CHAPTER 5:
CONCLUSION, RECOMMENDATIONS AND AVENUES FOR FUTURE WORK

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5.1 CONCLUSION

The aim of this project was to identify the most common unsafe driving actions (UDAs) associated with crashes, and to assess the feasibility of observing how frequently they occur in the course of normal driving. Stage 1 involved an examination of previous studies to gain an insight into the most common UDAs and to assess the techniques used in these studies. This consisted of a re-examination of the Adelaide in-depth study (McLean *et al*, 1980), using the behavioural definitions from earlier studies. It became apparent that an improved system for assigning UDAs was required and a new flow chart technique was therefore designed. Stage 2 involved testing whether this technique could be applied to police crash report forms. The aim of Stage 3 was to pilot techniques for observing UDAs in normal driving. This primarily involved comparing different techniques for observing conflicts on the road.

Stage 1 proved to be very successful. A flow chart method was developed for assigning driver errors in road crashes (see Appendix B). The method has several advantages. It simplified the process of coding because it only required answering direct 'yes-no' questions, leading to high reliability between coders. The earlier experience of coding with definitions from other studies revealed that the Treat *et al.* (1976) definitions were much too difficult to assign reliably; categories such as false assumption and inadequate defensive driving often could not be distinguished. While Lohman *et al.* (1976) did show good agreement between raters, they used unsafe driving action categories which lacked sufficient detail.

A further advantage of the flow chart was that it allowed grouping of separate flow chart decisions to form categories similar to those used in earlier studies and thus made comparison between studies easier. This comparison did show a high degree of similarity with the Treat *et al.* (1976) and Sabey and Staughton (1975) studies which suggests that the method used is quite valid. It also revealed that there were significant differences between this study and the findings of Lohman *et al* because of differences in sample. This highlights the fact that results of studies are dependent on the sample and great care must be taken when generalising to the crash population as a whole.

At this point it is important to recall that the in-depth study was a small study based on only 304 crashes and it was restricted to crashes in the Adelaide metropolitan area to which an ambulance was called. The results cannot be taken as representative of the entire population of Australian road crashes. Nevertheless it is interesting to point out the most frequent flow chart decisions found in this study. In order of decreasing order, they were as follows:

(a) assumed no conflicting traffic movements,
(b) failed to see,
(c) visual obstruction,
(d) distraction,
(e) excessive speed,
(f) inadequate control,
(g) inappropriate evasive action,
(h) misjudged speed or position,
(i) pedestrian ran onto road

These results are consistent with Treat *et al.* (1976) and Sabey and Staughton (1975) who found failing to see/improper lookout as the highest human error category, followed by inattention/distraction and then speed. 'Assumed no conflicting traffic movements' is an extra category used in this study which included the 'false assumption' and 'inadequate defensive driving' categories from Treat *et al.* It was closely associated with the occurrence of 'fail to see' and 'visual obstruction' and suggests that drivers may tend to assume that no vehicle is approaching when they cannot see past a visual obstruction.

Stage 1 also categorised the crashes from the in-depth study into Road User Movements (RUMs) (see Appendix A). Past studies have either analysed RUMs from mass accident data files (e.g. Charlesworth *et al.* 1985) or have examined UDAs/driver errors in in-depth investigations (e.g. McLean *et al.* 1980). By crosstabulating RUMs with flow chart decisions it was possible to examine the most common UDAs associated with particular driving manoeuvres. Knowledge of driving manoeuvres is relevant for the purposes of developing enforcement countermeasures because the police cannot detect and enforce a more detailed level of behaviour. However, for other purposes it is more important to know the behaviours involved in these unsafe manoeuvres. For example, if cross-traffic crashes are particularly prevalent because drivers are failing to accommodate to a visual obstruction and are assuming that no vehicle is approaching, then the danger of making such an assumption can be emphasized to novice drivers. Alternatively, redesign of intersections may result in fewer obstacles obstructing the view of the driver.

Table XXX11 in Chapter 2 showed the most frequent RUMs in the Adelaide in-depth study and the driver behaviours as obtained from the flow chart for each of these RUMs. Turning to the more frequent RUMs, for RUM 21 (cross traffic) the most common unsafe driver behaviours were assuming no conflict, failing to see, and failing to accomodate for a visual obstruction. For RUM 31 (right against) the same three behaviours were the most common flow chart decisions with 'assuming no conflict' being particularly prevalent for drivers driving straight through the intersection (i.e. those with priority). For hitting a parked vehicle (RUM 52) there were many cases where drivers failed to detect the vehicle and they were often associated with drivers having a blood alcohol concentration above 0.05g/100mL. RUM 82, which consisted of vehicles leaving the carriageway to the left and hitting a fixed object, were primarily due to drivers losing control. RUM 24 (right near) involved a similar pattern of flow chart decisions as RUM 21. There were not enough driveway (RUM 44) cases to identify the main problem in this type of crash, except that both drivers seemed to assume no conflicting traffic movements.

With only 304 crashes examined in the in-depth study, the frequency of particular RUMs was generally low. Consequently, in Chapter 2, crashes were grouped into pedestrian, bicycle, single-vehicle and multi-vehicle categories. For pedestrian crashes the most frequent unsafe behaviour was a pedestrian running onto the road without looking. For single-vehicle crashes, cross-tabulation of RUMs and flow chart decisions showed how the driver behaviours related to particular pre-crash manoeuvres. It was found that speed was an important factor in crashes where drivers lost control on a curve, while distractions appeared to be highly related to a vehicle losing control on a straight road. Speeding appeared to be less frequent in 'fail to detect' than 'loss of control' crashes, and distractions were more prevalent in 'fail to detect' crashes. This crosstabulating of different RUMs and flow chart decisions has led to very logical results. The three highest ranking multi-vehicle crashes were RUMs 21, 24 and 31, which have already been discussed.

Stage 1 developed a technique for measuring the frequency of unsafe behaviours involved in the different unsafe manoeuvres. Because the sample was so limited, the obtained frequencies should not be regarded as representative of the crash population. The results from the re-analysis of the in-depth study using the flow chart technique simply showed how well the flow chart could be used to give a clear picture of the behaviours involved in the different types of road crashes.

The aim of Stage 2 was to analyse a larger sample of road crashes using the flow chart. If successful, this would provide a measure of the frequency of driver behaviours in the crash population. In addition, by cross-tabulating the results with the different variables available on the mass accident data file, it is possible to also identify the age/experience of the driver, location details such as whether the intersection was signalised or not, etc. This information is relevant to all forms of countermeasure. Knowing whether young drivers are particularly prone to doing a particular unsafe behaviour can aid instructors and government bodies in educating novice drivers. It may also be relevant to legislation which is directed towards drivers in their first years of driving.

The police crash report forms seemed an obvious choice for analysis for Stage 2 because a large sample could be obtained and they were easily accessible. A sample of 1600 forms were selected; 800 from the South Australian Department of Transport and 800 from the Victorian Road Traffic Authority. These were stratified such that there were 400 metropolitan and 400 rural crashes from each state and within the sample of 400 reports, there were 100 each from four different injury levels.

However, when the data were examined for the presence of particular driver behaviours using the flow chart developed in Stage 1, the two coders coded an unacceptably high level of 'unknown' responses. This meant that the frequency of driver behaviours in unsafe manoeuvres could not be established. A positive result from Stage 2 was that the database designed to amalgamate the results from the flow chart analysis with mass crash data was very successful. Despite the large proportion of 'unknowns', coders were able to code the flow chart decisions reliably. The flow chart was easily learnt by coders who were not involved in designing it. There are two possibilities as to why too many 'unknown' responses were coded. The first is that the coders may have used a very conservative approach in order to maintain high reliability. The second explanation is that the forms did not contain sufficient information.

After completion of the coding of Stage 2 it was discovered that the police held additional statements from drivers and witnesses, and that this information was available for analysis. A very small pilot study was conducted to determine whether this information could be useful. The results, reported in Appendix E, suggested that this information would reduce both the number of 'unknowns' and the disagreements between coders.

Without systematic testing, it is not possible to know whether relaxing the criteria for certainty with data from the police forms would be as effective as using the additional information, while retaining the same criteria. Report forms are already routinely available, whereas obtaining the extra information requires extensive further searching.

A second pilot study with a sample of 100 crashes from the original sample was conducted to test the difference between the original method (method 1), a more lenient approach using the original report forms (method 2) and using the report forms with additional police information (method 3). The results are summarised in Appendix E. While there are certain behaviours which are reliably identified by using Method 2, Method 3 identified UDAs more frequently. For some types of UDAs, particularly speeding and inadequate control, the more lenient approach led to an unrealistically high proportion of false positives as shown by Method 3. Therefore the results suggest that method 3 is far superior to both methods 1 and 2.

Thus, since little information can be gleaned from the current results from Stage 2, it is necessary to repeat it. The additional information at police headquarters offers a source of data which should provide more information.

The aim of Stage 3 of the project was to test the feasibility of measuring conflicts in normal driving. In particular, interest focussed on the frequency of conflicts corresponding to the RUMs most frequently associated with crashes.

If it were possible to obtain this information, then it would be possible to calculate the probability of a conflict for a given manoeuvre, the probability of a crash given that a conflict has occurred, and hence the relative risk of different conflicts. As discussed in the introductory Chapter this leaves the options open as to whether to calculate relative risks of conflicts (as Lohman *et al* did with UDAs) or to calculate the absolute ratios (as did Glauz *et al*).

Both video and manual observation of specific sites were collected and compared. Observation sites included roundabouts, signalised and unsignalised intersections. This allowed measurement of the exposure of RUMs such as 21 (right angle), 24 (right near), 31 (right against), and 37(rear-end intersection). Unfortunately, the reliability between the two methods was found to be poor and thus at this stage inappropriate for a method of measuring exposure.

Fewer conflicts were observed with the video. The lower viewing angle of the field observer made it appear that vehicles came close to making contact, when in fact it was often apparent from the overhead view offered by the camera that they did not. The sounds of braking and acceleration, which were absent from the video record, may have also come into play. On the other hand, the unfamiliar elevated view from the video camera is difficult to relate to the experience of ordinary driving, and may engender a sense of complacency about the relative movement of vehicles. While it is not possible to say which technique is more valid, it is encouraging to note that the observer-based techniques produced results in general agreement with those of other investigators. For example, the conflict/manoeuvre ratios were very similar to those found by Glauz *et al.*, while the car-following technique yielded total incident rates similar to those reported by Lohman *et al.*

A car-following technique was used and although the reliability of it was not measured it appeared successful in identifying conflicts. This method would be appropriate for measuring exposure of manoeuvres involved in mid-block type crashes such as RUM 44 (driveway), RUM 33 (rear end mid-block), RUM 52 (hit parked vehicle) and the more frequent rural RUMs (e.g. 71,72,81, 82) which involve drivers leaving the carriageway, RUM 61 (head on) and RUMs 62 to 66, which involve side-swipes. With further testing, the car-following technique may be appropriate for gaining exposure measures of unsafe driving manoevres which occur mid-block.

While it would be preferable if the exposure measure of all types of driving manoeuvres were the same to facilitate the estimate of relative crash risks, it may be more practical to use different techniques for mid-block and intersection crashes and either endeavour to adjust the two measures to make them as equivalent as possible or to rank intersection and mid-block type manoeuvres separately.

5.2 FUTURE WORK

At this stage, several options are available for pursuing this line of research. Before a final decision concerning future directions for the research can be made, two related issues must be resolved. These are the purposes to which the research is to be put, and the extent to which risk estimates associated with particular UDAs are likely to be important in decision-making.

As discussed earlier, the different observational methods yield quite different information, which relates to different aspects of the flow chart used to ascertain the presence of specific behaviours. In fact, only the in-car technique has the capacity to measure whether most of the behaviours listed on the flow chart took place, that is to say the looking, seeing, assuming no on-coming traffic and other behaviours. However, the presence of the observer cannot but affect the way in which the driver approaches the driving task in such a way that the technique measures something close to optimum performance rather than typical performance. Most obviously, there is little possibility of observing even mildly aberrant behaviour, such as driving while alcohol-affected in a manner verging on the reckless. Nevertheless, by observing the undesirable behaviours of which drivers are unaware, are unconcerned about or insist are appropriate, useful information can be obtained about how driver training or continuing safety education might be modified. By carefully observing the patterns of behaviours at particular sites and considering these in relation to site characteristics, useful information about site characteristics which give rise to difficulty might be obtained. This, in turn, can suggest priorities for traffic engineering improvements.

It is unlikely, though, that this technique can reveal much that is of interest to enforcement strategists, as drivers are unlikely to commit the full range of offences that they otherwise would. For this purpose, it is necessary to observe traffic as unobtrusively as possible. This is necessary both to ensure that the traffic is behaving normally and because this is the only type of behaviour which the enforcement authorities themselves can observe. To the extent that obvious deficiencies in driving technique can be detected, this technique may be useful input into driver training and continuing education. To the extent that more conflicts/UDAs/incidents are observed at sites with particular characteristics, it can yield useful insights into traffic engineering practice.

Perhaps the most important conclusion from this part of the investigation is that one global attempt to define and observe driver behaviours for all purposes is probably not feasible. The behaviours to be modified determine the behaviours which are appropriate to observe, and hence the observation technique.

This raises the related question on whether risk measures are actually necessary in order to decide which behaviours should be given priority in countermeasure development. Knowledge of the relative risks associated with the various behaviours is clearly desirable. The unresolved question is whether it is worth the considerable effort involved to obtain this information. While Lohman *et al* used a fairly sophisticated sampling procedure to obtain estimates of how frequently the UDAs they were interested in occurred, they did not report the variability associated with these observations. Since many of the observations were made only rarely, the associated variation is inevitably large. On the other hand, Glauz *et al.* reported observations at about the same number of sites, but over a much larger period and they addressed a limited number of conflict situations: nevertheless, the variation associated with these observations was considerable.

On the one hand, simply knowing the proportion of crashes in which a particular behaviour is implicated gives a clear indication of the priority which would be accorded in countermeasure development. Ideally, behaviours should receive priority according to the frequency with which they contribute to crashes. However, an understanding of the risks associated with the behaviour, i.e. the probability that the behaviours will lead to a crash, and the probability that the behaviour will occur, is useful in deciding which type of countermeasure is appropriate. For example, behaviours may be very high risk, but occur too infrequently for them to warrant being the target of enforcement activity. Alternatively, if the crash risk is low compared to other behaviours and the resultant crash problem small despite the frequency of the behaviour, enforcement may not be the appropriate countermeasure. Thus the extent to which risk must be known in order to develop a hierarchy of countermeasures is an open question.

Thus it appears there are five options for future work. These are:

(1) to complete the process of applying the flow chart analysis to existing data, supplementing it with information from statements;

(2) to extend this process by comparing crash records with detailed information about traffic movements available from co-ordinated signal systems;

(3) to complete an enforcement-oriented study, using stationary observation of traffic;
(4) to complete an education orientated study, using the car-following technique; and
(5) some combination of these.

The advantages, disadvantages and costs of these are as follows. Costs are based on ARRB's current consultancy rates which include overheads. In view of the wide application of this work , joint sponsorship may be possible.

Option (1) Completing the Process of Applying the Flow Chart Analysis Supplemented by Statements

The SIR database necessary for the analysis of this phase has already been established, and the feasibility of the technique demonstrated by the application of the flow chart to the in-depth data and the pilot study with the supplementary data. Application of these techniques to a larger sample of crashes is clearly a worthwhile goal and one which can be readily achieved.

This option would require the recoding of the sample of Victorian police report forms with the supplementary statements. While there were 800 forms in the original sample, the recoding would exclude the property damage crashes because there would normally only be one person's account of a property damage crash and this would presumably lead to unreliable information for this type of crash. Thus the sample would be reduced to 600 crashes. Recoding would also be done for South Australian data if the South Australian police have similar information which is accessible.

A further stage in this option may be to test the validity of the police information by comparing these data with those of an in-depth study. An in-depth study of rural crashes in South Australia, currently in progress, may be suitable for such an investigation.

Assuming that five cases can be processed per hour, taking into account the supplementary data, it would take approximately five weeks for one investigator to work through the sample of 600 cases. Two weeks would also be required for orientation and training in the use of the flow chart. In order to maintain the check on reliability, two investigators would be required.

In addition, it may be anticipated that three months of an investigator's time would be required for assembling the data, supervision, analysis, interpretation and write-up. An experimental scientist grading seems appropriate for all of these tasks: thus a total of twenty-six experimental scientist weeks would be required to carry out this part of the investigation, with very little other expenses. At $1450 per week, this is equivalent to a total cost of $38 000.

At present, it is not clear whether the same data is readily accessible in other jurisdictions. If this is the case, then the investigation could be widened to include records from these other jurisdictions. Apart from additional travel costs, to obtain the necessary records, costs will be similar.

Option (2) Comparing Crash Data with Traffic Movement Data from a Co-ordinated Signal System.

It would be a relatively simple matter to obtain movements, including separate turning movements, from one of the co-ordinated traffic signal systems which control traffic in most Australian cities. By comparing movement data with crash histories, it should be possible to estimate the risk associated with manoeuvres, rather than conflicts. It should also be possible to estimate how risks vary according to time of day, and from intersection to intersection. It would require little in the way of data collection, capitalising on an existing, sophisticated system installed to control traffic. However, it would be applicable only to the signalised portions of the urban road system.

At this stage, estimates of the amount of time required to collect data and the amount of data required for such an investigation are necessarily very tentative. However, if we assume that four days data would be desirable from each intersection studied, and that it requires half a day of technical officer time to collect this information, then a committment of ten technical officer weeks would allow data collection from 100 sites. Obtaining crash records and data entry for these sites is estimated at two weeks of technical assistant time, while supervision, analysis, interpretation and write-up would probably require eight weeks of research scientist time. An investigation of the scope proposed would therefore probably cost $2000 in technical time, $14 500 in technical officer time and $17 000 in research scientist time. Now that all major Australian cities have co-ordinated traffic signals, this exercise could easily be expanded. Costs would again be similar except that a travel component for liaison and data collection would be necessary.

Option (3) An Enforcement-Centred Study

Hoque and Andreasssend (1986) estimated that nearly 80 per cent of reported urban crashes occurred within 30 m of an intersection. Since the urban crash problem can be characterised as one which largely involves intersections, a technique using stationary observers in the manner used in the study is appropriate. The poor relationship between the video record and the field observers would be of little consequence, since behaviours observable by police officers would be the focus of interest.

A rough estimate of number of incidents likely to be observed per hour of observation can be derived from *Table XXXII* (see also sections 4.2.5 and 4.4). Taking all types of conflict into account, approximately 30 conflicts/hour were observed. If rear-end conflicts are not taken into account, then approximately eight conflicts/hour were observed.

A team of two observers would be required to ensure reliability of observations. One hundred hours of observation would probably be a reasonable monthly target for such a team, in the course of which they could be anticipated to observe approximately 800 conflicts, excluding rear-end conflicts. However, it must be stressed that these are average figures only and that the incidence of conflicts varies greatly from intersection to intersection. Nevertheless, if such a team were to be put into the field for three months, allowing time for training and collating results, observations of approximately 2000 conflicts may be anticipated.

If the team were expanded by one other member trained in the use of the video trailer and analysis equipment, measures of speeds and headways would also be possible.

Such a team would consist of an experimental officer and two technical assistants and would cost in the order of $3550 per week. Thus a three month project of the type described would cost $42 600 for field work supervison, analysis and write up would probably require six weeks' research scientist time, costing $12 450. Thus total costs would be approximately $55 000.

For rural driving, the car-following technique would appear to be more appropriate as typically low volumes mean that few vehicles would be encountered with stationary observation. Loss-of-control is a frequent feature of rural crashes, usually associated with encroaching on the shoulder, wide cornering or excessive speed, all of which could in principle be easily observed by car-following. However, apart from excessive speed, none of these behaviours were observed.

More development work is required before an assessment of the usefulness of this technique can be made. In particular, it is necessary to establish how reliable observations are, and to select behaviours to be observed on the basis of crash records. This requires the more detailed examination of the supplementary crash records proposed.

The video techniques used in the present study could produce useful supplementary data on speed and headways in rural settings.

Option (4) An In-Car Study Aimed at Driver Training and Improvement.

A study involving this technique has just been carried out at ARRB (Quimby 1988). A different UDA classification was developed in his study, although the types of behaviour recorded are similar and in fact, several of the UDAs are the same. For education purposes it is important to record detailed levels of behaviour in both the crash and observation stages. To calculate the relative crash risks of UDAs it would be preferable to apply the same classification in both stages. The flow chart has been shown to be effective for analysing crashes at the desired level. Thus, the in-car technique used by Quimby (in press) would be further developed to incorporate the flow chart technique. While it is clearly not feasible to go through the whole flow chart procedure for each incident while driving, it may be possible: a) to select a few key items such as presence of obstruction, did driver look, which can be assessed on all occasions, or b) to develop the technique in terms of pulling over whenever a 'conflict' or 'incident' occurs and applying the flow chart procedure. It would not be appropriate to decide on the particular UDAs to be observed until Stage 2 was repeated with the supplementary statements (Option 1). Without this, it is not possible to determine the most important behaviours to be observed.

At this stage, costing is based on the results Quimby (1988) obtained with his UDA classification. If each subject drove a designated route of 100 minutes duration, it seems reasonable to observe two subjects per day. Based on Quimby's estimates, 16 weeks of observation would result in approximately 7000 UDAs of which approximately 1000 would result in conflicts. The in-car technique requires an experimental scientist to observe and record the UDAs from the rear seat of the car and a technical assistant is needed to sit in the front seat and administer a subsidiary task which will be used to distract the driver from the real purpose of the drive. A technical assistant would be required for the 16 weeks of observation, amounting to $17 000 and an experimental scientist would be required for the 16 weeks of observation plus 8 weeks for analysis and report writing, amounting to $35 000. Thus, the total cost would be $52 000.

Option (5) More than One of the Above

Option (1) must clearly have precedence over any of the other options. If it is decided to proceed with other options, they should not commence until Option (1) is substantially complete, so that a much better picture of the behaviours normally preceding crashes can be established.

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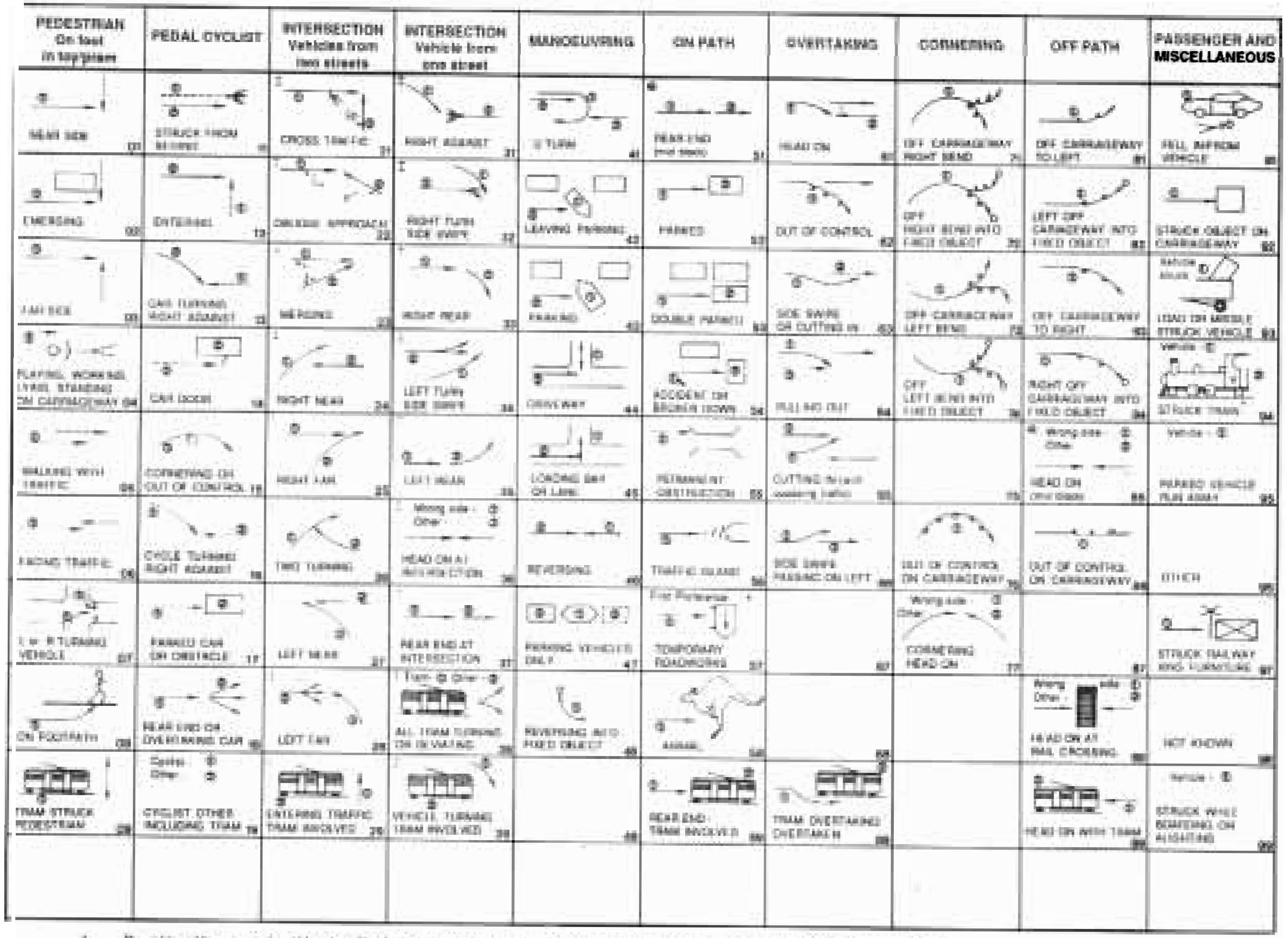
APPENDIX A

ROAD TRAFFIC AUTHORITY — **CODING OF ROAD USER MOVEMENTS**



1. Road User Movement should be classified first by the written divisions along the top of the page and then by the diagrammatic subdivisions.
2. The subdivision chosen should describe as accurately as possible the general movement executed by the vehicles having the initial collision. It should not describe the cause of the accident. A car might cut into a traffic stream and while not actually colliding with any vehicle, cause another vehicle to run off the road. This should be coded as 81, Off roadway to left. If the car collided with the other vehicle when cutting in, it should be coded as 65, Cutting in.
3. Priority should be given to 67, the subdivisions in numerical order.
4. Road User Movements marked as ① or ② must be used only at intersections or midblocks respectively.
5. The numbers ① and ② indentify individual vehicles involved in the initial event when R.U.M. is linked with other driver/vehicle information

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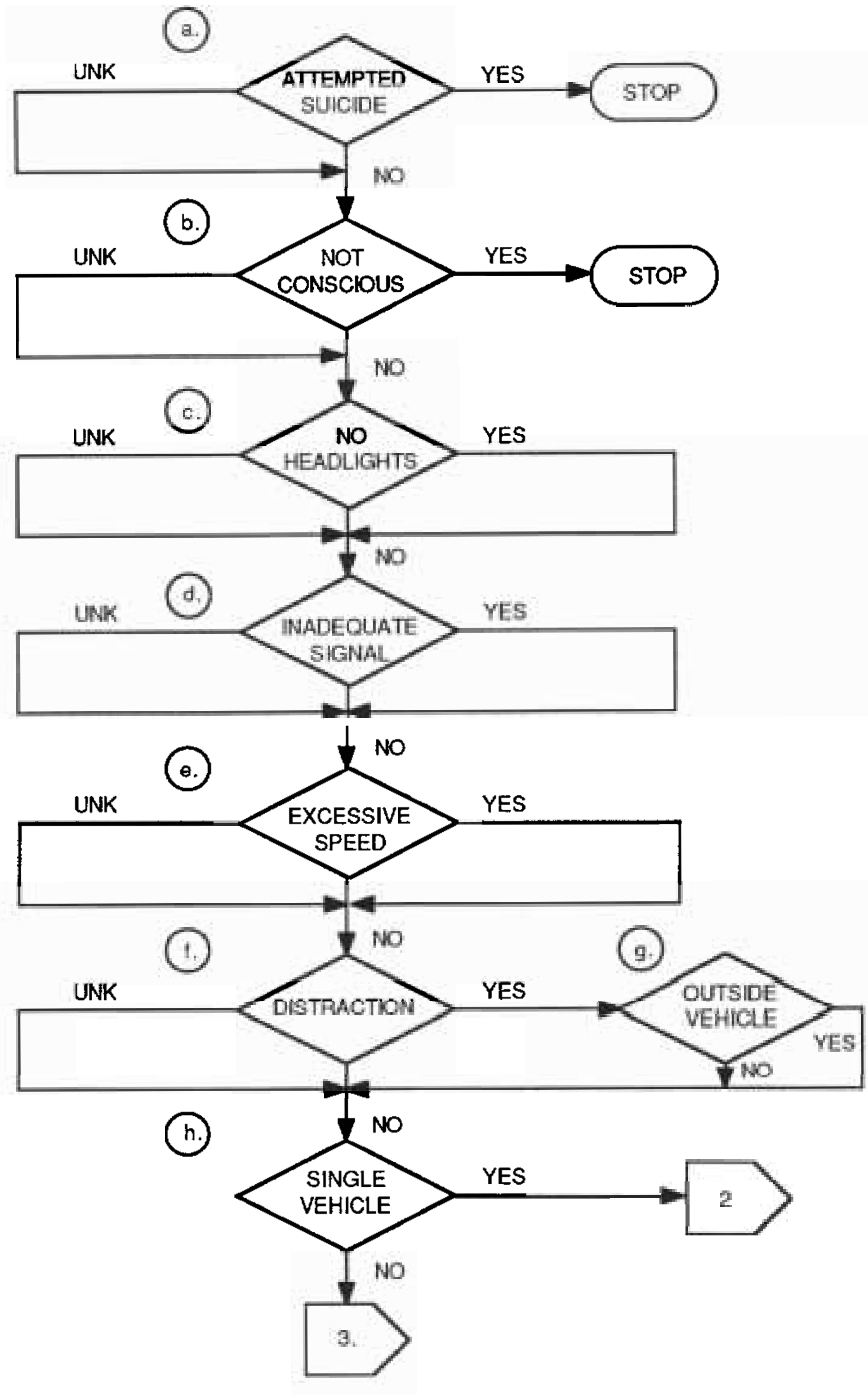
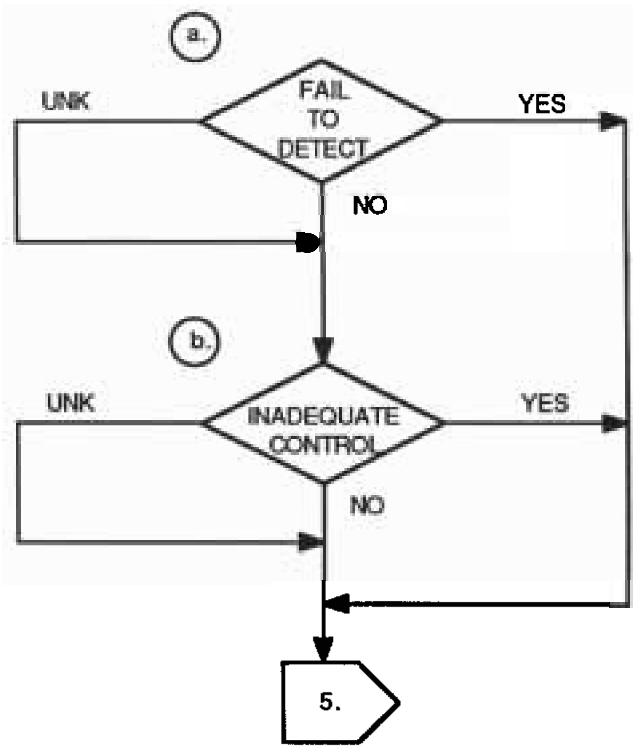
APPENDIX B : FLOW CHARTS

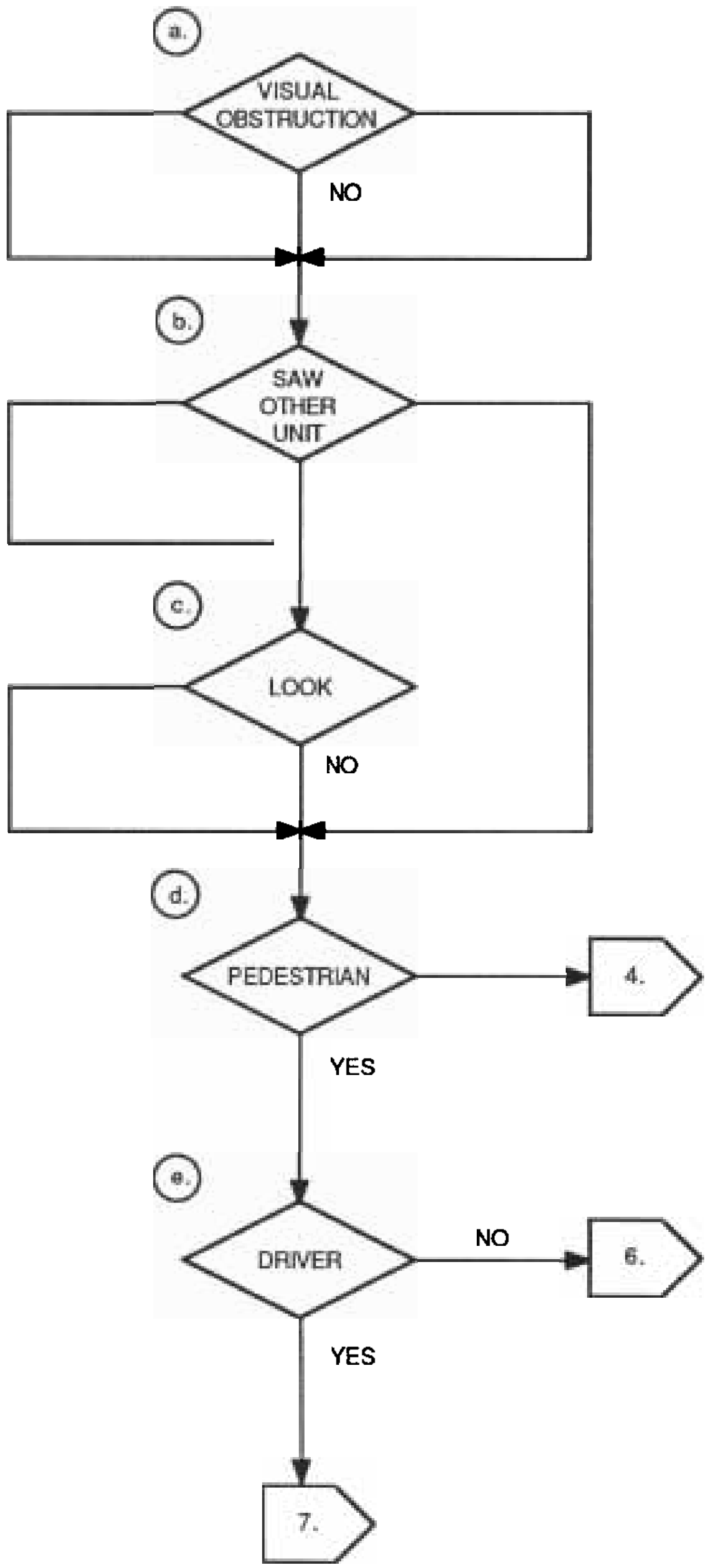
1. HOW DID PARTICIPANT APPROACH SITUATION?



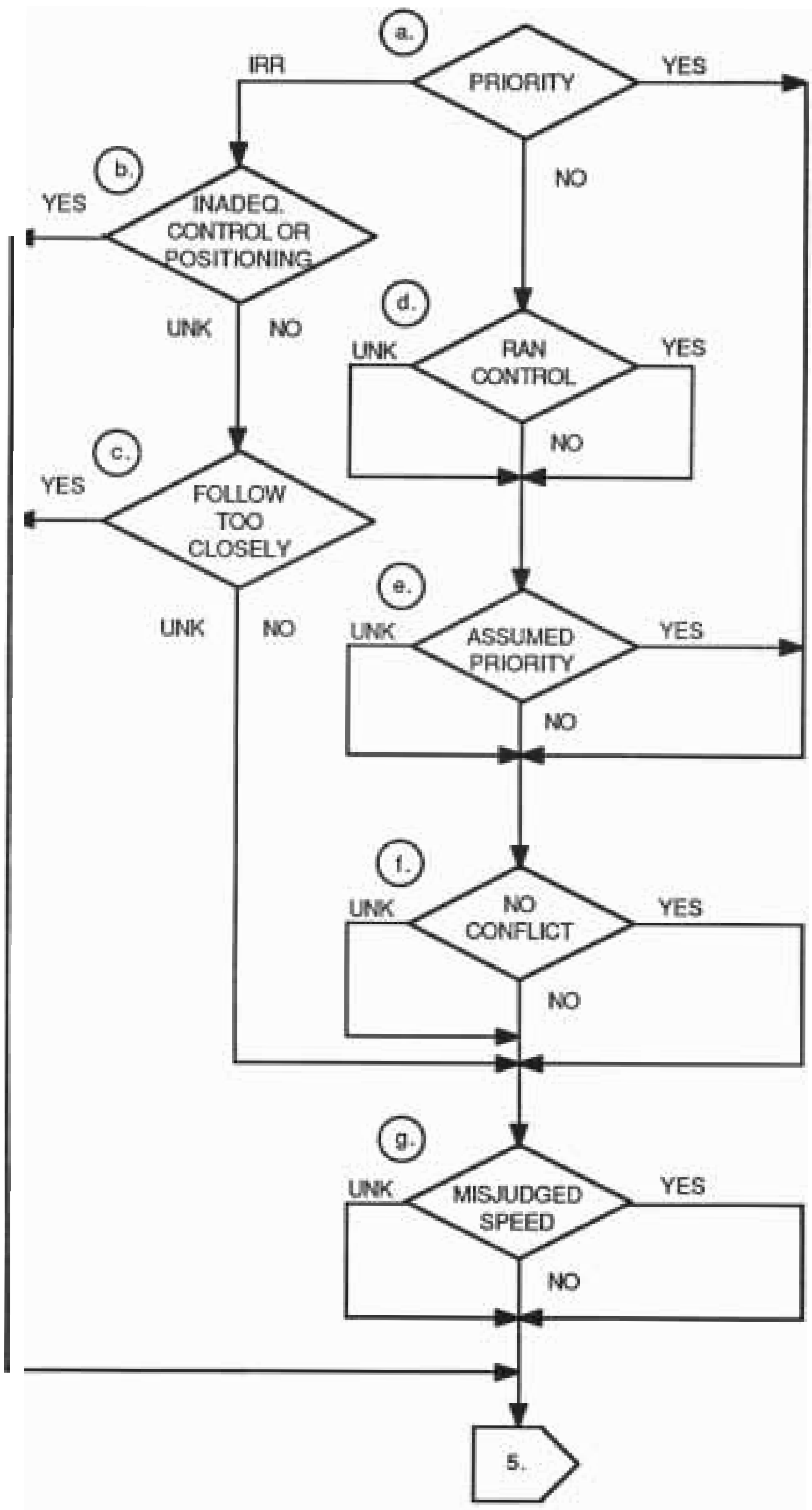
2. SINGLE-VEHICLE CRASH : WHAT DID DRIVER DO?



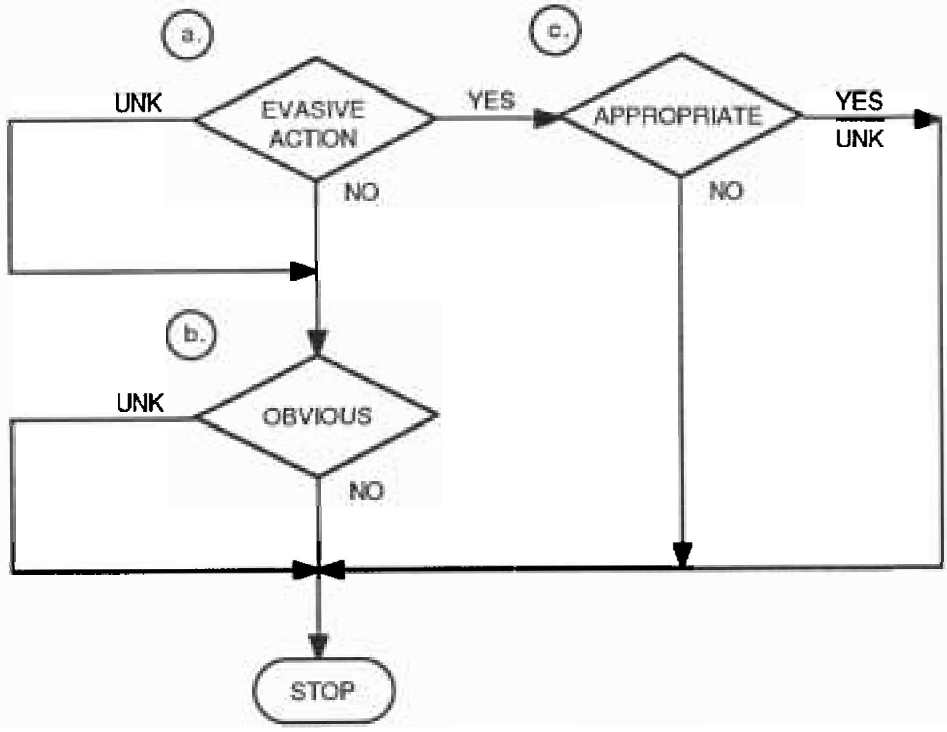
3. WHAT DID PARTICIPANT SEE ?



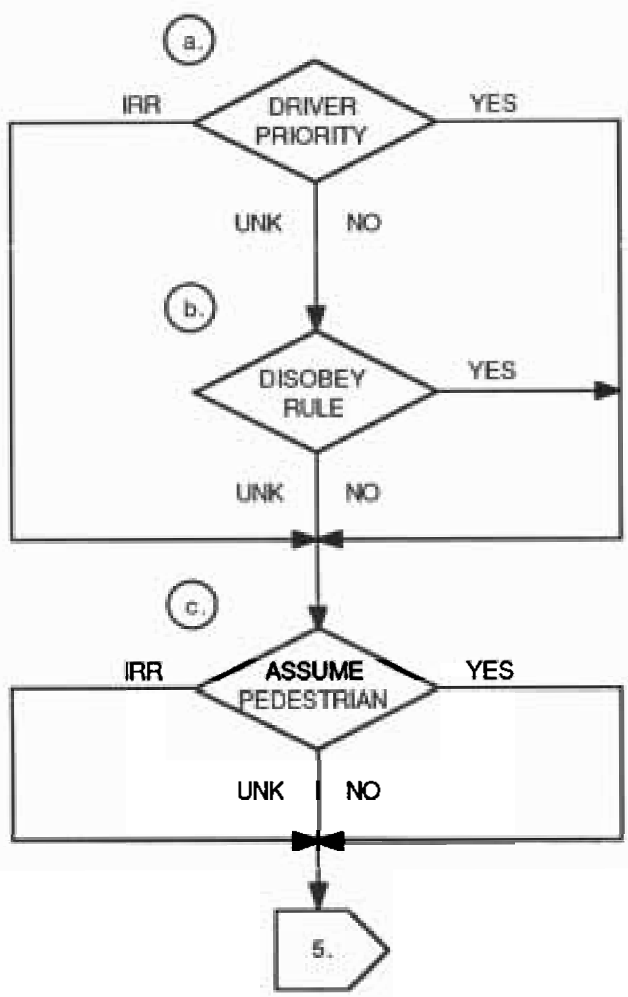
4. WHAT DID DRIVER DO ?



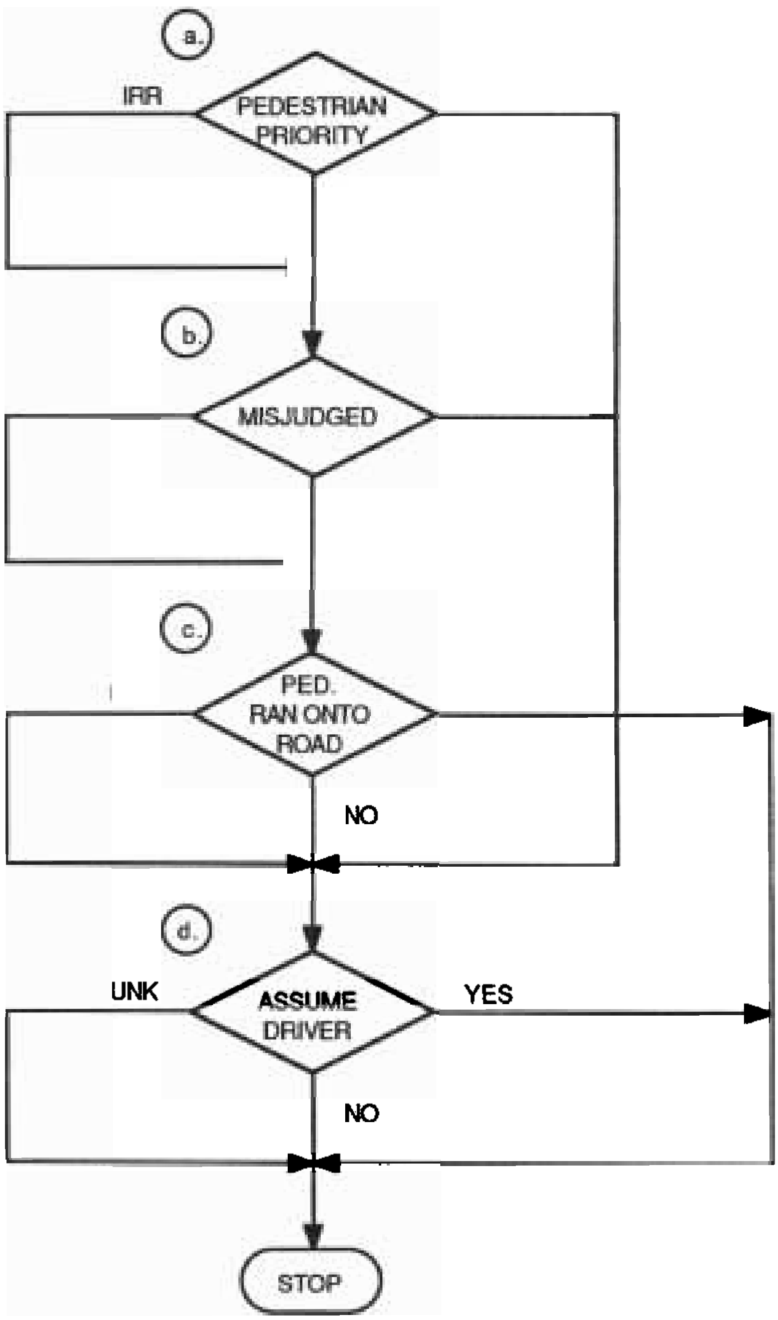
5. EVASIVE ACTION



6. PEDESTRIAN CRASH - WHAT DID DRIVER DO ?



7. PEDESTRIAN CRASH - WHAT DID PEDESTRIAN DO ?



APPENDIX B
FLOW CHART DECISIONS

Below the criteria for responding 'yes' to a flow chart decision are provided. Respond 'no' if the criteria does not fit and unknown if it is unclear. Cases where 'irrelevant' is a possible response will be described in detail.

1. HOW DID PARTICIPANT APPROACH SITUATION?

a. If attempted suicide was mentioned in the description of the crash.

b. If the description states that a driver was not conscious due to either falling asleep, having a heart attack or blacking out prior to the crash.

c. If the narrative states that the vehicle's headlights were not on when they were required. This includes faulty headlights and driver's failure to turn them on.

d. In a situation where a signal is required, if the description states that no signal was used. Includes brake lights and indicators and failure due to vehicle fault or driver's error.

e. If the narrative mentions that the driver is driving too fast for the speed limit or for environmental conditions (including weather, road geometry etc.).

f. If there is a distraction mentioned in the narrative, or if the Adelaide in-depth crash data has listed 'inattention, distraction' or 'inattention, engaged in secondary activity' as an error.

g. If the distraction was outside the vehicle. If the distraction was associated with the condition of the vehicle, respond 'no'.

h. If the crash involves a single-vehicle or hitting a parked vehicle.

2. SINGLE-VEHICLE CRASH-WHAT DID DRIVER DO?

a. If the description and diagram of the crash indicate that the crash primarily involved a driver not seeing an obstruction in time to take effective evasive action.

b. If the narrative or diagram suggests that the crash was due to a driver losing control.

Note: if a vehicle was driving in a straight path and hit an object, then respond 'yes' to 'a'. If the vehicle lost control and then hit an object, respond 'yes' to 'b'.

3. WHAT DID PARTICIPANT SEE?

a. If narrative mentions a visual obstruction or a short sight distance or an obstruction is clear in the diagram.

b. Regardless of whether there was an obstruction or not, if the driver saw the other vehicle prior to the crash.

c. If the vehicle was not seen or if it is unknown, if the narrative states or suggest that the driver looked in the relevant direction, respond 'yes'.

d. If a pedestrian was involved in the crash.

e. If the driver is being coded.

4. WHAT DID DRIVER DO?

a. If the driver is facing a green or amber signal, if the other driver is facing a give way or stop sign at an intersecting road or if he is on the right of the other driver at an uncontrolled intersection, and if another driver is pulling out from a parking place or driveway or turning in front of him. If it is a situation where a driver has driven into the rear of another vehicle, priority is irrelevant.

b. If the driver has driven into another vehicle due to lack of control, or poor positioning of a vehicle is involved in the crash.

c. If the driver is driving behind another vehicle and in the absence of other factors eg. distraction, has been unable to avoid running into the first one.

d.If a driver does not stop at a stop sign or disobeys a traffic signal (eg. drives through when facing red signal or turns on red arrow).

e. If a driver does not have priority but assumes that he does . For example, a driver may not have seen a stop sign or he may have thought he had priority when turning in front of a driver facing an amber traffic signal.

f. If there is evidence that the driver has either assumed that there was no traffic in conflicting pathway or that any conflicting traffic would stop.

g. If a driver has seen another vehicle but has driven into its path because he has misjudged its speed or position.

Note : 'unknown' should be recorded for both 'f' and 'g' in cases where it is unclear whether the other vehicle was seen or not.

5. EVASIVE ACTION

a. If the description makes it clear that evasive action was taken.

b. If no evasive action was taken, respond 'yes' if according to the description or diagram there was evasive action that could have been taken.

c. If evasive action was taken, respond 'yes' if the evidence suggests that it was the most effective action in reducing the consequences of the crash.

6.PEDESTRIAN CRASH-WHAT DID DRIVER DO?

a. If the pedestrian is not on a 'working' crossing or if the driver is not turning a corner where the pedestrian is crossing. Record 'irrelevant' in cases where a pedestrian is standing in the centre of the road waiting to cross.

b. If the driver hasn't priority and he has disobeyed a traffic rule. For example he has not waited until a child has crossed a children's crossing.

c. If the driver has seen the pedestrian but assumes that he will not move into his pathway.

7. PEDESTRIAN CRASH-WHAT DID PEDESTRIAN DO?

a. If responded 'no' to driver.

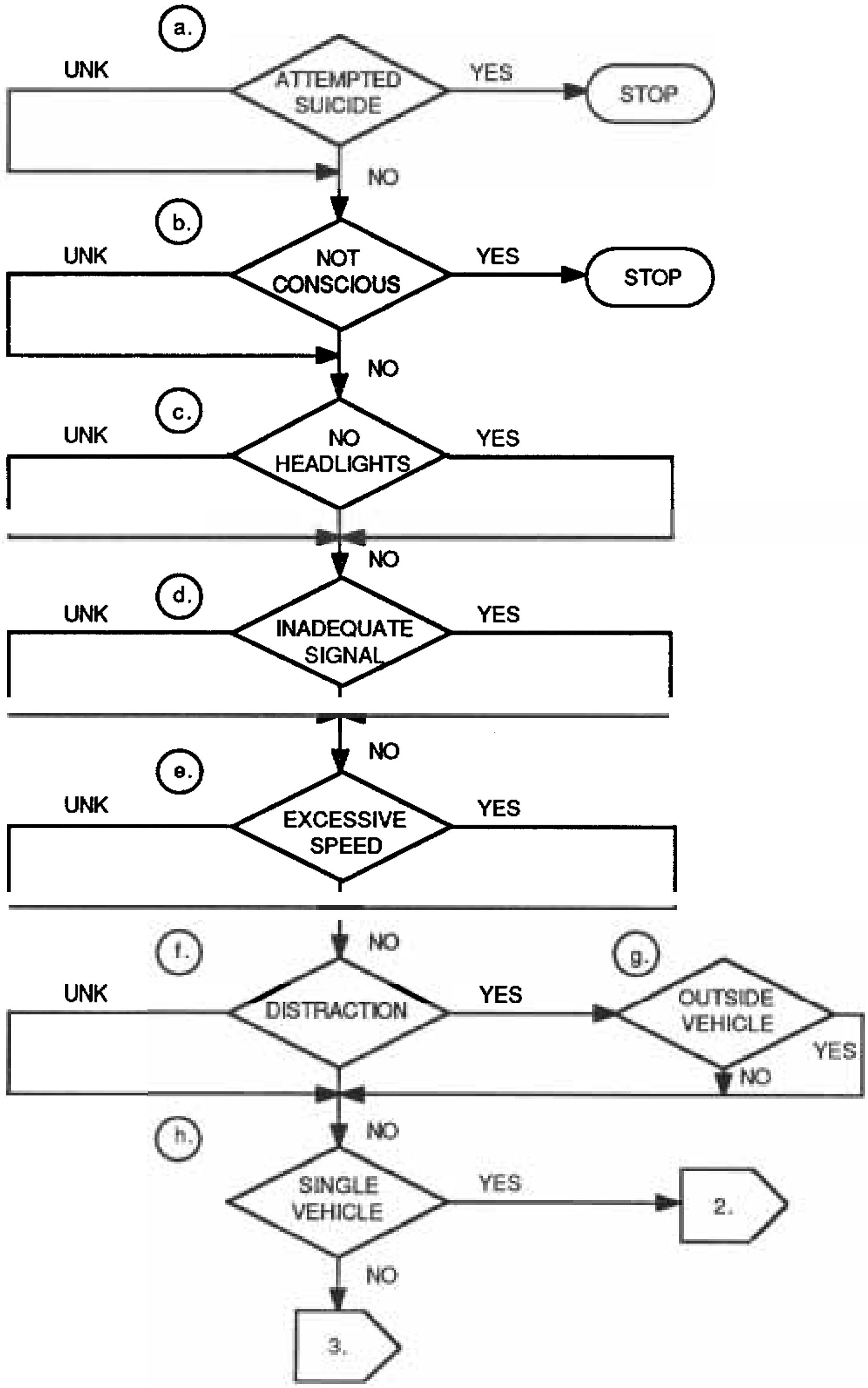
b. If the pedestrian does not have priority or priority is irrelevant, and has seen the driver but misjudged its speed or position and consequently walked out into driver's path.

c. If the pedestrian does not have priority and did not misjudge driver's speed or distance but stepped into driver's pathway.

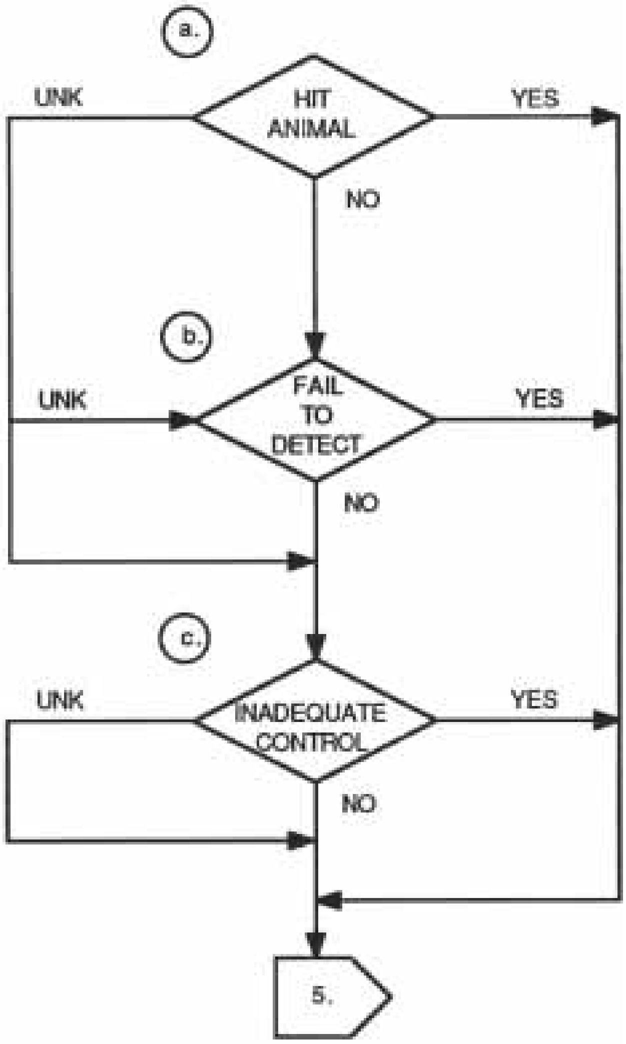
d. If pedestrian saw driver and assumed he would stop.

APPENDIX C: REVISED FLOW CHARTS

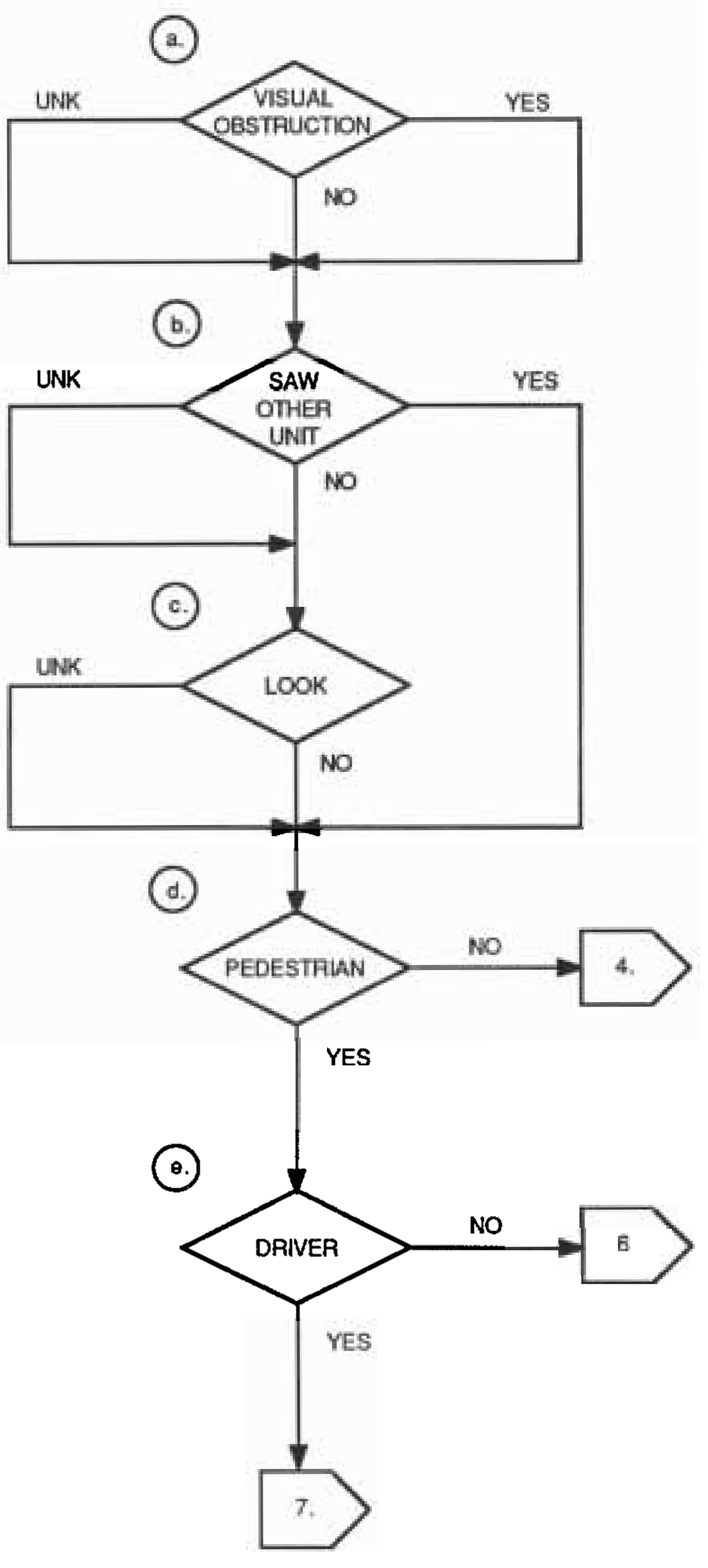
1. HOW DID PARTICIPANT APPROACH SITUATION?



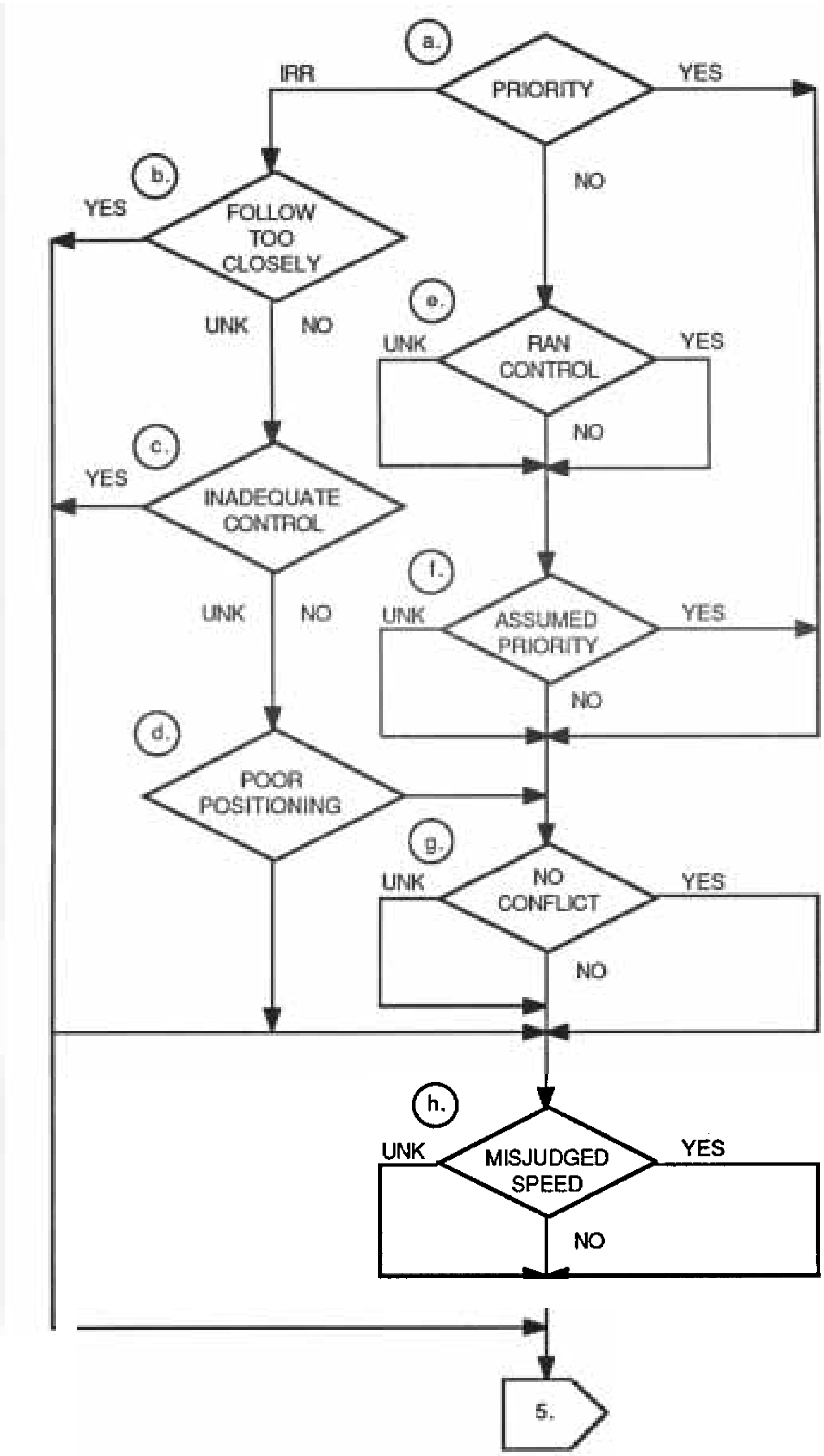
2. SINGLE VEHICLE CRASH : WHAT DID DRIVER DO?



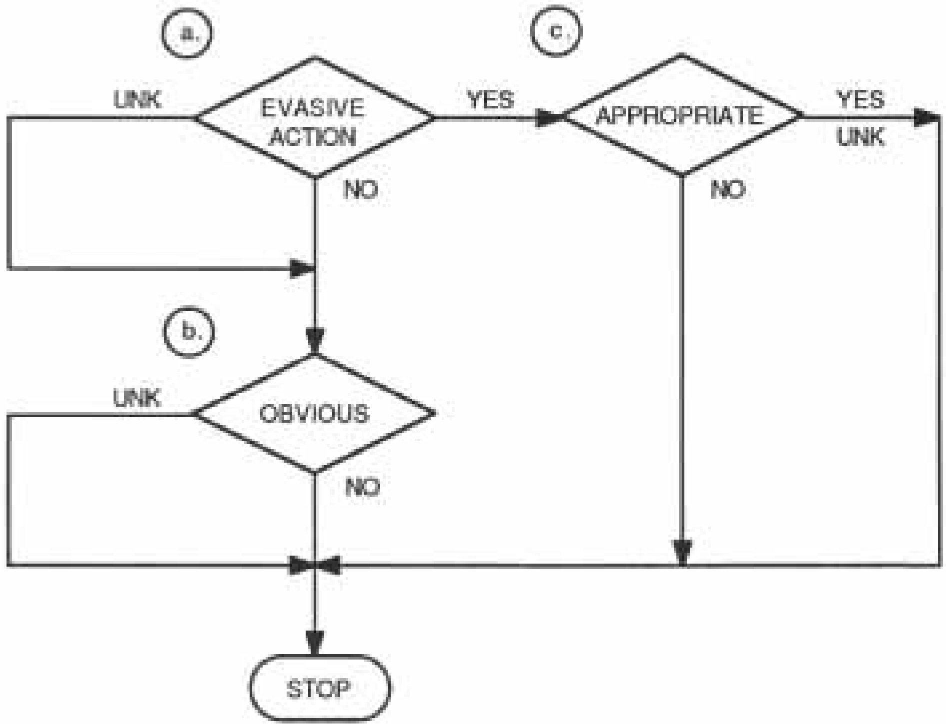
3. WHAT DID PARTICIPANT SEE ?



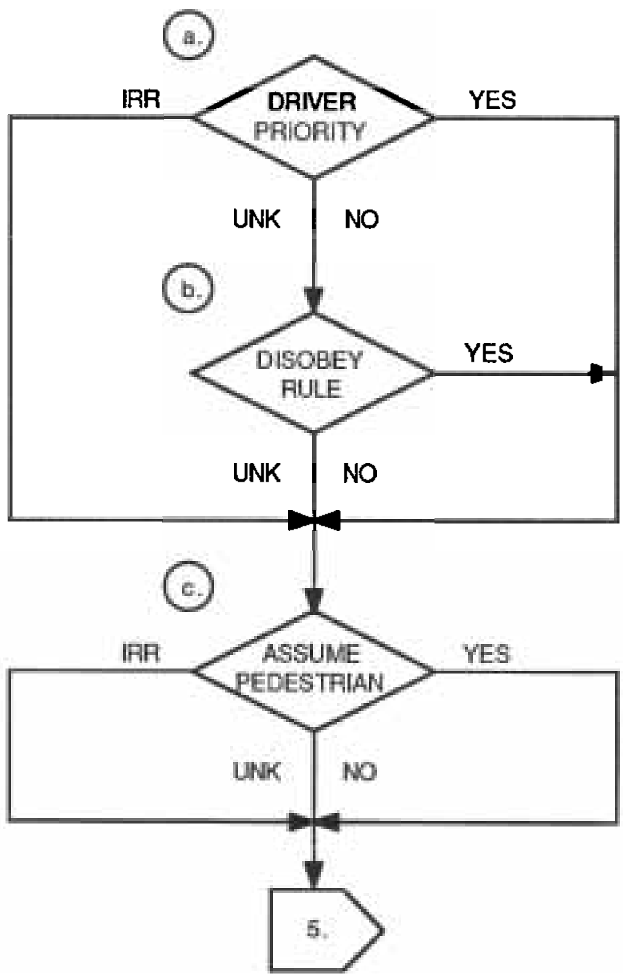
4. WHAT DID DRIVER DO ?



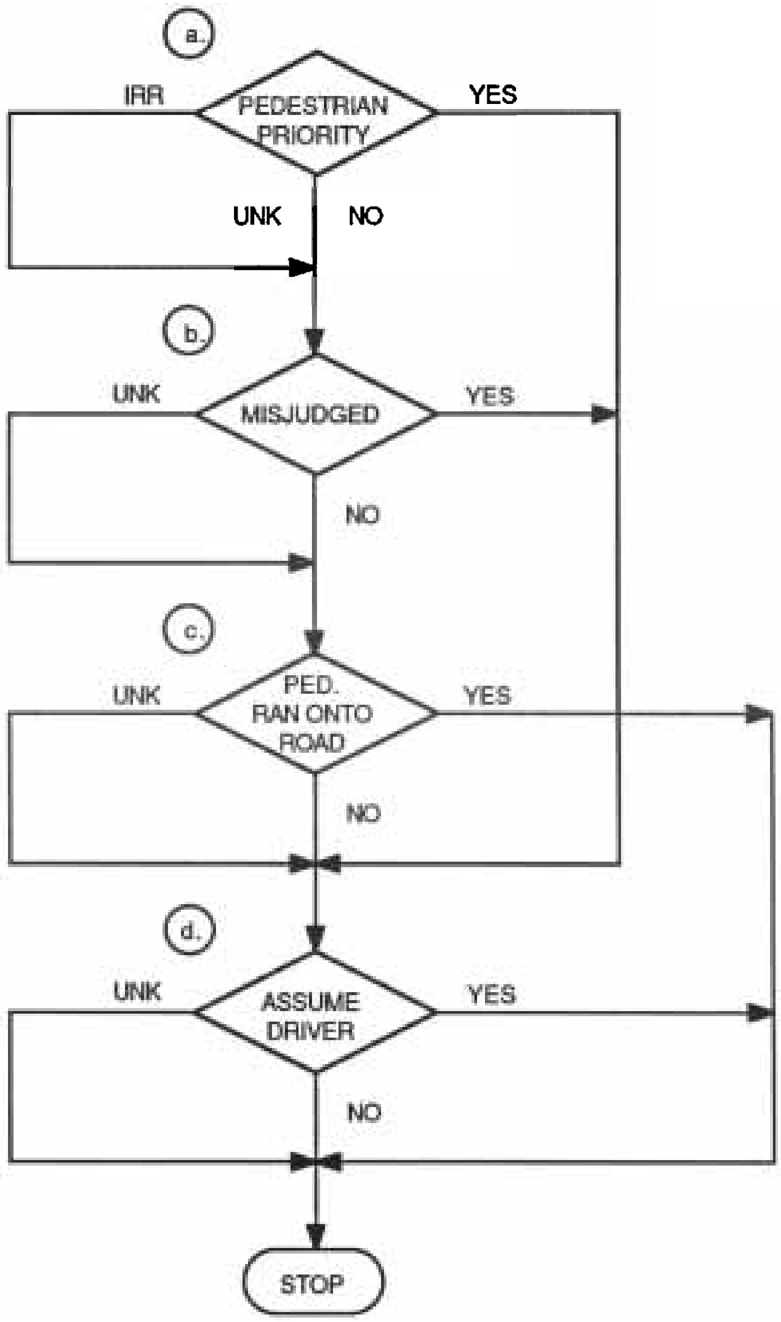
5. EVASIVE ACTION



6. PEDESTRIAN CRASH - WHAT DID DRIVER DO ?



7. PEDESTRIAN CRASH - WHAT DID PEDESTRIAN DO ?



APPENDIX C
FLOW CHART DECISIONS

1. HOW DID PARTICIPANT APPROACH SITUATION?

a. If attempted suicide is stated, then code 'yes' and cease further coding. If it is not stated, code 'no'. If suspected but not confirmed, code 'unknown' and continue coding.

b. If the narrative states that a driver was not conscious due to either falling asleep or blacking out, then code 'yes' and cease coding. If it is not stated, code 'no'. If suspected, but not confirmed, code 'unknown' and continue coding.

c. If the narrative states that the vehicle's headlights were not on when they were required, including faulty headlights and driver's failure to turn them on, then, record 'yes' and go on to the next question. Otherwise code 'no' or 'unknown' and go to next question.

d. In a situation where a signal is required, if the narrative states that no signal was used then code 'yes' and go to next question. This includes brake lights and indicators and failure due to vehicle fault or driver's error. Otherwise code 'no' or 'unknown' and continue on.

e. If the narrative mentions that the driver is driving too fast for the speed limit or for the environmental conditions (including weather, road geometry etc.) code 'yes' and go to next question. Otherwise code 'no' or 'unknown' and continue.

f. If there is a distraction mentioned in the narrative (including driver being engaged in secondary activity) record 'yes' and go to 'g'. Otherwise code 'no' or 'unknown' and go to 'h'.

g. Record 'yes' if the distraction was outside the vehicle and 'no' if it was inside. Inside includes all distractions associated with the condition of the vehicle.

h. If the crash involves a single unit or hitting a parked vehicle code 'yes' and go to question 2. Otherwise code 'no' and go to question 3.

2. SINGLE-VEHICLE CRASH-WHAT DID DRIVER DO?

a. If the narrative suggests that the driver has hit an animal then code 'yes' and go to question 5. If 'no', continue coding.

b. If the narrative and diagram indicate that the crash occurred due to a driver not seeing an obstruction in time to take effective evasive action, code 'yes'. Otherwise 'code 'no' or 'unknown'.

c. If the narrative or diagram suggests that the crash occurred due to the driver losing control prior to impact, code 'yes', Otherwise code 'no' or 'unknown.'

3. WHAT DID PARTICIPANT SEE?

a. If the narrative mentions a visual obstruction or a short sight distance, or it is clear in the diagram, then 'yes' should be coded.

b. Regardless of whether there was an obstruction or not, did the driver see the other vehicle prior to the crash? If the vehicle was not seen until it was too late to avoid a conflict, then respond 'no' and go to 'c'. Code 'yes' if there is evidence that the vehicle has been seen but if it is unclear respond 'unknown.'

c. Is there evidence that the driver looked in the relevant direction?

d. If a pedestrian was involved in the crash, code 'yes' and go to 'e'. If not, code 'no' and go to question 7.

4 MULTI-VEHICLE -WHAT DID DRIVER DO?

a. A driver has priority when:

i. facing a green or amber signal.

ii. the other driver is facing a 'give way' or 'stop' sign at an intersecting road

iii. the driver is on the right of the other driver at an uncontrolled intersection

iv. the other driver exits from a driveway or parking space.

Code 'irrelevant' in cases of rear end, head-on and overtaking crash

b. If two vehicles are being driven following one another in such a way, that the rear vehicle, in the absence of other factors such as distraction, is, unable to avoid running in to the first one, code 'yes' and continue to question 5. If 'no' or 'unknown' go to 'c'.

c. if a driver has been involved in a crash due to loss of control then code 'yes' and go to 'h'. If 'no' or 'unknown' go to 'd'.

d. If the driver has been in the wrong position, such as on the wrong side of the road in a head-on collision, code 'yes' and go to 'g'. For 'no' and 'unknown' also go to 'g'.

e. If a vehicle disobeys a traffic signal, 'stop' sign or 'give-way' sign or fails to give way at a roundabout, then code 'yes' . Otherwise code 'no' or 'unknown' and continue coding.

f. If the driver does not have priority but assumes that he does, code 'yes'. For example, a driver may not have seen a stop sign or he may have thought he had priority when turning in front of a driver facing an amber signal.

g. If there is evidence that the driver has either assumed that there was no traffic in conflicting pathways or that any conflicting traffic would stop, then code 'yes'. Otherwise code 'irrelevant', or 'no' and continue to 'h'.

h. If there is evidence that the driver has misjudged the other driver's speed or distance, then code 'yes'. Otherwise, code 'no', or 'unknown'. Go to question 5 after this decision.

Code 'unknown' for 'g' and 'h' if it is unclear whether the driver misjudged the other driver or whether he thought it would stop.

5. EVASIVE ACTION

a. If it appears that the driver took evasive action, code 'yes' and go to 'c'. Otherwise code 'no' or 'unknown' and go to 'b'.

b. Does it appear that there was evasive action that could have been taken?

c. If evasive action taken, was it such that it was likely to have reduced the effect of the crash?

6. PEDESTRIAN CRASH - WHAT DID DRIVER DO?

a. The driver does not have priority if the pedestrian is crossing the road on a 'working' crossing or if the pedestrian is crossing the road while the driver is turning a corner. In most cases the driver would have priority. An irrelevant case would be one where a pedestrian is standing in the centre of the road waiting to cross and a vehicle is driven into him. If 'yes' or 'irrelevant' go to 'c', otherwise continue to 'b'.

b. If the driver hasn't priority, has he disobeyed a traffic rule? For example, he may not have waited until a child has crossed a children's crossing, or he may not have stopped for pedestrian while turning a corner.

c. If the driver has seen the pedestrian but assumes that he will not move *into his pathway, code 'yes' and go to question 5. An 'irrelevant' case is* when the driver has not seen the pedestrian.

7. PEDESTRIAN CRASH - WHAT DID PEDESTRIAN DO?

a. Priority will be opposite to the driver, or irrelevant if irrelevant for driver.

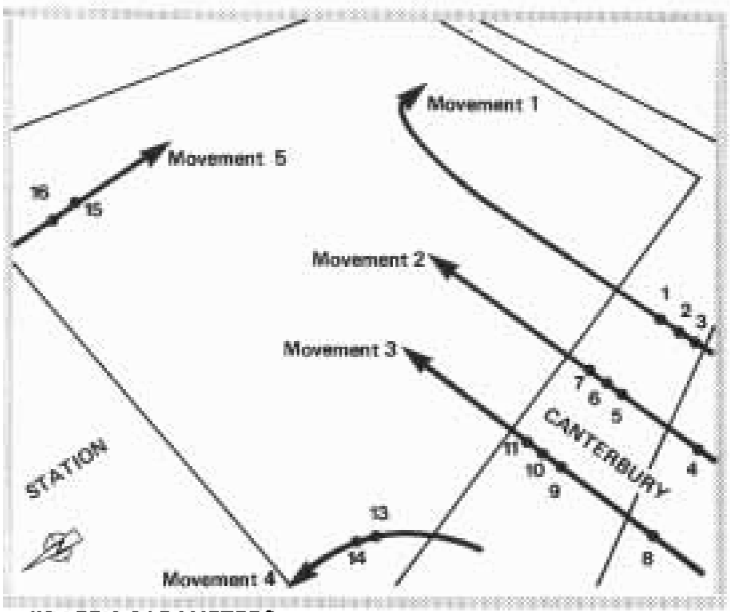
b. If the pedestrian does not have priority or priority is irrelevant, and has seen the driver but misjudged its speed or position and consequently walked out into driver's path, then code 'yes' and go to 'd'. Otherwise code 'no' or 'unknown' and go to 'c'.

c. If the pedestrian does not have priority and did not misjudge the driver's speed or distance but stepped into the driver's pathway, respond 'yes' and finish coding. Otherwise code 'no' or 'unknown and go to 'd'.

d. If the pedestrian saw the driver and assumed he would stop then code 'yes'. Otherwise code 'no' or 'unknown'.

APPENDIX D
SITE REPORTS
SESSION 1

Station Street and Canterbury Road, 17/4/86 Session 1



TRAFFIC PARAMETERS

Poor light conditions meant detector point sensitivity could not be set adequately. Consequently, volume, speed and headway data is not available for this session.

CONFLICTS

Conflicts From Session 1, Station St and Canterbury Rd., 17/4/86

Type	Field (1 observer)	Field (both observers)	Estimated hourly rate	All Video	Video and 1 observer	Video and both observers
4	1					
5	17	4	2.3	1		
6	8	3	1.7	3		
7	1			1		
8	2					
9	8	3	1.7			
10	1			1		
12	5	1				
13	41	9	0.6	3	3	1
14	48	14	8.1	45	18	5
15		2	1.2	3		
17	1					
Total	133	36		57	21	6

Observation Time 4.09 – 5.55 pm (1 hr 44 min)

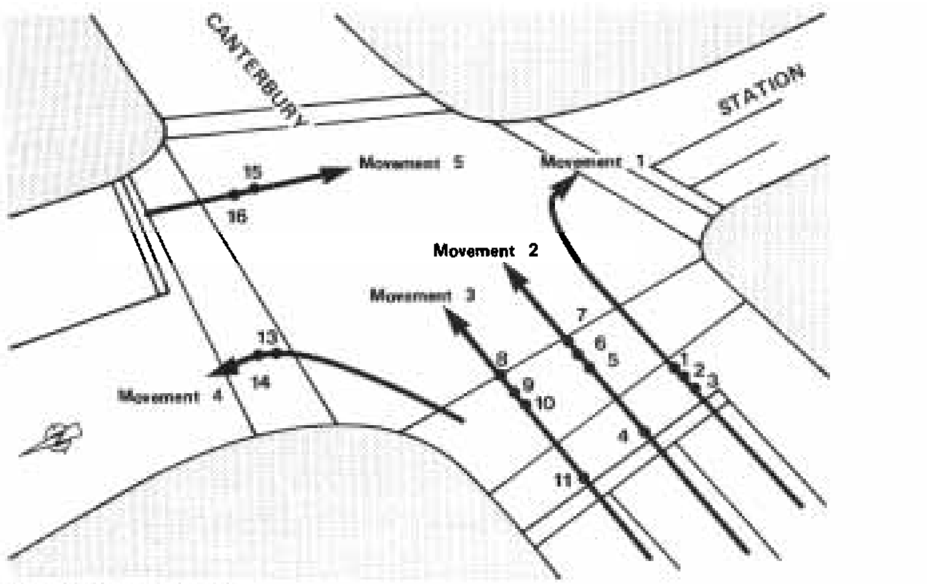
CASUALTY ACCIDENTS*, 1979 – 1981

07	2
19	1
21	4
31	3
34	1
35	2
37	2
46	1
55	1
Total	17

* This table also applies to the next two sessions

Station St and Canterbury Rd. 20/5/86 Session 2

SESSION 2



TRAFFIC PARAMETERS

Movement	Period	Volume	Est. hourly vol.	$\overline{X}$ Speed	Median Speed	SD Speed	Median Highway	SD Headway
1	1	55	82					
1	2	68	128					
1	3	45	118					
2	1	530	791					
2	2	475	896	56.9	58.0	17.4	1.8	92.2
2	3	279	734	59.4	61.8	19.5	1.8	8.0
3	1	252	376					
3	2	391	737	46.5	45.6	18.0	2.1	112.4
3	3	245	644	45.5	45.6	19.0	1.6	6.8
4	1	132	197					
4	2	139	262					
4	3	173	455					
5	1	352	525					
5	2	348	657					
5	3	232	610					

Period 1 — 40 mins
Period 2 — 32 mins
Period 3 — 23 mins

CONFLICTS

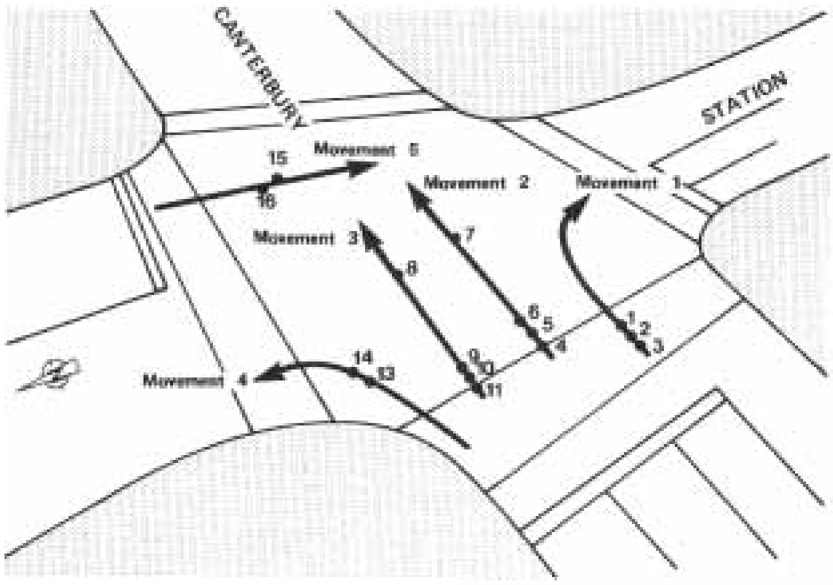
Conflicts From Session 2, Station St. and Canterbury Rd., 20/5/86

Type	Field (1 observer)	Field (both observers)	Estimated hourly rate	All Video	Video and 1 observer	Video and both observers
6	38	12	5.4	18	5	4
7	1					
9	2			1		
11	16	16	7.2	13	13	3
12	4	3	1.3	4	4	3
13	9	2	.9			
14	81	59	26.5	7	8	7
17				8		
19	3	3	1.3			
20	1					
Total	155	95	42.3	51	30	17

Observation Time : 3.41 – 5.55 pm, 2 hrs 14 mins

SESSION 3
Part 1

Station St and Canterbury Rd. 21/5/86 Session 3, Part 1



TRAFFIC PARAMETERS

Movement	Period	Volume	Est. hourly vol.	$\overline{X}$ Speed	Median Speed	SD Speed	Median Headway	SD Headway
1	1	45	58					
1	2	14	116*					
2	1	258	330					
2	2	40	333*					
3	1	42	54					
3	2	14	116*					
4	1	130	167					
4	2	38	316*					
5	1	295	378					
5	2	58	483*					

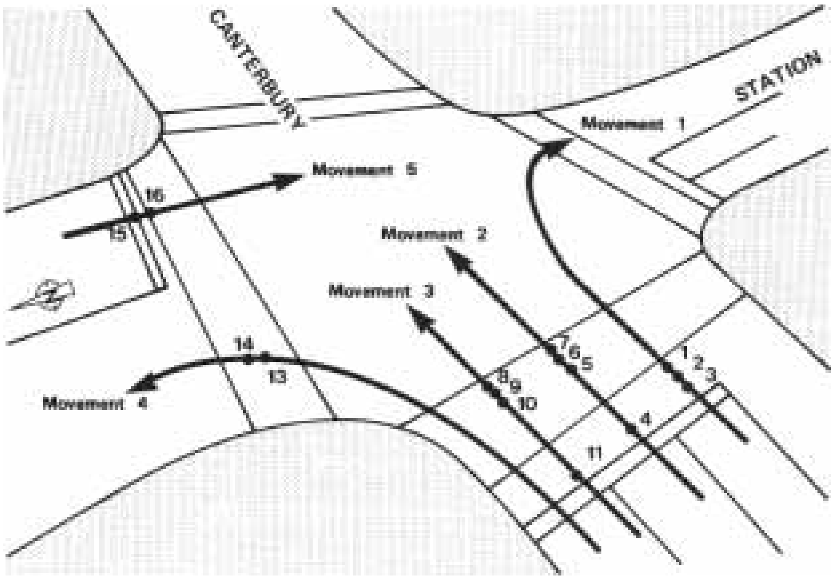
Period 1 – 47 mins

Period 2 – 7 mins * These estimates are based on too small a sample time to be reliable

An unexplained fault developed on these tapes and subsequent analysis was not possible

SESSION 3
Part 2

Station St and Canterbury Rd. 21/5/86 Session 3, Part 2



TRAFFIC PARAMETERS

Movement	Period	Volume	Est. hourly vol.	$\overline{X}$ Speed	Median Speed	SD Speed	Median Headway	SD Headway
1	1	19	66					
2	1	142	489	48.8	48.2	18.8	1.7	5.8
3	1	39	134	46.9	42.7	24.4	0.6	3.3
4	1	22	76					
5	1	150	517					

Poor light conditions precluded further analysis

Period 1 : 17.5 mins

CONFLICTS

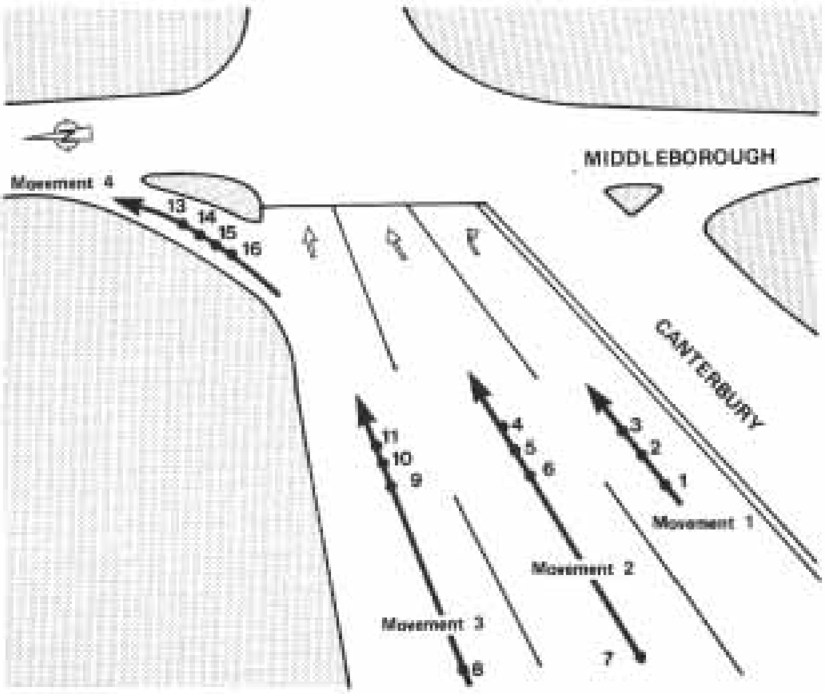
onflicts Session 3, Station St. and Canterbury Rd., 21/5/86
Conflicts from Parts 1 and 2 analysed together)

Type	Field (1 observer)	Field (both observer)	Estimated hourly rate	All video	Video and 1 observer	Video and both observers
6	8	1	0.5	6	2	1
7	3					
9	3	2	1.1	2	1	
13	38	22	12.1	40	25	20
14	163	123	67.6	53	46	46
19	1					
Total	216	148	81.4	101	74	67

Observation Period : 2.57 – 4.46, 1 h. 49 min

SESSION 4

Middleborough Rd and Canterbury Rd. 23/4/86 Session 4



TRAFFIC PARAMETERS

Movement	Period	Volume	Est. hourly vol.	$\bar{X}$ Speed	Median Speed	SD Speed	Median Headway	SD Headway
1	1	123	286					
1	2	106	252					
2	1	386	897	48.7	45.4	19.0	1.6	6.6
2	2	217	517	49.3	47.6	21.4	1.5	8.2
3	1	410	953	42.7	37.0	19.3	1.7	68.2
3	2	238	567	43.9	37.4	20.1	1.7	7.8
4	1	35	82					
4	2	25	60					

Period 1 26 min
Period 2 25 min

CONFLICTS

Conflicts From Session 4, Middleborough and Canterbury Rds., 23/4/86

Type	Field (1 observer)	Field (both observers)	Estimated hourly rate	All video	Video and 1 observer	Video and both observers
2				1		
5	24	21	15.2	2	2	2
6	2					
13	2					
14	19	12	8.7	1	1	1
Total	47	33	23.9	4	3	3

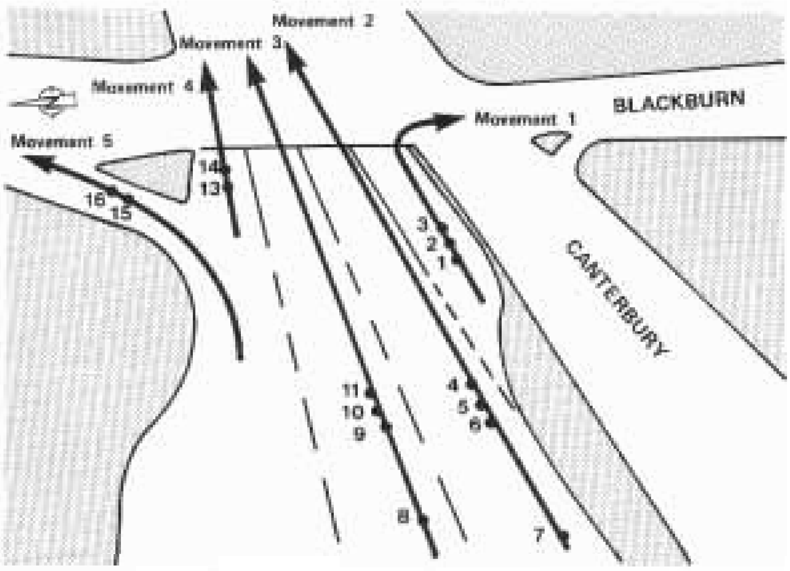
Observation period 4.37 – 6.00 pm, 1 h 23 min

CASUALTY ACCIDENTS, 1979 – 1981

RUM	Frequency
12	1
13	1
16	1
21	3
27	1
31	7
34	1
35	2
37	2
60	1
Total	20

SESSION 5

Blackburn Rd and Canterbury Rd. 16/4/86 Session 5



TRAFFIC RAMET RS

love-ient	erio	/olume	Est. ourly vol.	$\overline{X}$ Speed	Median Speed	SD Speed	Median Headway	SD Headway
1	1	145	311	51.4	48.1	22.7	1.3	5.4
1	2	130	277					
1	3	106	247					
1	4	25	192*					
2	1	343	730	48.1	45.5	20.8	1.6	6.5
2	2	377	802					
2	3	299	695					
2	4	136	1046*					
3	1	337	717					
3	2	351	747					
3	3	212	493					
3	4	103	792*					
4	1	233	496					
4	2	205	436					
4	3	208	483					
4	4	56	431*					
5	1	34	72					
5	2	43	91					
5	3	22	51					
5	4	25	192*					

Speed and headway data are not available due to a machine failure attributable to a faulty file These are in principle available, but time was not available to reconstruct the relevant files.

CONFLICTS

Conflicts From Session 5, Blackburn and Canterbury Rds., 16/4/86

Type	Field (1 observer)	Field (both observers)	Estimated hourly rate	All video	Video and 1 observer	Video and both observers
5	5	4	3.2	5	3	2
6	1					
9	1					
13	13	4	3.2	1	1	
14	18			2	1	
17	1					
21				1		
22				5		
Total	39	8	6.4	14	5	2

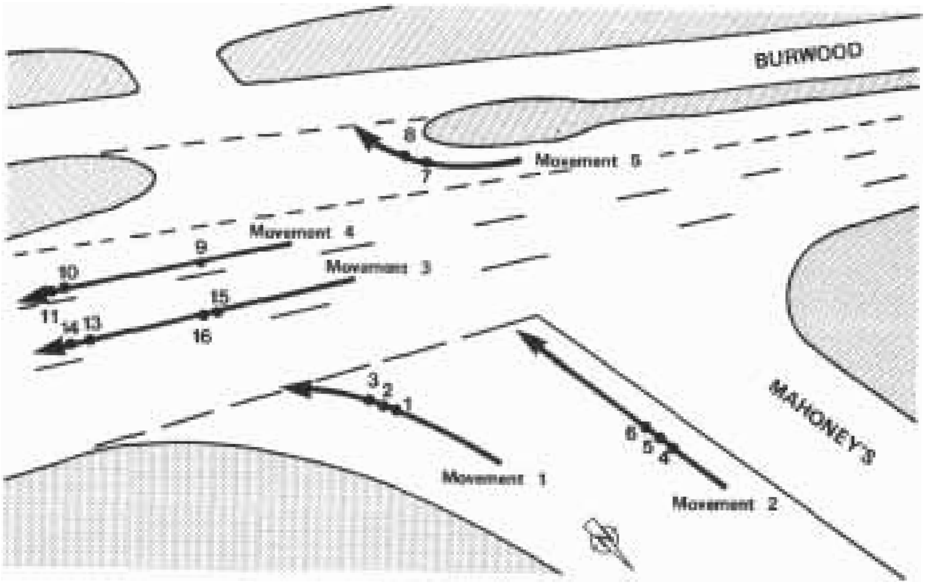
Observation Time 4.31 – 5.46, 1 h 15 min

CASUALTY ACCIDENTS, 1979 – 1981

RUM	Frequency
01	1
13	2
15	1
21	6
31	5
24	1
33	1
37	3
Total	20

SESSION 6

Burwood Hwy and Mahoney's Rd. 21/4/86 Session 6



TRAFFIC PARAMETERS

Move-ment	Period	Volume	Est. hourly vol.	$\overline{X}$ Speed	Median Speed	SD Speed	Median Headway	SD Headway
1	1	388	902					
1	2	237	551					
1	3	106	379					
2	1	57	133					
2	2	28	65					
2	3	25	89					
3	1	445	1034	82.2	85.0	13.7	2.2	3.8
3	2	292	679	79.0	84.5	14.0	2.1	4.7
3	3	185	661	76.9	78.5	17.3	2.3	5.9
4	1	445	1034	63.9	70.9	23.5	1.9	3.8
4	2	312	726	66.9	70.8	18.0	1.9	3.4
5	3	162	579	60.6	65.1	24.1	2.6	5.6
5	1	41	96					
5	2	45	105					
5	3	51	182					

Period 1 : 26 min
Period 2 : 26 min
Period 3 : 17 min

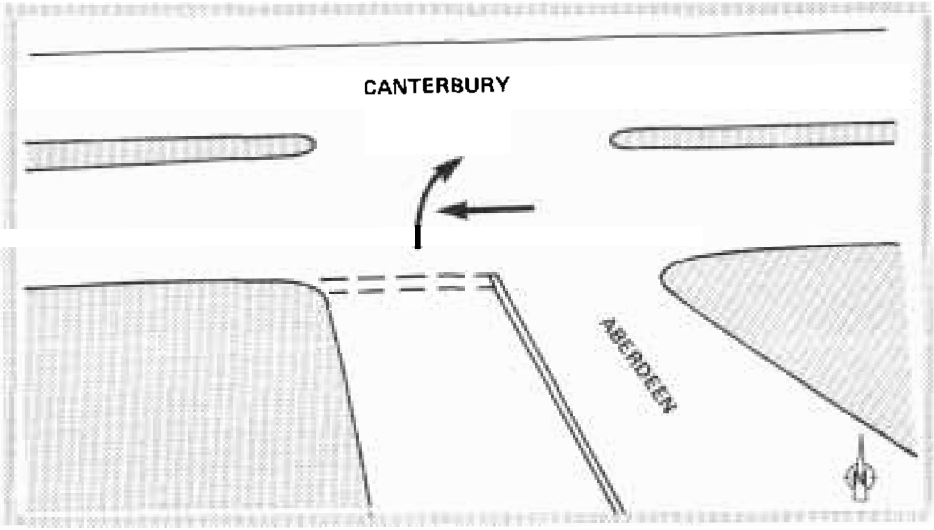
Conflicts From Session 6, Burwood Hwy and Mahoney's Rd., 21/4/86

Type	Field (1 observer)	Field (both observers)	Estimated hourly rate	All video	Video and 1 observer	Video and both observers
5	1	1	.72			
11				1		
12				1		
14	2	1	.72			
15						
17				2		
19				1		
20	2	1	.72	8	1	1
21	1			2		
Total	6	3	2.2	15	1	1

Observation period 4.21 – 5.44 pm, 1 h 23 min

SESSION 7

Canterbury Rd and Aberdeen St. 24/4/86 Session 7



After 1 h 30 min observation, only 1 conflict, indicated on the diagram was observed.
No analysis was attempted.

CASUALTY ACCIDENTS, 1979–1981

RUM	frequency
13	1
21	1
24	2
30	1
37	1
Total	6

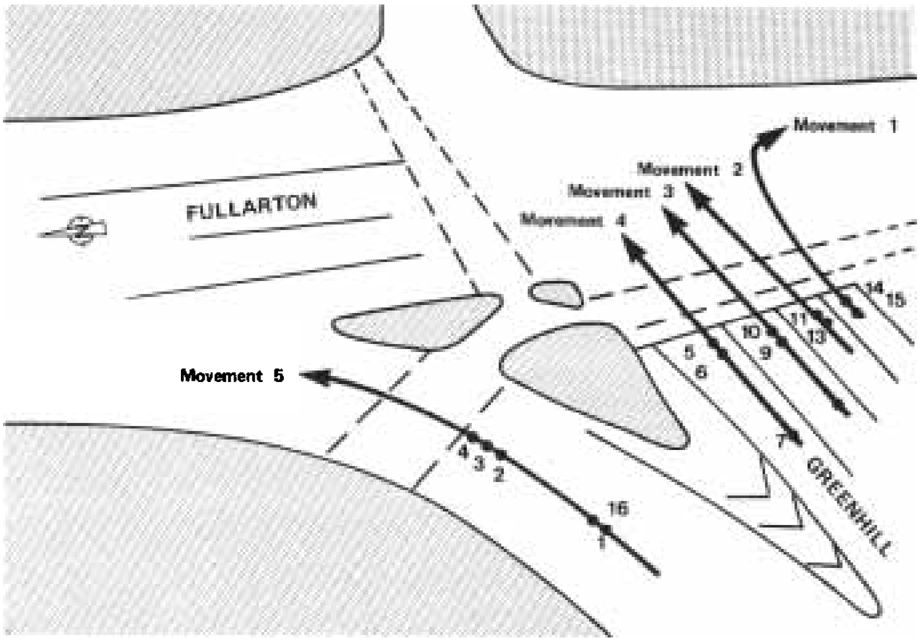
CONFLICTS

No conflicts were observed at this site.
Observation time : 3.35 – 5.21 p.m. 1 hr 46 min

ACCIDENTS, 1982 – 1985

Total	266
Casualty Accidents	32

Greenhill Rd and Fullarton Rd 26/5/86 Session 8 **SESSION 8**

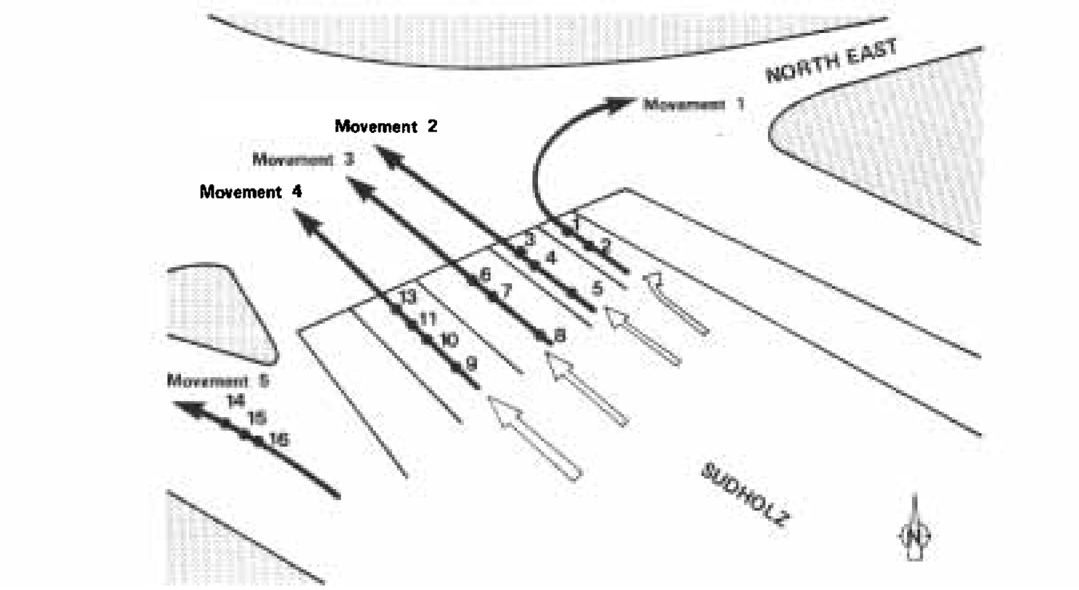


TRAFFIC PARAMETERS

ove-ent	Period	/olume	Ext. hourly vol.	$\overline{X}$ Speed	Median Speed	SD Speed	Median Headway	SD Headway
1	1	116	331					
1	2	33	132					
1	3	129	307					
2	1	105	339					
2	2	91	364					
2	3	177	421					
3	1							
3	2							
3	3							
4	1	Problems with the analysis – r			data available			
4	2							
4	3							
5	1	132	377					
5	2	83	332					
5	3	162	385					

SESSION 9

Sudholz Rd and North East Rd. 27/5/86 Session 9



TRAFFIC PARAMETERS

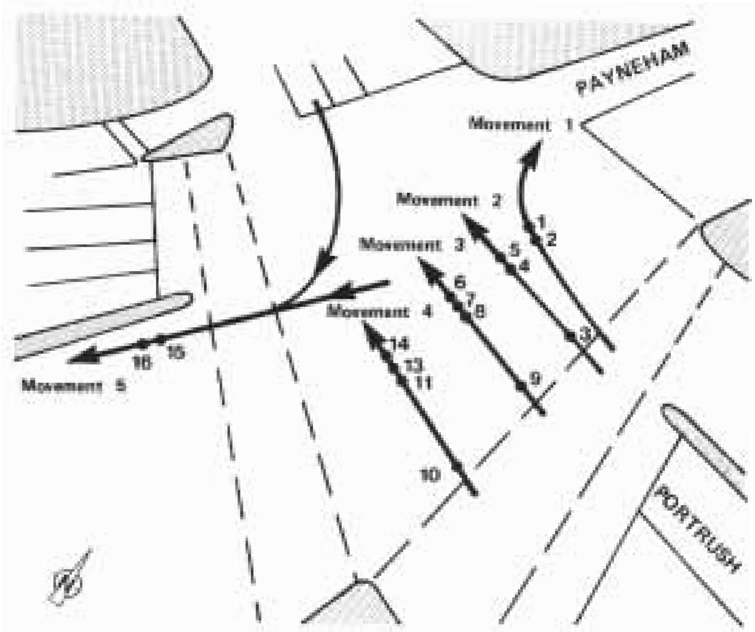
Move-ment	Period	Volume	Est. hourly vol.	$\bar{X}$ Speed	Median Speed	SD Speed	Median Headway	SD Headway
1	1	202	631					
1	2	143	530					
2	1	65	203					
2	2	90	333					
3	1	90	281					
3	2	80	296					
4	1	21	66					
4	2	20	74					
5	1	116	363					
5	2	69	255					

Period 1 : 19 mins
Period 2 : 16 mins

Note : It has not been possible to complete analysis of this data

Portrush Rd and Payneham Rd. 20/5/86, pm Session 10

SESSION 10



TRAFFIC PARAMETERS

Move-ment	Period	Volume	Est. hourly vol.	$\bar{X}$ Speed	Median Speed	SD Speed	Median Headway	SD Headway
1	1	668	768					
1	2	650	1226*					
1	3	288	670					
2	1	124	143	38.7	33.8	18.6	2.9	23.0
2	2	157	302	41.0	36.8	20.7	2.4	15.7
2	3	61	142	39.4	33.5	18.6	2.2	18.8
3	1	142	163	38.4	33.1	18.0	1.9	22.9
3	2	149	287	41.3	36.8	17.7	2.0	11.5
3	3	57	133	40.2	34.4	20.1	2.0	10.1
4	1	48	55	32.2	29.3	10.5	3.6	22.3
4	2	56	108	36.7	33.0	13.3	2.4	14.8
4	3	29	67	37.8	33.8	15.4	4.1	19.7
5	1	589	677					
5	2	596	1146*					
5	3	276	642					

Period 1 : [illegible] min
Period 2 : 31 min
Period 3 : 26 min

* These values seem high and should be treated with caution

Conflicts From Session 10, Portrush and Payneham Rds., 20/5/86

CONFLICTS

Type	Detected by 1 Observer only	Detected by both observers
6	1	
15	1	
Total	2	

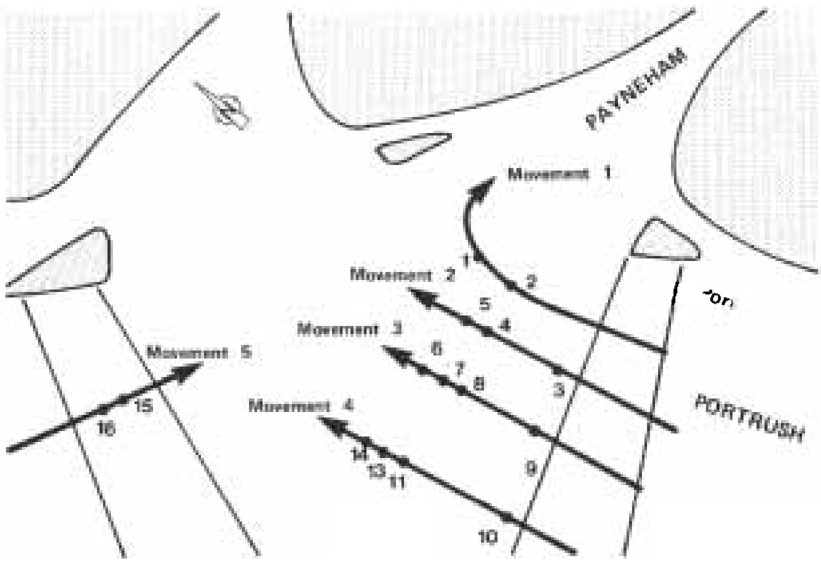
ACCIDENTS, 1983 – 1985

Total Accidents 228

Casualty Accidents 40

SESSION 11

Portrush Rd and Payneham Rd. 27/5/86, am Session 11



TRAFFIC PARAMETERS

ove-ent	Period	Volume	Est. ourly vol.	$\bar{X}$ Speed	Median Speed	SD Speed	Median Headway
1	1	250	342				
1	2	293	401				
1	3	75	326				
2	1	171	234				
2	2	142	194				
2	3	47	204	41.9	40.8	20.5	
3	1	129	177				
3	2	135	185				
3	3	36	49	39.0	33.8	19.2	
4	1	45	62				
4	2	34	47				
4	3	12*	52	60.8	59.0	18.8	215.9
5	1	359	492				
5	2	255	349				
5	3	80	348				

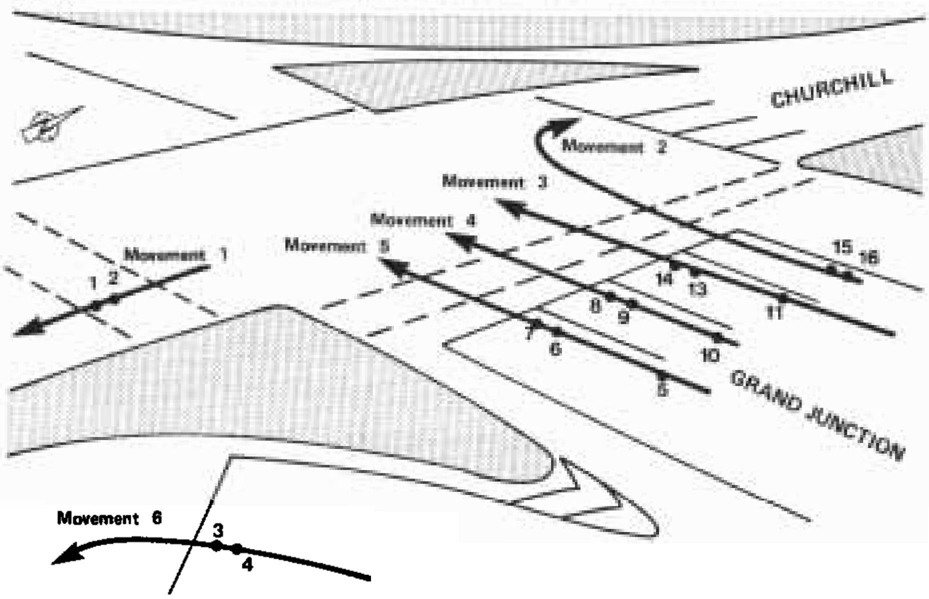
Period 1 : 44 mins
Period 2 : 44 mins
Period 3 : 14 mins

* Sample size too small to be meaningful

Type	Detected by 1 observer only	Detected by 2 observers
6		1
15	2	2
16	1	
19	2	
Total	5	3

SESSION 12

Churchill Rd and Grand Junction Rd. 28/5/86 Session 12



TRAFFIC PARAMETERS

Movement	Period	Volume	Est. hourly vol.	$\bar{X}$ Speed	Median Speed	SD Speed	Median Headway	SD Headway
1	1	141	282					
1	2	135	218					
1	3	112	215					
2	1	114	228					
2	2	40	65					
2	3	66	127					
3	1	240	480					
3	2	188	303					
3	3	171	329					
4	1	219	438					
4	2	192	310					
4	3	147	283					
5	1	223	446					
5	2	173	468					
5	3	110	212					
6	1	147	294					
6	2	90	145					
6	3	86	165					

Period 1 : 30 mins
Period 2 : 37 mins
Period 3 : 31 mins

CONFLICTS

Conflicts From Session 12, Churchill and Grand Junction Rds., 28/5/86

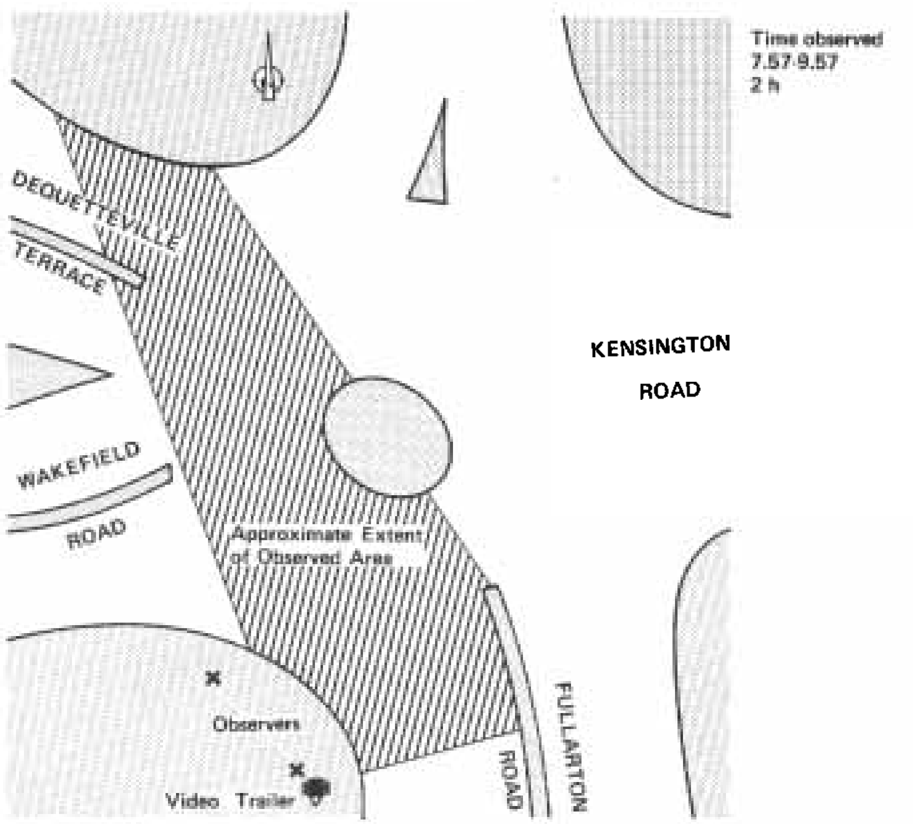
Type	Detected by 1 observer only	Detected by both observers
13	1	4
14	11	15

ACCIDENTS, 1981 – 1984

Total Accidents 148
Casualty Accidents 47

SESSION 13

Britannia Roundabout, am 26/5/86 Session 13



CONFLICTS

CONFLICTS

	Field		Video, Run 1		Video, Run 2	
	Seen by 1 observer only	Seen by both observers	Seen by 1 observer only	Seen by both observers	Seen by both field obs. and on video	Total seen on run 2
A	6	1				4
B	1					1
C	8	2			1	5
D	17	10	1	4	7	15
E	1			3		3
F	3		1	2		6
Total	36	13	2	8	8	34

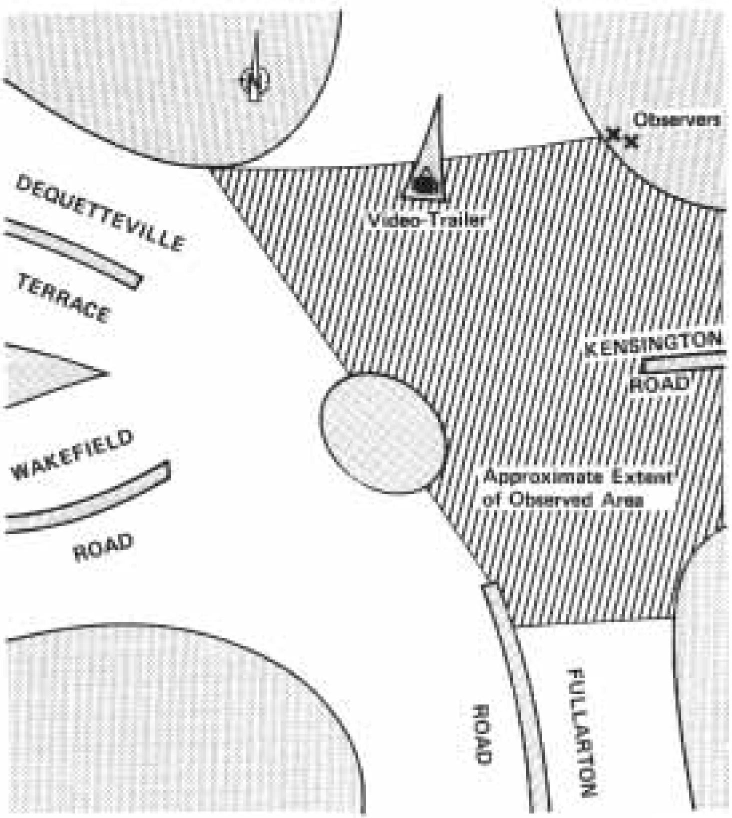
ACCIDENTS, 1980 – mid 1984

Total Accidents 303

Casualty Accidents 24

Brittannia Roundabout, pm, 28/5/86 Session 14

SESSION 14



Time observed,
3.15-5.35
2h 20 min

CONFLICTS

CONFLICTS

Type	Field		Video, Run 1		Video, Run 2	
	Seen b observ		observer only	both observers		
A						
B						
C						
D	4					
E						
F	2	3		3		
G						1
Total	16	18	6	24	14	43

APPENDIX E

Examination of Another Source of Data which may be Suitable for a Second Attempt at Stage 2

When the flow chart was used to allocate UDAs from police report forms, it was found that too many 'unknown' responses were allocated and consequently too few UDAs were recorded.

At the time that Stage 2 was designed and conducted, it was not known that the police held extra information including statements from drivers and witnesses which could be made accessible for the study. A brief examination of this information suggested that this would provide additional information which would help resolve the ambiguities in the report forms. Since the report forms are brief interpretations of the accident, the full statements should be more informative. There appeared to be few cases where there were conflicting statements.

It was decided that it would be worthwhile conducting a small pilot study to determine whether this extra information altered the responses already given by the coders.

Eight crashes were selected on the basis that there was a flow chart decision on which the two coders agreed on the occurrence of a UDA. The extra information confirmed six of these cases and revealed that a wrong decision had been made in two cases.

There were ten crashes selected which had one to three 'unknown' responses which had been agreed upon. In six cases, the UDA became apparent after the extra information was considered, in one case the report form appeared to already contain sufficient information and the statements confirmed the report form narrative, and in three cases the UDA remained unclear.

A further 11 cases were selected in which coders had disagreed on the response to one of the flow chart decisions. In eight cases, it was possible to determine the correct UDA, in two cases there appeared to be sufficient information on the report form and the extra details confirmed the interpretation given by the police on the report form, and in only one case was there not enough information to determine the correct flow chart decision.

The results of this small pilot study suggest that use of this extra information on crashes would:

(a) alter only a very small percentage of those decisions where coders agreed there was a UDA because there was sufficient detail on the report form to make the correct decision.

(b) allow the UDA to be determined for a large proportion of crashes in which there were 'unknown' responses. Seventy per cent of the 'unknown' decisions were able to be clarified - this would greatly reduce the proportion of 'unknowns'.

(c) allow improved reliability for allocation of UDAs because in 90 per cent of cases in which there was disagreement, the UDA was obvious in the additional statements.

While the first pilot study has shown that the extra information available from the police is better than the police reports alone, it is necessary to determine whether it provides substantially more information than using a more lenient approach with the police report forms since it will be more time-consuming and consequently more expensive to use this extra information.

A study was conducted to compare UDAs already obtained with the original method with those found with a more lenient approach and those found using the extra police information.

A sample of 100 crashes were selected from the original sample of 800 crashes. Property damage crashes were excluded. Each of the report forms were coded by two coders together using a lenient approach which tried to deduce as much as possible from any evidence available on the forms. This was followed by analysis of the police information which included statements.

The results are presented by examination of a selection of flow chart decisions:

SPEEDING - In the sample, the original coders (method 1) had only coded one driver as speeding. In this case, both coders agreed and when a more lenient approach (method 2) was used and when the police additional information was examined (method 3), it was agreed that speeding occurred. Nine other cases of speeding were found when method 3 was employed. Five of these had also been detected in method 2. Also method 2 incorrectly coded seven cases as speeding. Thus, methods 2 and 3 both resulted in more speeding cases being recorded but the lenient approach adopted in method 2 had resulted in errors being made as discovered by examination of the extra information in method 3.

FAIL TO SEE - According to method 1, there were three cases in which both coders agreed and in two of these it was agreed in methods 2 and 3 , but in one case method 3 showed that 'fail to see' did not occur. There were seven further cases in method 1 where one coder had coded 'fail to see'. For four cases, it was confirmed in methods 2 and 3 but in three cases method 3 found it to be incorrect. Thus of ten cases where 'fail to see' was coded by at least one coder in method 1, four were incorrect.

Method 2 indicated a further 17 cases of 'fail to see'. Each of these were confirmed in method 3. Thus method 2 provided extra accurate information but method 3 indicated a further 18 cases.

SINGLE-VEHICLE- INADEQUATE CONTROL OR FAIL TO DETECT - There were seven cases coded as 'fail to detect' in method 3. Four of these had been coded in method 1 and five had been coded in method 2. There were 13 cases in which 'inadequate control' was coded in method 3. Twelve of these were agreed in method 1, while ten were agreed in method 2. With this decision, the more lenient approach used in method 2 led to more errors than in method 1. There were a further two cases where there had been confusion as to whether it was 'fail to detect' or 'inadequate control' and when the extra police information was examined it was apparent that there had been a blown tyre. There was no way that this information could have been determined by the police report forms.

PED RAN ONTO ROAD - Method 3 showed that there were seven cases identified as being due to the pedestrian running out onto the road without looking. Two of these cases had been coded in methods 1 and 2 and a further two cases had been coded only in method 2. Thus while method 2 did provide some extra information, method 3 provided even more information.

MISJUDGED SPEED - There were three cases in which 'misjudged speed' was coded in method 3. Methods 1 and 2 were not sensitive enough to detect this UDA.

ASSUMED PRIORITY - Method 3 revealed three cases in which 'assumed priority' was a UDA. This UDA was not detected with the other methods.

FOLLOW TOO CLOSELY - There were four cases which were coded as follow too closely in method 3. Three of these had been detected in method 1 and method 2 and for the other case one of the coders had coded it in method 1.

There was a case in which one coder in method 1 thought the UDA was following too closely, in method 2 it was decided that it was 'misjudged speed' and in method 3 it was discovered that the driver had had an epileptic fit.

DISTRACTIONS - There were three cases of distractions coded using method 3. Two of these had also been coded in methods 1 and 2. It would still appear that a lot of distractions are not being detected as there were so few compared to the in-depth study.

Overall the results suggest that method 3 is far superior to both methods 1 and 2. While there are certain types of UDAs which are determined by using a more lenient approach with the police report forms, there are not as many UDAs detected as in method 3 and for some types of UDAs, particularly speeding and inadequate control, the more lenient approach led to too high a proportion of false positives as demonstated by method 3.

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