required information will be primarily captured from claim forms, although some is stored and can be made available in electronic form. The list presented below is designed to give some idea of what would be available from the SIO;

- Location (street/road name, suburb/town) is available from the claim form
- Sketch of accident circumstances and driver narrative are available from the claim form
- An incident code is computerised; this covers 39 circumstances, a number of which are not relevant to accident data analysis. Potential does exist for supplementing or replacing this with a smaller number of classes (based on DCA code as discussed on Page 10).
- Date of accident is computerised while time of day is only available from the claim form.
- Vehicle make, registration number and driver age and sex are computerised (driver details only for the last twelve months).

The RACV have already demonstrated their ability to code and analyse data from their PDO accident claims. They have indicated that they would be willing to undertake a further trial provided the RC could provide a means of allocating location codes in the same format as the RC accident data system. This trial should proceed so that the procedures and costs to each organisation of a permanent arrangement could be established.

Two further points need to be made;

- the method of gaining access to the agreed data items in the short term requires investigation. This could range from photocopying of forms (with names and addresses deleted), expanded data entry by insurance company staff (perhaps subsisised by potential users of the data) to optical scanning of forms.
- given the continued systems development (both hardware and software) that will be taking place in the future, it may be possible to revise the above short term procedures by incorporating the necessary data entry/processing directly into the data processing functions undertaken by the insurance company. This would represent integration at a higher level than just straight access to or supply of data and is considered to be more desirable.

It should be noted that the usefulness of integrating data from insurance companies depends to a large extent on the efficient coding of location data and the quality of the sketch and driver narrative - a specific study may be required to determine the extent to which the raw data will support the traffic engineering applications for which it is wanted.

6.3 Location Systems

Accident and non-accident databases require a common location system for their efficient integration, as do accident data from different sources (although the ability to "uniquely" identify a location from the raw data is probably the more important technical problem). Thus, the location coding system is of central importance to a fully integrated data system.

This is an issue which has been thoroughly investigated through the RTA/RCA traffic and accident data service review (Symons, Rao and Cleeland 1989); as such, the technical issues are well understood and the outcome of these deliberations would appear to be a function of both resources allocated to this issue and the time frame in which an acceptable solution can be implemented.

The best outcome, in terms of both commonality and efficiency of processing, will be to base all relevant data systems on the complete set of digitised cadastral maps currently in preparation by the Department of Survey and Mapping. These maps will provide the necessary uniformity, overcoming the current problem of changing road names etc which makes reconciliation of locational information from different sources difficult. However, this option will not realistically be available until 1994 or 1995.

A decision as to what to do in the short term, relates to whether action is to be taken at a data or the system level;

- action at the data level involves linking of that information currently on the both databases which is likely to return the greatest benefit, i.e. those locations/routes which represent the greatest density of accidents and/or traffic volumes. Attachment 1 (presented in Appendix F) of Sliogeris (1989) presents the rationale and process for this approach; he has estimated that the majority of (accident) locations could be linked with the respective road information for a cost of $75,000, involving both computer based and manual work.

  The other benefit of this approach is that the concentration on the most prevalent locations minimises the need for maintenance to be undertaken as it could be reasonably be expected that most locations on these roads found in prospective accident data would already exist in the system (a location in the accident database is only created when an accident report form referring to the location is received, rather than creating a list of all possible locations and assigning each accident to one such location as it occurs). However, a commitment to updating the linking process is required in advance to justify the foundation work.

- action at the system level involves work to reconcile the locational systems currently used by both parts of the organisation in order to allow the total prospective linking of data from both systems. However, this work is more expensive (an estimated $200,000) and involves the reconciliation of old technology.

In these circumstances, it is recommended that action at the data level proceed, given the availability of resources. Concurrently, it is recommended that work commence on appropriate software techniques to interrogate this linked database at all levels.

6.4 Blood Alcohol Concentration Data

Perhaps the most difficult item for the RC to collect and incorporate into the accident data system is the Blood Alcohol Concentration (BAC) of those drivers and other road users who have been tested. The data are available from three sources;

- the BAC of all road users killed is extracted manually from the Coroner's Court records, after the Coronial inquest has been completed. This is very labour intensive and imposes delays of more than six months in some cases.

  A system whereby the data were provided to the RC shortly after autopsy would be much more efficient and very valuable for timely monitoring of the road toll and various drink driving countermeasures.

- the BAC of all road users over the age of 15 whose blood sample was taken on admission to hospital is provided to the RC by the Police approximately three months after the accident. Unfortunately, only the names of the road user and the hospital involved are provided and matching to the accident database is onerous and often not possible (often because of spelling mistakes in the name). Only about 65% of drivers admitted to hospital on the RC database have a known BAC (for 1987 and 1988, this match rate is approximately 35% at this stage).

  A better system which would provide another identifier such as Police Accident Report number or vehicle registration number would be more efficient and should be discussed with the Police, who already perform the matching task for those BACs which are illegal.

6.5 Confidentiality of Access

The provision of data to other organisations means that adequate steps must be taken to protect the confidentiality of some identifier information provided to each organisation by its own "clients".

The information required by the proposed integrated data system is, by its very nature, statistical and therefore anonymous. Data capture from original information does mean that external organisations may gain exposure to names and addresses of accident involved persons (this is primarily an issue for access to insurance company data as such information already exists on the police accident report form and can be obtained by any of the three major users, viz, Police, RC & TAC).

The process by which this data capture is undertaken and the safeguards imposed by the holding organisation is a matter for the commercial and legal obligations with which they must conform. In preliminary discussions, this does not appear to be a major problem; detailed discussions will need to be conducted in order to arrive at the best method for doing this.

However, it is pointed out that unique, non-identifying (to outside organisations) variable(s) would desirably feature in each record so that direct access to the source data base would be possible for the purposes of updating information. This is of particular relevance to the TAC system, given the elapsed time to settle a claim, where claimant number would suffice.

7.0 QUALITY CONTROL ISSUES

This report has discussed ways of gaining access to data in a more timely manner and gaining access to a greater quantity of data through integrating data from a number of different sources. Quality control issues are the third component of an improved data system. In this area, there are three issues requiring consideration.

7.1 Accident Reporting by Police

The principles of an improved data system described at the start of this report emphasised the desirability of police having the central, and major, role in the collection of data on casualty accidents. The table presented below suggests that there is scope for increasing the direct on-site collection of data on personal injury accidents.

TABLE 1

ACCIDENT SEVERITY BY POLICE ATTENDANCE
BY MSD/ROS,1988

MELBOURNE STATISTICAL DIVISION

ACCIDENT SEVERITY

POLICE ATTENDANCE	FATAL	PERSONAL INJURY	PROPERTY DAMAGE	TOTAL
YES	355	8158	14299	22812
(%)	(98)	(57)	(60)	(59)
NO	9	6103	9673	15785
	(2)	(43)	(40)	(41)
TOTAL	364	14261	23972	38597

REST OF STATE

ACCIDENT SEVERITY

POLICE ATTENDANCE	FATAL	PERSONAL INJURY	PROPERTY DAMAGE	TOTAL
YES	256	3808	4718	8782
(%)	(98)	(69)	(71)	(71)
NO	6	1710	1945	3661
	(2)	(31)	(29)	(29)
TOTAL	262	5518	6663	12443

While the simple solution would be to increase the police attendance at personal injury accidents by reducing their attendance at property damage accidents (and further improving the timeliness of the self reporting of these PDO accidents by implementing a simplified form, see section 5.1(iii)), it should be remembered that accident severity is usually assigned after the event. Nevertheless, this principle is considered to have important quality and timeliness benefits; the identification of steps to improve the rate of direct police reporting of casualty accidents should be investigated further.

7.2 Common Data from the One Source

The potential for difficulties in reconciling data from different sources is increased if variables which are common to the data bases are captured from different sources. This is an area in which it is important for the contributing organisations to regard themselves as contributing to an integrated system as well as operating as independent organisations using the data for their own purposes.

It is possible to have several variables on the one record taking different values because they have been obtained from different sources (e.g. from police and claimants). This may not present significant problems to the original organisation as they know the origin of each variable.

However, if the principle of police collected data being pre-eminent is accepted, it is of great assistance to the integration of data for police reported (and verified) data to feature in data records held by contributing organisations wherever relevant. It would be preferable for this form of quality control to be done internally before enhanced data is made available. The implications of this proposal need to be assessed by the TAC and insurance companies to determine the feasibility of the suggested approach.

7.3 Quality Control Feedback

At present, there are no formal feedback loops to ensure that when data are altered (e.g. through enhancement) in a given record, such alterations are transmitted to the same record held in other databases. This reflects the lack of integration in the overall data system.

This indicates that there needs to be;

- a clear understanding of the role which each of the contributing organisations plays in the integrated data system
- a willingness to pass on the benefits of work done internally to other users, in terms of edited data files
- formal feedback loops established to ensure data accessed by users represents the most accurate information available.

8.0 THE PROPOSED DATA SYSTEM

The proposed structure of the revised and integrated data system is presented below in modular form as some elements of the system require further inter-organisational discussions and formal decisions. The modular format identifies the key areas and is designed to allow these discussions to proceed in parallel.

Module 1

Aim:

To improve the timeliness of police reported accident data, to expedite the data enhancement process and to provide access to timely accident data for the purposes of RC road safety research and monitoring.

Work Required:

Proposals have been made to further improve the rate of receipt of accident report forms; at the end of the subsequent calendar month, 97% of the final total should be the aim. These proposals need to be considered by the relevant organisations.

If the proposals are implemented, direct access to this file could be provided for monitoring and research purposes, given adequate levels of data reliability. To this end, it is proposed to compare the Police and RC tape for a completed month on a variable by variable basis to determine the need for additional quality control.

A decision is required on the implementation of a separate, simpler form for the reporting of accidents at a Police station (in cases where Police do not wish to prosecute). Decisions are also required on the nature and extent of the simplification of DCA coding and on recommendations to delete some items from the Police accident report form.

Module 2

Aim:

To produce a matched/merged data file comprising enhanced Police accident and TAC data.

Work required:

Issues emerging from the matching and merging of RC and TAC data will be identified from the project in progress.

Module 3.

Aim:

To generate an independent, expanded PDO file to supplement the matched RC/TAC casualty accident file.

Work required:

Formal discussions with insurance companies are required to establish the type and nature of data capture from their claims database. Possible changes to their database(s) to increase utility should also be explored.

Technical processes for handling this additional data and the matching techniques required to avoid double counting of PDO accidents already reported to Police require investigation.

Module 4.

Aim:

To link accident and non-accident RC databases by locational information in the short to medium term prior to implementing a common, sophisticated locational system in about four years time.

Work Required:

Short term linking has been examined in detail by RC staff and, given available resources, should proceed.

Monitoring of progress by the Department of Survey and Mapping should be undertaken and the possibility of gaining access to completed segments of the cadastral maps prior to the whole task being completed explored.

9.0 IMPLEMENTATION SCHEDULE

The implementation schedule is set out below:

MODULE 1

ACTION

. *Reinforcement of report form completion and the need for prompt data entry.*

This is an internal Police matter; strategies for which are probably best developed at the local level. Feedback on timeliness of report completion to be provided to District Superintendents regularly.

Time Frame

. Immediate, and ongoing

ACTION

. *Development of weighting factors to scale up recent accident report numbers to their estimated final totals.*

Further analysis of time lags will be undertaken and a set of weighting factors specified. The level at which these weighting factors need to be applied will also be established (i.e. whether separate weighting factors are required for different Districts).

Time Frame

. Specification of weighting factors by February 1990

. Quality control, ongoing

ACTION

. *Review of the Police Accident Report Form.*

This has a number of facets (see pages 6-8) and is currently underway within the TAIS system.

Time Frame

. At the discretion of the participating agencies

ACTION

. *Simplification of DCA coding.*

A simplified grouping of DCA codes is to be determined and agreed to by all parties. Procedures for filling out this field and any issues arising from the addition of a second DCA variable to the database will also be addressed.

Time Frame

. Completed by April, 1990

ACTION

. *Development of a simplified form for completion of PDO accident reports when police have not attended the scene.*

This will require the identification of the key variables to feature on the form, the development of the pro forma and procedures for its completion and possible modifications to existing TAIS software to cater for a revised form.

Time Frame

. The development of the form and procedures will be completed by April 1990 (trialling, if required, could be undertaken in May 1990).

Software modifications, and hence the implementation of the revised system, is at the discretion of the agencies involved.

ACTION

. *Quality control study (as described on page 9) to determine the feasibility of access to the Police tape prior to enhancement and the development of appropriate software to facilitate access.*

Time Frame

. The quality control study will be completed by February 1990; software development could be completed by June 1990, given the availability of resources.

ACTION

. *Further consideration of a viable time limit for the reporting of accidents.*

Time Frame

. At the discretion of the relevant agencies. If agreed, this would require legislation.

MODULE 2

ACTION

. *Production of a matched/merged file of RC and TAC data.*

A pilot study is in progress; this will determine the nature and extent of future activities.

Time Frame

. Pilot study will be completed by March 1990. Once the procedures and rules have been determined, the establishment and updating of a merged data file is at the discretion of the relevant agencies.

MODULE 3

ACTION

. *Generation of an independent, expanded PDO file to supplement the matched RC/TAC casualty accident file.*

Formal discussions with insurance companies and the development of methods for handling such data need to be determined. A trial is to be undertaken by the RACV.

Time Frame

. Progress will depend upon the outcomes of consultations and the trial. It could reasonably be anticipated that such a system could be in place by the start of 1991.

MODULE 4

ACTION

. *Linking of accident and non-accident RC databases by locational information in the short to medium term prior to implementation of a common, sophisticated system.*

The procedures for the former activity have already been described (see Attachment F).

Time Frame

. Short term linking is contingent upon the availability of resources and as such, progress is at the discretion of the RC.

10.0 CONCLUSION

This report has examined the potential for improving the timeliness, integration and quality of information available from a number of related databases in the roads, traffic and safety areas.

To this end, a number of issues have been identified for action and the further work required before final decisions can be taken has been outlined.

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. Mr D Kearsley
. Mr D Attwood
. Mr J Robertson
. Mr M Hammond

Roads Corporation

. Dr M Lay
. Mr R Solly
. Mr D Anderson
. Mr M Cameron
. Dr O Haque
. Ms U Rao
. Ms H Lau
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APPENDIX A

SUMMARY OF NEEDS FOR ACCIDENT DATA BY STATEWIDE ORGANISATIONS ON A CONTINUING BASIS

Police

- requirement to provide information on all deaths quickly
- information needed to prosecute offenders
- data for planning enforcement strategies/programs
- information on specific accidents for legal purposes
- information to other organisations, the public, media etc.

Roads Corporation

- requirement to provide statistical information (on all road users killed or admitted to hospital) to A.B.S. for national and state statistics
- information about road user, vehicle, road and environmental factors to enable monitoring of road accident occurrence and outcomes, as well as research and evaluation related to countermeasures
- location specific information (includes route or areawide) to enable implementation of road or traffic engineering safety improvements
- in the future, accident record of individual licence holders could be required to implement driver improvement programs
- information to the other organisations, the public and media.

T.A.C.

- information legally required to process claim for compensation
- additional information to facilitate fraud investigation
- information needed for effective business management as an insurance company.
- information to develop road safety strategies and programs designed to reduce the cost of claims.

APPENDIX B

SUBSETS OF ACCIDENT INFORMATION COLLECTED BY OTHER ORGANISATIONS

Insurance Companies

- accident circumstances, vehicle damage and repair costs for vehicles insured by them (and sometimes other vehicles involved in those accidents)

Accident Compensation Commission

- as for TAC for motor vehicle accidents in the course of employment and on journey to or from work (the "journey" accidents will eventually appear in the TAC system, but the "course of employment" accidents will not).

Hospitals

- limited information on patients treated at the hospital (information is more detailed for those admitted) and is available in computerised form from Health Computing Services.

Ambulance Services

- information on road accident victims transported by the particular service

Tow Truck Allocation Scheme

- very limited information on accidents in the Metropolitan area where a tow truck is required.

APPENDIX C

WORKLOAD DUE TO PROPERTY DAMAGE ACCIDENTS

Traditionally, accidents involving damage to property alone have been required to be reported to Police if the owner of the property has not been present and Police have also completed the accident report form for cases they wished to prosecute. This requirement was supplemented from the community point of view from 1 January 1987 when, under the revised transport accident compensation system, a police accident report form was needed to obtain compensation.

This attachment thus deals with a fundamental issue of accident reporting. The principle underlying it is that it would be desirable to increase the attendance of Police at injury accidents for timeliness and quality of data reasons; this may be achieved by reducing the level of duplication in the reporting of PDO accidents by both Police and insurance companies. However, it appears to be very difficult ot translate this principle into practice.

The number of Property Damage Only (PDO) accidents processed by the Police/Roads Corporation has nearly trebled in recent years as the table below shows. This is more a reflection of the change in reporting procedure that occurred in 1986 (replacing the 512 and 513 forms with the single 510 form), although it is understood that a sizeable proportion of current PDO reports are lodged as "insurance" against a subsequent TAC claim.

REPORTED ACCIDENT NUMBERS BY SEVERITY, 1984-1988

	YEAR				
ACCIDENT SEVERITY	1984	1985	1986	1987	1988
INJURY*	16045	16796	17314	19531	20405
PDO+	11704	12583	24712	27083	30635
TOTAL	27749	29379	42026	46614	51040

* includes fatal accidents

\+ this definition by the RC also includes accidents in which the most severe injury was "injured - not requiring medical treatment".

From a resources point of view, general information on genuine PDO accidents is best obtained through links with the comprehensive vehicle insurance system, thus avoiding duplication of effort. It can be reasonably anticipated that a reduction in PDO accidents processed through the Police system would expedite the processing of personal injury accident forms. However, it is unclear how this could be achieved without creating some administrative difficulties for TAC processing of compensation claims.

It is understood that the primary reason for requiring that a Police accident form be lodged prior to acceptance of a claim by TAC was to assist in the assessment of claim eligibility. It would be reasonable to investigate the extent to which this requirement has been useful in meeting that purpose.

POLICE ACCIDENT DATA SYSTEM

The Police system for reporting fatal road accidents which has been operating for many years is an excellent one. Almost all fatalities are reported by telex within 24 hours and arrangements exist to update the system as a result of "follow-on" deaths within 30 days of the accident or decisions by the coroner on death by natural causes or decisions by the Roads Corporation that a particular case does not fall within the definition of a road traffic accident. Unfortunately the system for reporting injury accidents is not so timely.

An investigation was conducted with the co-operation of the Statistics Section, Traffic Department, Victoria Police, to determine how long it takes for all reported injury accidents for any given month to be recorded in the Police computer.

The Statistics Section provided a printout of reported accidents computed about 30 days after the end of the month for each month of 1989, together with the same computer run done again on 5 September 1989. From this, the amount by which the number of reported injuries grew between 30 days after the end of the month and 5 September is shown in the Table below. The numbers are shown separately for Metro and Country districts.

METRO ACCIDENTS

Month	Original Run Date	Number of Injuries Original Run	Number of Injuries 5 September	Increase in Injuries No.	Increase in Injuries Percent
January	1 March	1701	1883	182	10.70%
February	1 April	1836	2034	198	10.78%
March	30 April	2151	2353	202	9.39%
April	29 May	2031	2231	200	9.85%
May	7 July	2275	2386	111	4.88%
June	1 August	2212	2286	74	3.35%

COUNTRY ACCIDENTS

January	1 March	872	924	52	5.96%
February	1 April	696	749	53	7.61%
March	30 April	917	973	56	6.11%
April	29 May	823	861	38	4.62%
May	7 July	830	855	25	3.01%
June	1 August	749	771	22	2.94%

The table shows that if a computer run is done about 30 days after the end of a month, the number of injuries will continue to increase over the next few months, by somewhat more than 10% for Metro accidents and 6-7% for country accidents. Also it takes about 4-5 months until the numbers have grown to within 1% of their final numbers.

The Police accident data system has the most potential for provision of timely information about the numbers and severity of accidents which have occurred in different areas of the State. In order to improve its timeliness there would need to be a follow-up study to determine the reason why it takes much longer than 30 days for about 10% of Metro and 7% of Country accidents to reach the system. The reasons may be that:

(i) some drivers do not report the accident to the police until several months after the event,

(ii) the completion of the accident report form is being delayed while further information is obtained, or

(iii)that delays are occurring in the processing system.

The first of these is beyond the control of the Police, the second could be improved by submitting a partially complete form for processing, followed by the additional details later, while the third involves convincing all those involved of the importance of the information, so that the process can be speeded up.

If procedures could be implemented to reduce the numbers outstanding after 30 days to less than about 2%, then a correction could be made for this small group.

At the request of the Police the data from the Table on the previous page has been tabulated for each Police District for the first three (3) months of 1989 and this is shown in Attachment 1. A similar tabulation for the number of major injury accidents is shown in Attachment 2. Both Attachments show considerable variation in growth of numbers between the various Districts. The number of major injury accidents which are not included in the computer run taken thirty (30) days after the end of the month is still quite large and indicates that the reporting/processing delay is not confined to minor injuries.

In 1989 there has also been a change in the wording of the injury descriptions on the accident report form, eg. from "injured - admitted to hospital" to "major injury (injuries requiring hospital admittance)" and from "injured requiring medical treatment" to "serious injury (requiring medical treatment)" which has resulted in considerably fewer injuries being allocated to these two categories than in previous years. It is important that the descriptions on the form be clarified and standardised to enable continuity to be maintained.

Perhaps the form should revert to the 1988 definitions, or it might be desirable to accept a discontinuity at this stage and devise new definitions which are easier for Police to use in the field, eg.

injured - transported to hospital
injured - not transported to hospital.

To satisfy the ABS requirement for hospital admissions data, such information could be obtained from the TAC or the Hospital Morbidity File. However, further investigation is required to reconcile discrepancies between these two databases.

NUMBER OF INJURIES (1989)
METRO DISTRICTS

Metro Distr	Mean %	JAN Run 3Jan	JAN Run 5Sep	JAN Grth %	FEB Run 1Apr	FEB Run 5Sep	FEB Grth %	MAR Run 30Apr	MAR Run 5Sep	MAR Grth %
A	15.8	147	167	13.6	155	181	16.8	158	185	17.1
B	11.8	98	113	15.3	135	153	13.3	146	156	6.8
H	10.2	126	135	7.1	105	117	11.4	149	167	12.1
I	12.3	113	135	19.5	108	121	12.0	76	80	5.3
M	13.4	144	167	16.0	149	168	12.8	173	193	11.6
P	6.5	191	208	8.9	249	257	3.2	303	325	7.3
Q	11.4	190	202	6.3	198	233	17.7	256	282	10.2
U	13.0	111	128	15.3	148	161	8.8	160	184	15.0
V	4.5	142	145	2.1	161	172	6.8	196	205	4.6
Y	12.6	233	273	17.2	257	286	11.3	349	382	9.5
Z	5.0	206	210	1.9	171	185	8.2	185	194	4.9
Metro Total	**10.3**	**1701**	**1883**	**10.7**	**1836**	**2034**	**10.8**	**2151**	**2353**	**9.4**

NUMBER OF INJURIES (1989)
METRO DISTRICTS

C'try Distr	Mean %	JAN Run 3Jan	JAN Run 5Sep	JAN Grth %	FEB Run 1Apr	FEB Run 5Sep	FEB Grth %	MAR Run 30Apr	MAR Run 5Sep	MAR Grth %
C	5.4	111	114	2.7	97	106	9.3	121	126	4.1
D	9.7	109	120	10.1	82	90	9.8	119	130	9.2
E	9.9	40	43	7.5	36	44	22.2	33	33	0.0
F	5.3	119	125	5.0	70	72	2.9	101	109	7.9
G	6.0	69	71	2.9	75	78	4.0	73	81	11.0
J	5.5	134	138	3.0	84	90	7.1	140	149	6.4
K	5.2	73	75	2.7	42	46	9.5	59	61	3.4
L	6.3	19	21	10.5	24	26	8.3	30	30	0.0
N	4.7	59	63	6.8	44	46	4.5	73	75	2.7
R	3.7	52	55	5.8	33	33	0.0	37	39	5.4
S	15.3	46	54	17.4	48	57	18.8	72	79	9.7
W	4.9	41	45	9.8	61	61	0.0	59	62	5.1
C'try Total	**6.6**	**872**	**924**	**6.0**	**696**	**749**	**7.6**	**917**	**974**	**6.2**
Total	**9.1**	**2573**	**2807**	**9.1**	**2532**	**2783**	**9.9**	**3068**	**3327**	**8.4**

NUMBER OF MAJOR INJURY ACCIDENTS (1989)
METRO DISTRICTS

Metro Distr	Mean %	JAN Run 3Jan	JAN Run 5Sep	JAN Grth %	FEB Run 1Apr	FEB Run 5Sep	FEB Grth %	MAR Run 30Apr	MAR Run 5Sep	MAR Grth %
A	8.3	19	22	15.8	10	10	0.0	11	12	9.1
B	0.0	8	8	0.0	11	11	0.0	8	8	0.0
H	19.7	10	10	0.0	8	12	50.0	11	12	9.1
I	23.7	8	12	50.0	10	11	10.0	9	10	11.1
M	8.9	10	11	10.0	13	13	0.0	18	21	16.7
P	4.3	21	22	4.8	22	23	4.5	27	28	3.7
Q	4.4	22	22	0.0	12	13	8.3	20	21	5.0
U	3.3	6	6	0.0	10	11	10.0	12	12	0.0
V	3.5	18	18	0.0	22	23	4.5	17	18	5.9
Y	7.8	30	36	20.0	24	24	0.0	30	31	3.3
Z	3.9	22	23	4.5	14	15	7.1	16	16	0.0
Metro Total	**7.1**	**174**	**190**	**9.2**	**156**	**166**	**6.4**	**179**	**189**	**5.6**

NUMBER OF MAJOR INJURY ACCIDENTS (1989)
COUNTRY DISTRICTS

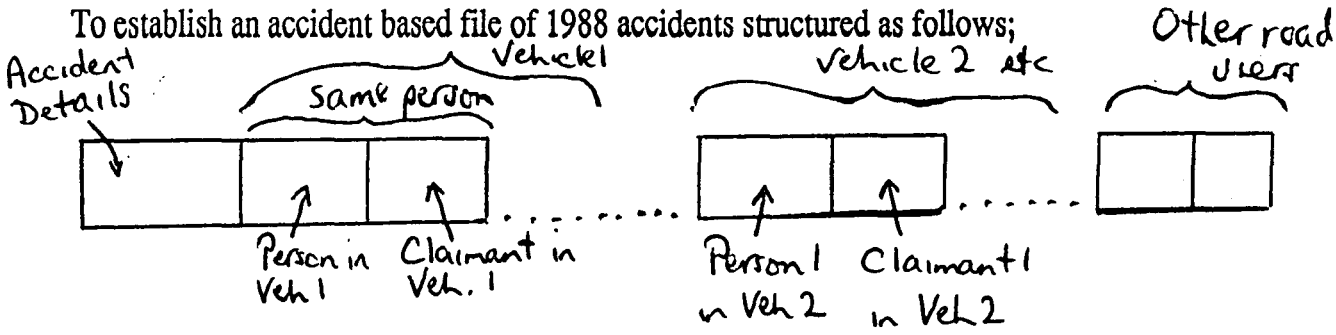
C'try Distr	Mean %	JAN Run 3Jan	JAN Run 5Sep	JAN Grth %	FEB Run 1Apr	FEB Run 5Sep	FEB Grth %	MAR Run 30Apr	MAR Run 5Sep	MAR Grth %
C	3.7	14	14	0.0	9	10	11.1	10	10	0.0
D	15.5	21	22	4.8	13	16	23.1	16	19	18.8
E	13.3	4	4	0.0	5	7	40.0	4	4	0.0
F	6.5	15	15	0.0	16	17	6.3	15	17	13.3
G	8.1	7	8	14.3	10	10	0.0	10	11	10.0
J	13.3	10	11	10.0	5	6	20.0	10	11	10.0
K	3.0	11	12	9.1	10	10	0.0	9	9	0.0
L	18.9	6	7	16.7	5	7	40.0	3	3	0.0
N	4.2	8	9	12.5	3	3	0.0	12	12	0.0
R	8.3	7	7	0.0	5	5	0.0	4	5	25.0
S	8.9	6	7	16.7	6	6	0.0	10	11	10.0
W	10.3	6	7	16.7	6	6	0.0	7	8	14.3
C'try Total	**8.9**	**115**	**123**	**7.0**	**93**	**103**	**10.8**	**110**	**120**	**9.1**
Total	**7.8**	**289**	**313**	**8.3**	**249**	**269**	**8.0**	**289**	**309**	**6.9**

MATCH/MERGE OF TAC & RCV DATA

PROJECT SPECIFICATION

Objective

To establish an accident based file of 1988 accidents structured as follows;



Each record relates to one accident and comprises;

- accident details
- details on all persons involved, arranged by vehicle (all persons in vehicle listed successively), with other road users (e.g. pedestrians) following vehicle occupants
- TAC data on relevant persons to immediately follow data on same person obtained from the Police Report Form.

Process

(a) Allocating Claimants To Accidents

1. All TAC claimants with a common accident number allocated to the one RC record with the same accident number

2. If valid accident number does not exist on claimant record, matching is to be attempted on the basis of Vehicle Registration Number and Date of Accident. This represents an attempt to uniquely identify accident from which TAC claim was derived.

(b) Matching Claimants To Persons Involved

Once claimants have been allocated to an accident, they are to be matched to persons involved as follows;

For Vehicle Occupants

- vehicle registration number by seating position
- age by sex of occupant are to be checked for those claimants for whom the primary check does not prove possible.

For Other Road Users

. road user code by age by sex

Problems Encountered

Problems could be encountered at every stage of the matching process, e.g. valid accident numbers incorrectly punched, registration numbers incorrectly reported etc.

Analysis is to be undertaken to determine the nature and relative size of problems at each stage, e.g.

. number of claimants not allocated on the basis of accident numbers

. number of the above not allocated to accidents on the basis of registration number and date

. numbers not matched to persons involved on the basis of seating position

. numbers not matched on the basis of age and sex

Listings (sorted by key variables) are to be produced for:

. RC casualties without matched TAC claimant data

. RC non-casualties with/without matched TAC claimant data

. TAC claimant data which has not been assigned to either an accident or to a person involved.

It is hoped that inspection of these lists will enable rules to be formulated to either validly increase the matching rate or identify data problems to be resolved.

TAC Identifier

A reliable claimant identifier (e.g. claimant number) should also be added to the record for each claimant to enable updated information to be obtained from the compensation system.

APPENDIX F

RCA/RTA DATABASE MERGING
SHORT TERM REQUIREMENTS

(extracted from Sliogeris (1989))

This attachment gives brief background and the practical steps needed to link the RCA and RTA databases. For simplicity RCA database stands for the Road Management Information System database and the RTA database refers to the location and accident database used by the Accident Studies section as well as the Traffic Statistics section of the RTA.

The original recommendation for the data merging was:

> "Short term - stay with existing systems and amend existing data to ensure compatibility with common location system, estimated to cost $150,000".

The above "amend existing data" is seen as an essential step in all medium to long term options in linking the databases.

It must be made clear that any enhancement to RTA/ROSTA or RCA maps is not necessary to link the existing databases.

SCOPE OF IMPLEMENTATION

Considerations in determining scope

Prioritise those locations/routes:

A. where accidents concentrate
B. that are common to both systems (e.g. minor/local roads are not on RCA/Road Inventory database)
C. that are seen as low effort to make common between both databases

Recommended scope

The following recommended scope is split into 5 stages based on the criteria above. Broadly, higher stages require more effort for less return. The stages can be executed concurrently.

Stage 1: All highways and freeways plus selected major rural arterials
Stage 2: Melbourne/Geelong primary and secondary arterials (as per Melways)
Stage 3: High priority rural arterials (other than in Stage 1)
Stage 4: Remaining main roads
Stage 5: High priority minor/local roads

A. Output in terms of cumulative casualty accident coverage (fatals in brackets)

	Melbourne	Rest of State	Total
Stage 1:	30% (30%)	45% (60%)	30% (40%)
Stage 2:	80% (80%)	45% (60%)	70% (65%)
Stage 3:	80% (80%)	60% (65%)	73% (68%)
Stage 4:	80% (80%)	65% (70%)	75% (70%)
Stage 5	85% (85%)	70% (75%)	80% (75%)

B. Stages 1 through 4 are common to both RTA location and RCA road inventory databases

C. Stage 1 is seen as very easy to do and a large part of the work has already been done. Stages 2 and 3 are relatively straightforward but would take considerably more resources. Stages 4 and 5 are definitely high effort-low return.

SPECIFICATION FOR PROCESS TO LINK DATABASES

Background

Basically a location description or key common to both databases needs to be created. All existing location fields were examined. After initial sieving of road names, route and kilometrage-from-roadstart data and node/link numbers were seen as the most useful in creating a common location key between both databases (a node is an arterial/arterial intersection and a link is the road between two nodes).

Specifications

Stage 1:

- for roads here route/kilometrage fields in both databases are closely matched already.
- RTA route data is the 1972 RCA network. RCA database still has much of this data intact.
- Process
  - (i) extract lists/files of all intersections/side roads in kilometrage order for every route
  - (ii) do computerised merging based on 1972 kilometrage and intersection road names
  - (iii) manually edit locations that are not able to be computer merged.
  - (iv) final check to make sure every location is on every route e.g. to pick up coding errors etc. where a location that should have been on a route has not been coded correctly onto a route. Entails searching a list by shire of all locations and checking to see if they really should be on a route.
  - (v) add a new number based reference key to each database for each location (to facilitate computer processing).

Stage 2:

- unlike Stage 1, for these roads route/kilometrage is not common on both databases.
- location fields with most complete coverage for these roads are route/kilometrage and road names (RCA) and node/link and road names (RTA).
- Process:
  - (i) extract lists/files of all intersections/side roads by arterial
    - for RCA data, sorted by route/kilometrage, flagging arterial/arterial intersections (i.e. nodes)
    - for RTA data extracted by relevant node/links sorted by AMG (Australia Map Grid) coordinates as an aid.
  - (ii) do computerised merging based on intersection names and secondarily AMG (where available).
  - (iii) and (iv) and (v) as Stage 1.

Stages 3 and 4

- basically the only potentially common fields here are intersection names and LGA (local government area) codes.
- Process
  - (i) extract lists of all intersections/side roads by road.
    - for RCA data sorted by route/kilometrage by lga.
    - for RTA extracted by intersection names within lga, secondarily by map reference to aid matching.

(ii) do computerised matching by intersection names
(iii) and (iv) and (v) as Stage 1.

Stage 5:

- for these roads no data exists on RCA system. RTA data coverage is determined by whether an accident occurred on road.
- Process: create route on RCA system and do process similar to Stages 3 & 4.