

COMMITTEE REPORT ANNEX C

Local Transport Strategy - Annex 1

Road Safety Review and Plan

Falkirk Council

May 2006

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1 Summary

1.1 Introduction.

The relationship of this review and second road safety plan to other policy documents published by the Council is described and common key themes identified.

The relationship between a road network and people's everyday lives is highlighted.

It is recognised that a large number of agencies can contribute to improving road safety in the area, and that an integrated approach may pay dividends. The importance of good data is described, as is the approach taken to examining the casualty situation.

It is hoped that the plan will serve as a point of reference for all interested parties and that it may be developed further with contributions from them.

1.2 Aims.

The plan aims to provide information on roads safety matters and provide a focal point of reference for all involved.

1.3 Objective.

This is defined as being to continue to reduce road accidents, and hence casualty numbers.

1.4 Major milestones.

A number of local and national issues relative to road safety are referred to and the role of Central government is acknowledged. A list of road safety milestones and legislation is contained in Appendix 1.

1.5 National context.

This puts danger on the road into context, and shows how it relates to other hazardous areas, such as the home. Attention is drawn to the large number of agencies involved in road safety at the national level. The important of remembering that the road system is not a local phenomenon is stressed.

1.6 Casualty data.

A rational approach to the problem of reducing accidents and casualties demands that interested parties are aware of what is actually happening in the casualty arena. The casualty situation is described in a series of graphs, each of which relates to a particular casualty class or age range. Basic statistics are presented, and use is made of five-year averages so that year to year variation is smoothed out. This is consistent with the use by central government of a five-year average as the basis for measuring progress.

The casualty situation in Falkirk Council area at the end of 2003 is summarised below

In very general terms, casualty rate:

- is estimated to be about 25% lower than the Scottish average, overall (277 compared with 370 casualties per 100 000 for Scotland).
- is highest for casualties aged 17-24 years.

When compared with the period 1994-1998, casualty numbers are rising amongst:

- drivers/riders aged 25-54, 55-74 and 75-99 years.
- passengers aged 5-10 years.

Injury severities are higher amongst:

- drivers/riders aged 5-10, and 55-74 years.
- passengers aged 11-16 and 17-24 years.
- pedestrians aged 17-24, 55-74 and 75-99 years.

1.7 Targets

The national targets for casualty reduction are described, and there is a discussion of the principle of setting local targets. Previous targets are compared to actual casualty reductions achieved, both locally and nationally, and a casualty reduction target for the future is established.

1.8 Issues for further consideration.

This section of the plan contains information on a number of road safety matters arising from the foregoing and from the experience gained since 2001. They are grouped under the headings road environment, user, vehicle, and "what works". Under the first, the importance of the road maintenance function is stressed. Under the second, driver behaviour and modal choices are discussed, and under the third, vehicle legislation and maintenance. Under the final heading, the need for road safety schemes to be based on the results of sound scientific research is emphasised.

1.9 Progress and plans.

These are set out under the headings: education, enforcement, engineering and encouragement. They provide readers with an insight into the activities of many of the agencies involved and their plans for the future.

1.10 Actions by various agencies

This section summarises the responsibilities of each of the agencies involved and sets timescales for their actions.

1.11 Appendices.

These provide details of:

- road safety milestones and legislation
- blacksites treated in the Falkirk Council area since 1980
- average casualty rates across Scotland.

1.12 Conclusion

The main points that emerge from the plan are:

- there is no magic bullet
- casualty distributions change with lifestyle
- small contributions from many sources are required
- actions to improve road safety should, wherever possible, be based on evidence from the results of sound scientific research.

2 Introduction

- 2.1 Falkirk Council published its Strategic Community Plan 2005-2010, in October 2005. This sets out how all public agencies and community partners will work together to achieve their vision for the area.
- 2.2 Six 'Key Themes' have been established:
- improving the performance of the local economy and tourism
 - enhancing lifelong learning and opportunity
 - creating a sustainable local environment and improving transport
 - regenerating communities
 - enabling citizens to live safely
 - improving health and well being
- 2.3 All of the Key Themes have been developed into priorities for action, and a number of Objectives established for each. Road safety fits into this framework at a number of locations, but can most appropriately be related to three of the Key Themes, namely:
- creating a sustainable local environment and improving transport
 - enabling citizens to live safely
 - improving health and well being
- 2.4 A new Community Safety Strategy, which will include further road safety related issues is currently in preparation, and is expected to be finalised late in 2006. These policy documents set the framework within which all road safety related work, which for best effect, requires to be tackled from a multi disciplinary approach, can best be delivered. However such joint approaches rely on a commitment from individual partners, and it has long been recognised that a lead must be taken by councils in their role as roads authorities.
- 2.5 Perhaps the single most important task facing a local authority is the provision and maintenance of the road system, including footways and cycleways. This is usually the first thing the public set foot upon outside their homes, and even vital services such as water and drainage can be delivered by road. In some parts of the world, they are.
- 2.6 Few other services would have become available without roads. Indeed,
- "History testifies that the provision of roadways is necessary to draw a country out of a state of barbarism, but that civilisation is not attained until communications between neighbours is made so easy that the local differences which breed narrowness and bigotry are minimised. ... Indeed it can be said that the prosperity of a nation is bound up with the state of its roads ..."¹
- 2.7 Generally, the state of the country's road network has steadily improved over the years, some would say, until relatively recently. This has been largely due to the increase in the use of motorised vehicles, which has necessitated improvements in design and construction techniques. Unfortunately, the widespread use of these vehicles has also led to the road environment becoming one of the most dangerous people face on a day-to-day basis.
- 2.8 Creating a safer road system would, therefore, greatly assist Falkirk Council and its community partners in achieving many of the objectives established under the Strategic

¹ O'Flaherty, CA 1974. Highways. Vol. 2

Community Plan. This review and second road safety plan has been prepared with those objectives in mind. Consequently, it complements the Local Transport Strategy, of which it is a constituent part, and also the Community Safety Strategy and Strategic Community Plan.

- 2.9 Amongst the public agencies and community partners involved in the development of the Strategic Community Plan, the following have been active in the road safety arena for many years:
- Central Scotland Police
 - Falkirk Council
 - NHS - Forth Valley
- 2.10 The Council's road safety objectives could perhaps be paraphrased as "to improve the quality of life", a phrase which appears in the Central Scotland Police mission statement² and in the NHS - Forth Valley's statement of aims³. Each agency, in its own way, has been working towards the common goal of road accident casualty numbers and severity reduction in the Falkirk Council area for many years. The Road Safety Review and Plan (the Plan), therefore describes some of their activities. In so doing, those areas where an integrated, or partnership, approach may pay dividends, should become clear.
- 2.11 The plan provides an insight into the casualty situation in the area, and demonstrates the aggregate performance of the agencies involved. It should also provide a point of reference for all agencies involved in the casualty reduction effort, whether public, private, statutory or non-statutory.
- 2.12 The plan contains sections that provide a short history of road safety activities since 1967, describe the national context, and state its aims and objective.
- 2.13 Casualty data are presented, graphically by:
- year and severity
 - class, year and severity
 - age group, year and severity
 - cost.
- 2.14 The above utilises only a few of the data collected by Central Scotland Police after a road accident. These are recorded on a local version of the "Stats19" form, one suggested by central government's statistical service, as being suitable for the purpose. To the latest version, which contains around 75 more or less objective variables, has been added a further 9 variables, called "contributory factors". Up to six of these may be selected, then attributed to participants and finally weighed up as to their likelihood of having contributed to the accident. A greater degree of subjectivity has, therefore, been introduced, which may or may not, be helpful. The new form was brought into use in January 2005.
- 2.15 Attendance at an accident scene is not a pleasant experience for anyone involved, whether as a victim, or as a member of the police, fire, ambulance or medical services. Recording accident details is probably not uppermost in anyone's mind in the heat of

² "To improve the quality of life within the communities we serve by providing effective policing which delivers local solutions to local problems."

³ "To improve the quality of life of the population in Forth Valley by improving health, delivering effective healthcare services and working in partnership with other agencies to address the wider determinants of health."

the moment, but it cannot be stressed too heavily that accurate records are fundamental to the process of casualty reduction.

- 2.16 High quality data mean that those planning to reduce casualties by education, enforcement, engineering or encouragement can work with confidence towards the goals that they have identified from that data. There is, however, some way to go before the design of the current form, or the taxonomy (classification of the data it contains), is satisfactory.
- 2.17 The age groups used in this plan were selected so that they relate to easily identifiable stages in life from pre-school days on. Each casualty will belong to an age group whose particular road safety problems will be addressed in a manner relevant to his, or her, stage of development. Readers will be able to identify with at least one of the sub-groups discussed.
- 2.18 The plan provides for comparisons of casualty:
- number
 - rate (population and traffic-based)
 - severity ratio.
- 2.19 Where possible, statistics are calculated for each casualty class and age group considered, and compared with those for the all classes average. A summary of the casualty data is provided, before a discussion on the question of target setting.
- 2.20 Having provided the reader with an insight into the casualty situation, the plan next discusses road safety issues for further consideration.
- 2.21 Sections reporting on progress and plans in the areas of education, encouragement, engineering and enforcement, before a final section sets out a list of actions and the public agency, or agencies, responsible for each. An indication of the timing for each action is also provided.

Appendix 1 details major road safety milestones and legislation

Appendix 2 lists blackspots treated since the 1980.

Appendix 3 lists average casualty rates in Scotland by police force area.

3 Aims

- 3.1 The plan aims to provide information on matters including:
- the current road accident casualty situation in Falkirk Council area
 - the local agencies' activities aimed at reducing casualties
 - progress
 - future activities
 - timescales and responsibilities.
- 3.2 It also aims to:
- become a point of reference for all involved
 - promote public awareness of the casualty situation.

4 Objective

- 4.1 Falkirk Council's transport policies are set out in the Local Transport Strategy (LTS). The LTS sets out how Falkirk Council's transport vision will be achieved, in the context of the Transport White Paper "Scotland's Transport Future" published in June 2004. Successful implementation of the policies contained within the LTS will result in an increase in walking and cycling, and road safety planning will have to take account of the possibility of increased casualty numbers and severities as a result.
- 4.2 While a reduction in casualty numbers is the ultimate aim of this road safety plan, the agencies involved need guidance on the resources to allocate to the task. Unfortunately, it is not clear what contribution any particular local authority activities should be able to make towards achieving the national target.
- 4.3 Road Accidents Scotland provides a comparison of average casualty totals sustained in each of the Scottish local authorities' areas for the five-year periods 1994-1998 and 1999-2003. The all-Scotland average was a change of about -23%. The figure for Falkirk Council area was about -17%, within a range for council areas from -44% to +6%. The wide variation probably depends on geographical, meteorological and demographic factors.
- 4.4 Falkirk Council's objective must therefore simply be:
- to maintain the long-term rate of reduction in casualty numbers.

5 Major road safety milestones

- 5.1 Over the past 40 years or so, at national level, there have been many major legislative changes and road safety initiatives introduced, most aimed at reducing accident and casualty numbers or severities. In addition, locally there is a long history of engineering, enforcement, educational and encouragement initiatives all aimed at improving road safety on the Council's road network.
- 5.2 A chronological, but not necessarily exhaustive, list of many of the major national milestones or events is contained in Appendix 1.
- 5.3 Road design standards have also evolved over this time, and the contribution made by the authors of the Design Manual for Roads and Bridges is recognised. In the enforcement arena, it is also anticipated that the recently introduced Road Death Investigation Manual, which sets out procedures for investigating the circumstances surrounding deaths on the road network will raise the standard of information gathered in such circumstances
- 5.4 It is important to note, however, that not all of the measures described in the list have been thoroughly researched before their introduction, and it may be that not all of their effects will have been positive, in terms of accident reduction.
- 5.5 The work of gathering statistical information on the occurrence of, and circumstances surrounding, road accidents is of critical importance and must not be forgotten. This important task, in Scotland is performed by the Scottish Executive's Transport Statistics Branch and its efforts, over the years is acknowledged. Most of the statistical information used in this review and plan have been gleaned from Road Accidents Scotland 2003, and are set out here in the hope that they may reach a wider audience. Late in the process of preparing statistical information for this review Road Accidents Scotland 2004 was published, but information from this has not been included in this review.

6 National context

- 6.1 Accidents are relatively rare in comparison with other events and it should be no surprise if the public is not fully aware of this. Road accidents causing injury are even more of a rarity, with the vast majority resulting in damage only. They are probably perceived as an occupational hazard associated with travel, about which road users think there is little they can do.
- 6.2 However, nationally, the road environment ranks second to that of the home in terms of numbers of people accidentally killed. It ranks fourth after home, work, and sport⁴ in terms of accidental injuries treated in hospital. However, when it is considered how long one is exposed to each of these environments, it would appear that the road environment is likely to be the most 'at risk' environment.
- 6.3 Furthermore, about 1.3 casualties are sustained in each road accident involving personal injury. This small number means that individual road accidents do not have the same impact on the public imagination as an aircraft, ship or train accident. In one of these, casualty numbers can run into hundreds. Fortunately, they are rarer still but they are expensive, both in human cost and financial terms, however their cost is far outweighed by the accumulated expense of road accidents.
- 6.4 Road accidents in Scotland cost an estimated £1,391million⁵ in 2003. The current cost in the Falkirk Council area alone is around £26million per year⁶. This is a substantial social and economic burden. Its calculation, for all levels of severity, is now on a "willingness to pay, human cost" approach. This is intended to encompass all aspects of the costs, both human and economic. The human costs reflect pain, grief and suffering. The economic costs reflect the loss of output and medical costs. Allowance is made for damage to property, police and insurance administration costs.
- 6.5 A passenger on an aircraft, ship or train is not in a position to contribute a great deal to reducing accidents involving these modes. However, nearly everyone can contribute, in some way, to reducing road accidents. It would be reasonable to expect a proportion of the effort to come from those who drive, but because of the complexity of the accident situation, some direction of that effort is required.
- 6.6 Some direction comes from those national agencies whose policies and practices impinge on the local effort. There is a common focus in the Scottish casualty reduction target, but there must be a dialogue to ensure that policies and practices adopted at local and national levels do not conflict. The need is greater now than previously, when local authorities managed the trunk road network on behalf of central government. It is fundamental that any policy or practice adopted has been proved effective. Care must be exercised to ensure that wherever possible, this important principle is not overlooked.

⁴ Health in Scotland 1994.

⁵ The Scottish Executive, 2003. Road Accidents Scotland 2003.

⁶ 1999-2003 five-year average

- 6.7 The national agency with the greatest potential for influencing the direction of effort is the Scottish Executive and its Executive Agency, Transport Scotland. The activities of its education, environment, industry and home & health departments in the road safety context are described in its 1995 Road Safety Plan. Through these departments the Scottish Executive provides support to bodies such as:
- Road Safety Scotland (RSS), formerly the Scottish Road Safety Campaign
 - Health Education Board for Scotland (HEBS)
 - Royal Society for the Prevention of Accidents (RoSPA)
 - Scottish Accident Prevention Council (SAPC).
- 6.8 In 2005, having observed a wide variation in the performance of local authorities in respect of accident reduction, the Scottish Executive, through RSS, produced a “plan to improve road safety – good practice guidelines”. The first of those is the production of a road safety plan.
- 6.9 RSS provides advertising and educational resources. It liaises with road safety officers and organises an annual seminar on road safety topics.
- 6.10 HEBS have produced “A Strategic Statement on Accident Prevention and Safety Promotion”. This highlights the importance of these two separate strands of accident prevention and safety promotion.
- 6.11 RoSPA maintains a comprehensive library and runs the seminal road safety engineering and auditing courses.
- 6.12 SAPC seeks to promote co-ordination amongst local authorities and the health boards, with a particular emphasis on involving elected members.
- 6.13 Other national agencies include the:
- Association of Chief Police Officers in Scotland (ACPOS) which seeks to encourage and, where necessary, enforce safer behaviour on the roads,
 - Convention of Scottish Local Authorities (CoSLA) which seeks to encourage good practice in road safety planning by local authorities
 - motoring organisations
 - various campaigning groups.
- 6.14 Road safety is now considered an integral part of community safety. All Scottish local authorities are developing community safety strategies, with the support and co-operation of the Scottish Executive, CoSLA and ACPOS. CoSLA, in particular, has issued relevant guidance in its publication “Making the Public Environment Safer”. Falkirk Council produced its first Community Safety Action Plan in November 1998, and road safety was a main theme within that. A new Community Safety Strategy, which will include further road safety related issues is currently in preparation, and is expected to be finalised late in 2006. This plan, therefore, complements these documents.
- 6.15 The contribution to local accident and casualty reduction which all of these national agencies can make should be taken into account when local road safety measures are being developed. This review and plan should help to highlight roles and responsibilities, so that efficiency of casualty reduction activities at the local level is maximised.

7 Road Accident Casualties

7.1 Definitions of casualty severities.

7.2 STATS20, "Instructions for the Completion of Road Accident Report Form STATS19" provides the following guidance notes. These are assumed to have been followed, and therefore apply for the purposes of defining the severity of all accidents referred to in this road safety plan.

A. 'Fatal' injury includes only those cases where death occurs in less than 30 days as a result of the accident. 'Fatal' does not include death from natural causes or suicide (see Section 4.1 on Page 7 [of Stats20]).

B. Examples of 'Serious' injury are:

- Fracture
- Internal injury
- Severe cuts
- Crushing
- Burns (excluding friction burns)
- Concussion
- Severe general shock requiring hospital treatment
- Detention in hospital as an in-patient, either immediately or later
- Injuries to casualties who die 30 or more days after the accident from injuries sustained in that accident.

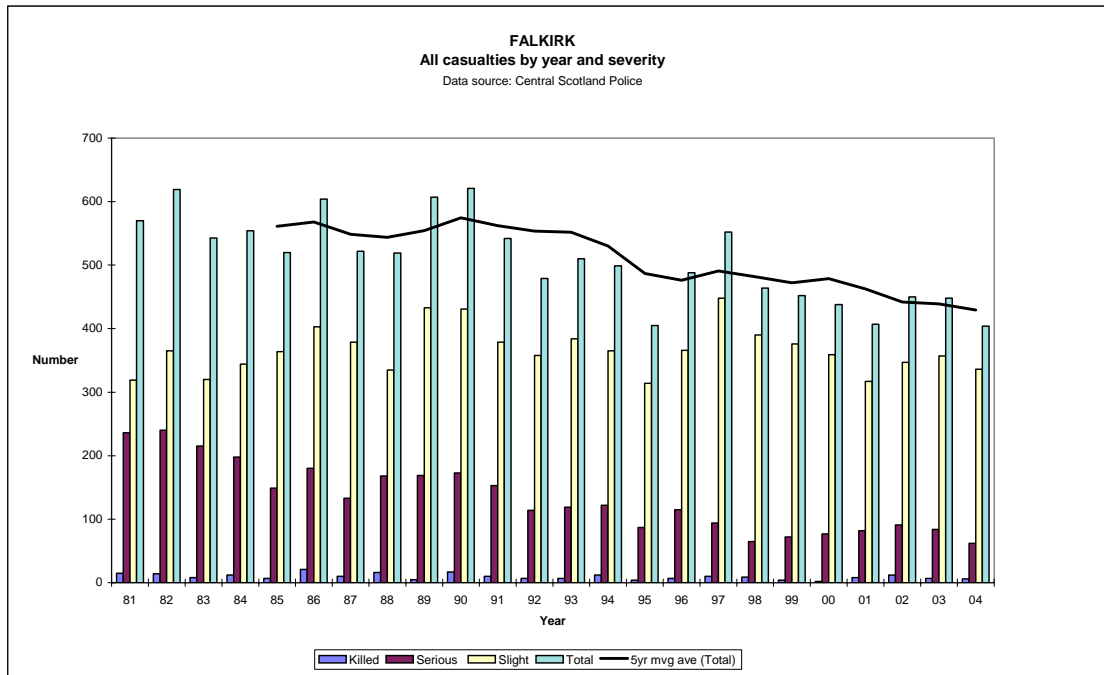
C. Examples of 'Slight' injury are:

- Sprains, including neck whiplash injury, not necessarily requiring medical treatment
- Bruises
- Slight cuts
- Slight shock requiring roadside attention.

7.3 This plan uses five-year moving averages throughout. These smooth out year to year variations and give a reasonable indication of underlying trend. Their use is consistent with Central Government's decision again to adopt a five-year average (1994-1998 since 2000), against which to measure progress.

7.4 Each of the tables which show the %age change in casualty numbers between '94-'98 and '00-'04 for the various classes of casualties, indicates progress in terms of five-year averages and severity ratios. In any statistical evaluation, the numbers killed are relatively small, so it is common practice to add them to those of the seriously injured. The resultant figure 'killed or seriously injured' is referred to as KSI. The severity ratio is that of KSI to the total of all casualties.

7.5 Casualties: all classes



- 2003 mid-year estimate of population 145,920
- Estimated 5ya casualty rate per 100,000 population 307
- Estimated Scottish casualty rate per 100,000 population 393

7.6 The above diagram indicates numbers of road accident casualties sustained within the Falkirk Council area since 1981. The bars represent the numbers slightly, seriously and fatally injured, and the total. The line indicates the movement of the five-year average total.

7.7 This plan uses five-year moving averages throughout. These smooth out year to year variations and give a reasonable indication of underlying trend. Their use is consistent with Central Government's decision again to adopt a five-year average (1994-1998) since 2000, against which to measure progress.

7.8 The diagram refers to all classes of road user. For record purposes, each casualty is classed as a driver/rider, passenger or pedestrian. Subsequent sections contain similar diagrams for each of these classes.

All casualties by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	8.4	7.0	-16.7
Serious	96.6	79.2	-18.0
Slight	376.6	343.2	-8.9
Total	481.6	429.4	-11
KSI	105.0	86.2	-18
Severity ratio	0.22	0.20	-8

7.9 Five-year averages of total casualty numbers and of severity ratios have fallen relative to those for '94-'98. In common with Scottish figures, casualty numbers have fallen considerably. The net decrease has been achieved in spite of a substantial increase (14% when the relevant averages are compared) in the volume of vehicular traffic. The relationship between volume and accidents is not straightforward, however, and an increase in volume is not necessarily matched by an increase in accidents.

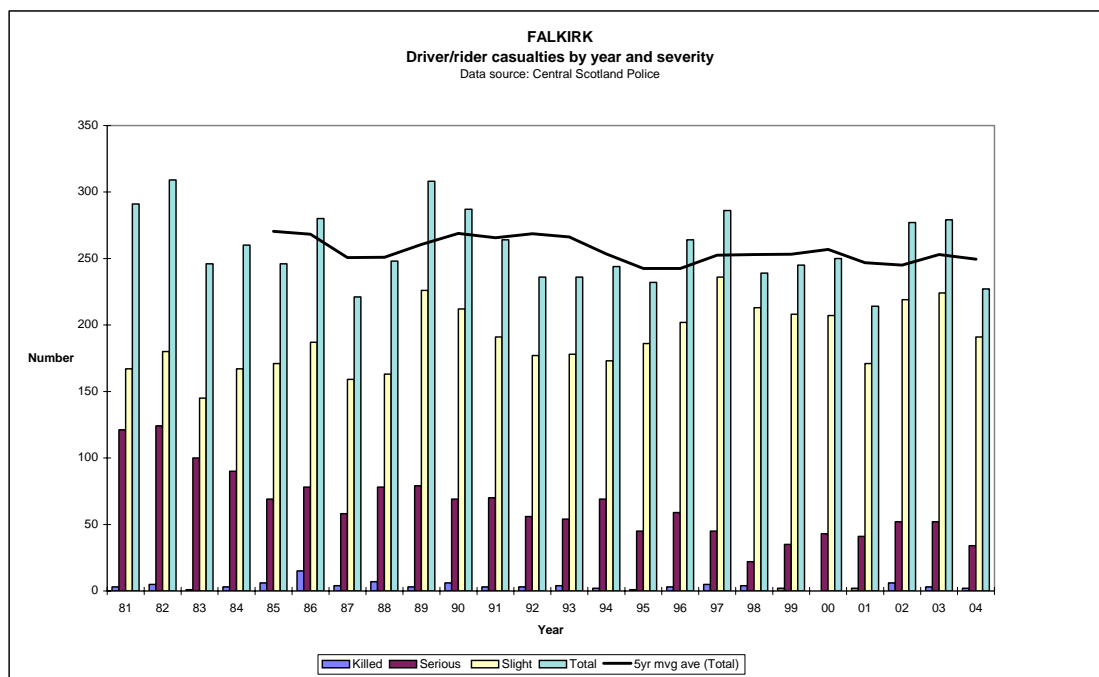
7.10 The main points are that, in the all classes casualty group, the:

- percentage change in average number is -11
- estimated number of casualties per 100,000 is 307
- severity ratio (number KSI/total number) is 0.20

7.11 These may be considered the averages for the Falkirk Council area. Similar statistics are calculated for each of the classes, and a selection of age groups, in the following sections.

7.12 The estimated casualty rate is considerably less than the 2003 Scottish rate of 393 per 100,000

7.13 Casualties: driver/rider



- Percentage of all casualties classed driver in 2004

56

7.14 The above diagram indicates the numbers of drivers/riders injured in road accidents in the Falkirk Council area since 1981.

7.15 The term 'driver/rider' means a person who was in control of a vehicle before the accident. The term 'vehicle' includes pedal cycles, ridden horses, horse-drawn vehicles and powered two wheelers. Hence, cyclists, horse riders and motorcyclists, as well as moped and scooter riders, are included.

7.16 In 1998, just over one-half (56%) of trips were made by drivers/riders. This is very similar to the Central Scotland Police area proportion quoted for 1999/2000 in the Scottish Executive's Household Survey Travel Diary (ref. Trn/2005/2). The figure quoted therein for 2003 is 59%.

Casualties classed driver by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	3.0	2.6	-13.3
Serious	48.0	44.4	-7.5
Slight	202.0	202.4	0.2
Total	253.0	249.4	-1
KSI	51.0	47.0	-8
Severity ratio	0.20	0.19	-7

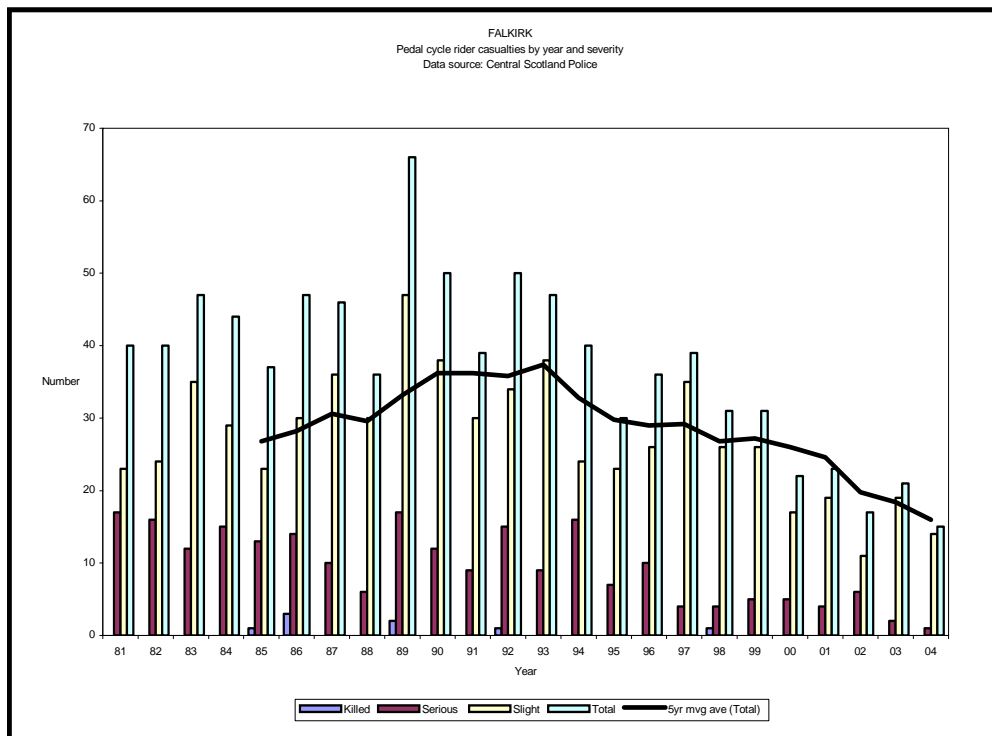
7.17 Comparing the driver/rider casualty class with all classes:

- | | | |
|---|--------------|------|
| | driver/rider | all |
| • percentage change in average numbers is | -1 | -11 |
| • severity ratio (number KSI/total number) is | 0.19 | 0.20 |

7.18 The smaller percentage reduction in the driver/rider class may reflect increased car ownership and use.

7.19 The low severity ratio for both the all classes and the driver/rider class may be a reflection of such factors as improved vehicle design and increased traffic volume.

7.20 A number of “drivers” are pedal cycle riders. The diagram below indicates the numbers of those injured in road accidents in the Falkirk area since 1981:

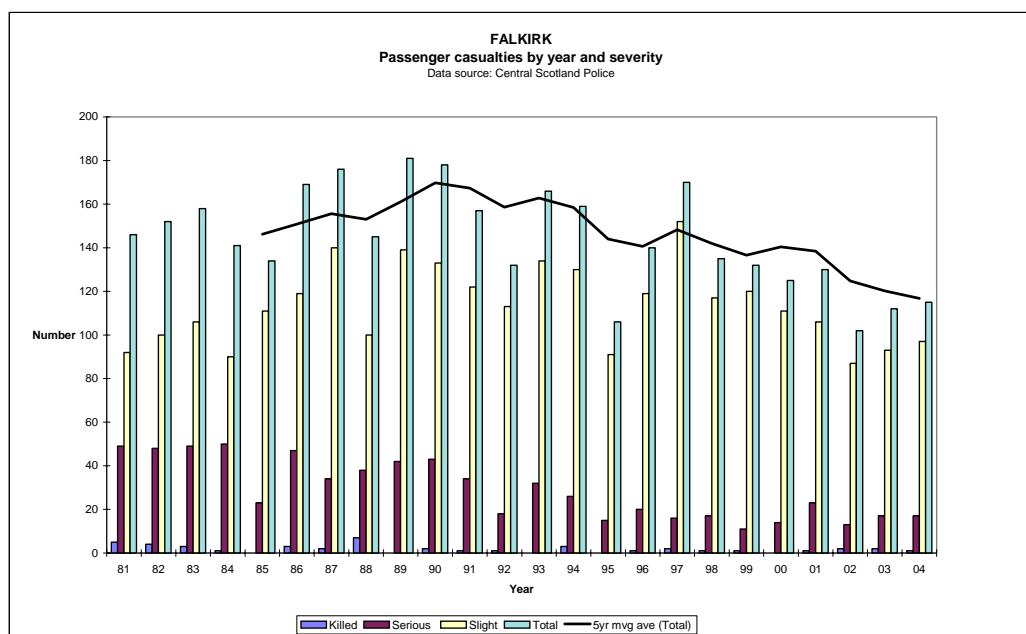


- Percentage of all casualties classed pedal cycle rider in 2003

Casualties classed PC rider by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	0.2	0.0	-100.0
Serious	8.2	4.4	-46.3
Slight	26.8	18.4	-31.3
Total	35.2	22.8	-35
KSI	8.4	4.4	-48
Severity ratio	0.24	0.19	-19

7.21 The main points on pedal cycle rider casualties might include the severity ratio, which has fallen to 0.19 in the five-year period ending in 2003. It should also be noted that around 40% of pedal cycle rider casualties are aged 15 years or younger.

7.22 Casualties: passenger



- Percentage of all casualties classed passenger in 2004

28

7.23 The above diagram indicates the numbers of passengers injured in road accidents within the Falkirk Council area since 1981.

7.24 The term 'passenger' means a person who was not in control of a vehicle but was riding on or in it before the accident. It includes a person riding, perhaps illegally, on roof or bonnet of a vehicle.

7.25 In 1998, less than one-fifth (17%) of trips were made by passengers. Unfortunately, there is no means available to learn what the equivalent percentage is in 2003, but it seems likely that passengers remain over-represented in terms of trips.

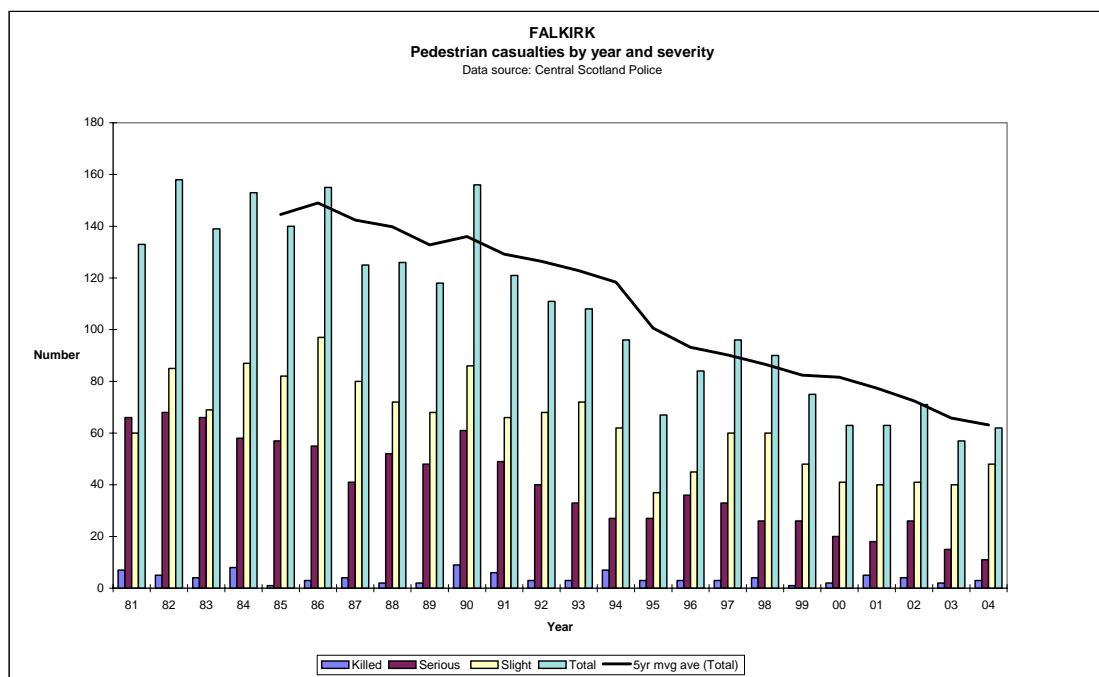
Casualties classed passenger by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	1.4	1.2	-14.3
Serious	18.8	16.8	-10.6
Slight	121.8	98.8	-18.9
Total	142.0	116.8	-18
KSI	20.2	18.0	-11
Severity ratio	0.14	0.15	8

7.26 Comparing the passenger casualty class with all classes :

- | | | |
|---|-----------|------|
| | passenger | all |
| • percentage change in average numbers is | -18 | -11 |
| • severity ratio (number KSI/total number) is | 0.15 | 0.20 |

- 7.27 Car ownership has been increasing. It seems reasonable to speculate that former passengers have become drivers, so that a decrease in passenger casualties might have been expected. The analyses that follow show that there has indeed, been a reduction in passenger casualties in all but the age group 5-10years. This leads to further speculation on whether there has been an increase in the number of passengers in that age group. If facts are to be substituted for such speculations, reliable data on exposure will be required.
- 7.28 The severity ratio is considerably less than average. It has increased slightly from the 0.14 of the base years '84-'85 relevant to central government's 2000 target, but it remains a vast improvement on the 0.32 for the base years '94-'98 relevant to its 1987 target.

7.29 Casualties: pedestrian



- Percentage of all casualties classed pedestrian in 2004

15

7.30 The above diagram indicates the numbers of pedestrians injured in road accidents in the Falkirk Council area since 1981.

7.31 The term 'pedestrian' also includes a person on a toy scooter, roller skates, riding a toy cycle or pedal car on the footway, controlling a vehicle while on foot, leading one or more animals, occupying a pram or pushchair, etc.

7.32 In 1998, around one-quarter (24%) of trips were made by pedestrians. Unfortunately, there is no means available to learn what the equivalent percentage is in 2003, but it seems likely that pedestrian casualties remain "under-represented" in terms of trips.

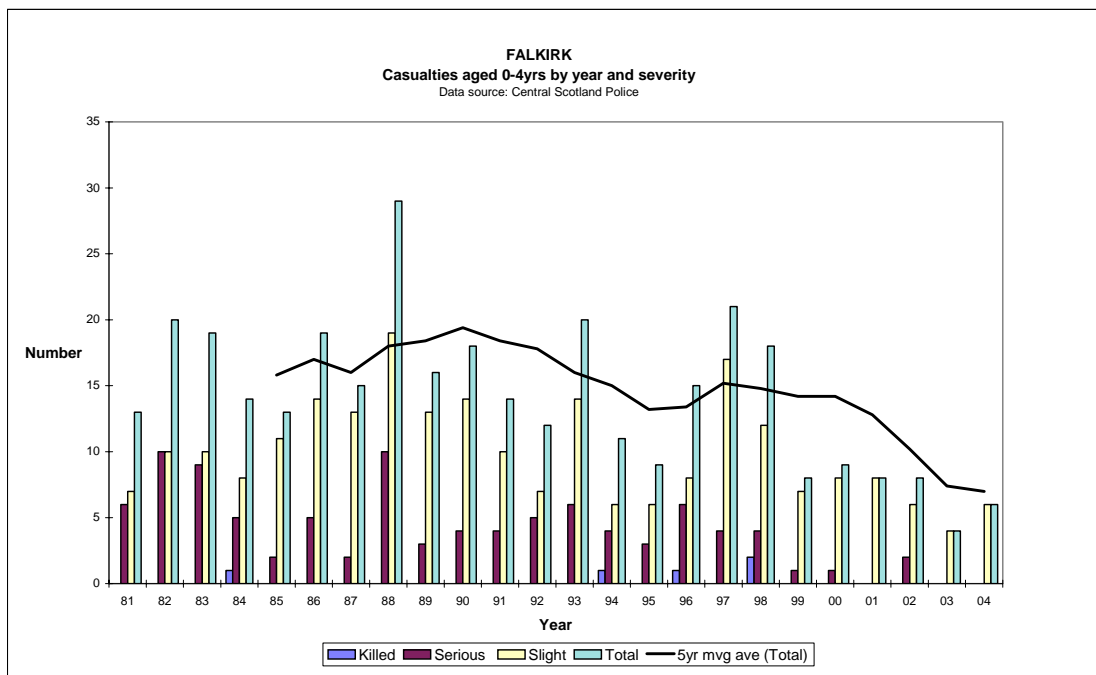
Casualties classed pedestrian by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	4.0	3.2	-20.0
Serious	29.8	18.0	-39.6
Slight	52.8	42.0	-20.5
Total	86.6	63.2	-27
KSI	33.8	21.2	-37
Severity ratio	0.39	0.34	-14

7.33 Comparing the pedestrian casualty class with all classes :

- percentage change in average numbers is pedestrian
-27 all
-11
- severity ratio (number KSI/total number) is 0.34 0.20

- 7.34 The large reduction in pedestrian casualties is welcome. Car ownership has been increasing, and an increase in pedestrian casualties might have been expected. However, former pedestrians may have become drivers, and avoided becoming pedestrian casualties. Some of these may have become driver/rider casualties instead. Any such effect would be difficult to detect and would probably apply only to short trips.
- 7.35 Nonetheless, if the apparent improvement has been due to a shift from walking to driving, then that is a matter for concern given the current drive to shift back. On the other hand, negative effects may be ameliorated by increased driver awareness following an increase in the numbers of pedestrians. Similarly in the case of an increase in the number of cyclists.
- 7.36 The severity ratio of 0.34 is much greater than average, although it has fallen considerably from the 0.39 of the base years '94-'98 relevant to the targets set in 2000. It is much improved on the 0.47 of the base years '81-'85 relevant to that set in 1987. This may have resulted from improved vehicle design, reduced speeds in urban areas and the installation of appropriate pedestrian crossing facilities at salient points in the road network.

7.37 Casualties by age group: 0-4years



- 2003 mid-year estimate of population aged 0 to 4years 8,050
- %age of entire population 6
- 5ya %age of all casualties 2
- Estimated 5ya casualty rate per 100,000 pop aged 0 to 4years 87
- Estimated Scottish casualty rate per 100,000 pop aged 0 to 4years 120

7.38 The above diagram indicates the numbers of those aged 0-4years injured in road accidents in the Falkirk Council area since 1981. Current statistics are listed below the diagram.

Casualties aged 0-4years by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	0.8	0.0	-100.0
Serious	4.2	0.6	-85.7
Slight	9.8	6.4	-34.7
Total	14.8	7.0	-53
KSI	5.0	0.6	-88
Severity ratio	0.34	0.09	-75

7.39 Comparing the 0-4years casualty age group with all classes :

	0-4years	all
• percentage change in average numbers is	-53	-11
• estimated number of casualties per 100,000 is	92	307
• severity ratio (number KSI/total number) is	0.09	0.20

7.40 The reduction in casualty numbers is considerably more than average. The casualty rate is much lower than average, and is slightly lower than the '99-'03 Scottish average of 120. The severity ratio, which would be expected to be higher than the all classes figure, is considerably lower than the 0.34 experienced during the base years.

7.41 Sub-division by casualty class produces the following:

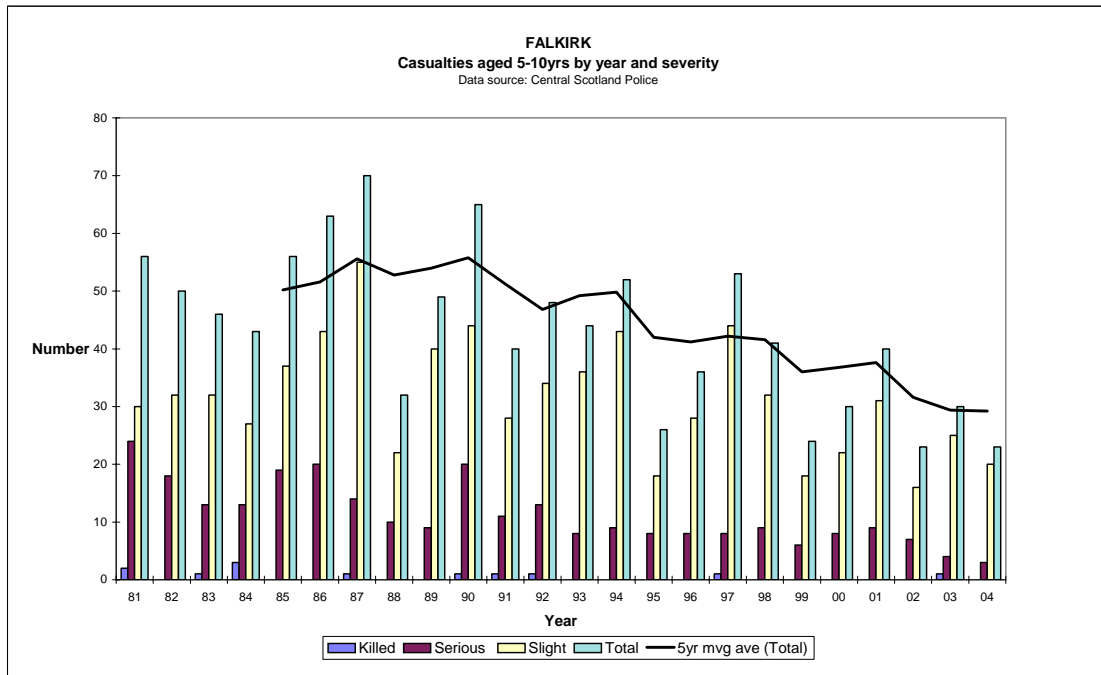
Casualties aged 0-4years by class			
Ave no. per year for periods			
Class	'94-'98	'00-'04	% change
Driver	0.2	0.4	100.0
Passenger	5.6	3.0	-46.4
Pedestrian	9.0	3.6	-60.0
Total	14.8	7.0	-53

7.42 The numbers involved are so small that there may be doubts about whether the above figures signify any real change in risk. That there is, however, seems clear from the diagram above paragraph 1. Travel mode changes may account for the apparent shift in proportion from pedestrian to passenger casualties. It may be that there is a tendency for children in this group to go by car rather than pram or pushchair (i.e. as a pedestrian, for the purposes of casualty data).

7.43 The casualty class "driver" may refer to persons riding a toy cycle, tricycle or pedal car on the carriageway.

7.44 In an ideal world, there should be no pedestrian casualties in this age group as all its members would be under strict parental control, however this does not reflect what actually happens in real life. Reducing casualties in this age group therefore requires educational initiatives to be aimed at parents, rather than at their children who are less than 4 years old.

7.45 Casualties by age group: 5-10years



- 2003 mid-year estimate of population aged 5 to 10years 10,666
- %age of entire population 7
- 5ya %age of all casualties 7
- Estimated 5ya casualty rate per 100,000 pop aged 5 to 10years 274
- Estimated Scottish casualty rate per 100,000 pop aged 5 to 10years 284

7.46 The above diagram indicates the numbers of casualties aged 5-10years injured in road accidents in the Falkirk Council area since 1981. Current statistics are listed below the diagram.

Casualties aged 5-10years by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	0.2	0.2	0.0
Serious	8.4	6.2	-26.2
Slight	33.0	22.8	-30.9
Total	41.6	29.2	-30
KSI	8.6	6.4	-26
Severity ratio	0.21	0.22	6

7.47 Comparing the 5-10years casualty age group with all classes :

	5-10years	all
• percentage change in average numbers is	-30	-11
• estimated number of casualties per 100,000 is	276	307
• severity ratio (number KSI/total number) is	0.22	0.20

7.48 The reduction in casualty numbers is rather greater than average. The casualty rate is lower than average, and rather lower than the '99-'03 Scottish average of 284. The severity ratio is rather above average, and slightly more than the 0.21 experienced during the base years.

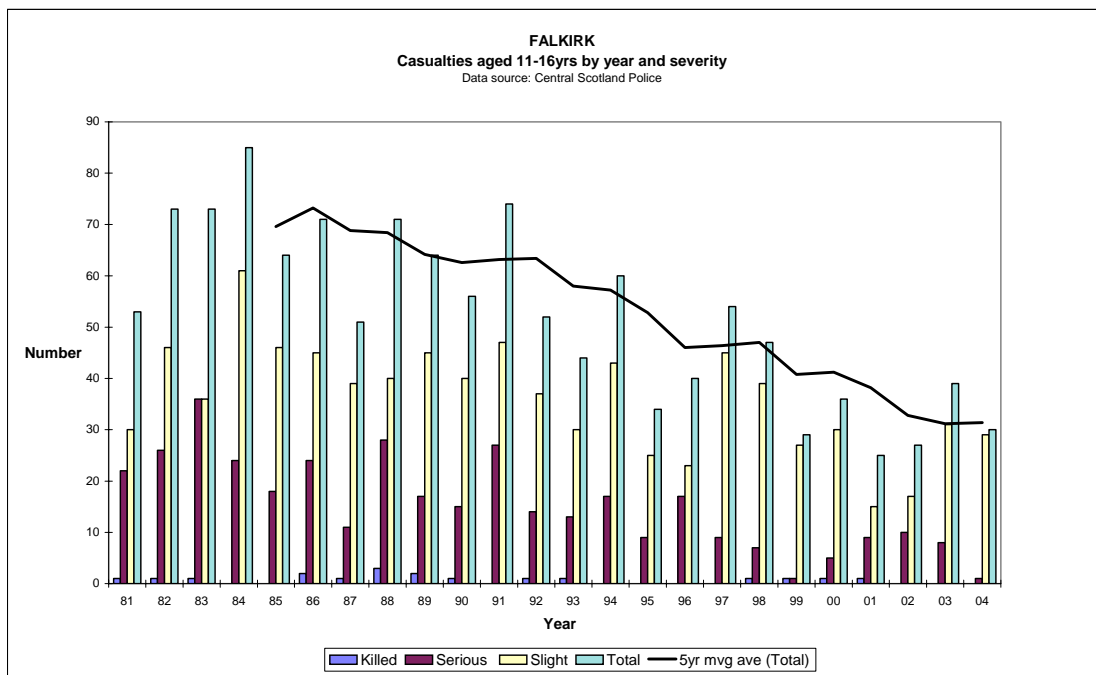
7.49 Proportions of the above changes may simply be due to the tendency for children in this age group to be ferried around in cars by their guardians, rather than being escorted on foot.

7.50 Sub-division by casualty class produces the following:

Casualties aged 5-10years by class			
Ave no. per year for periods			
Class	'94-'98	'00-'04	% change
Driver	8.6	5.2	-39.5
Passenger	10.6	11.6	9.4
Pedestrian	22.4	12.4	-44.6
Total	41.6	29.2	-30

7.51 The reduction in pedestrian casualty numbers is apparently offset by an increase in passenger casualties, which is numerically small but proportionally large. Again, this may be accounted for by a general increase in transport by car.

7.52 Casualties by age group: 11-16years



- 2003 mid-year estimate of population aged 11 to 16years 11,098
- %age of entire population 8
- 5ya %age of all casualties 7
- Estimated 5ya casualty rate per 100,000 pop aged 11 to 16years 283
- Estimated Scottish casualty rate per 100,000 pop aged 11 to 16years 385

7.53 The above diagram indicates the numbers of casualties aged 11-16years injured in road accidents within the Falkirk Council area since 1981. Current statistics are listed below the diagram.

Casualties aged 11-16years by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	0.2	0.4	100.0
Serious	11.8	6.6	-44.1
Slight	35.0	24.4	-30.3
Total	47.0	31.4	-33
KSI	12.0	7.0	-42
Severity ratio	0.26	0.22	-13

7.54 Comparing the 11-16years casualty age group with all classes :

	11-16years	all
• percentage change in average numbers is	-33	-11
• estimated number of casualties per 100,000 is	281	307
• severity ratio (number KSI/total number) is	0.22	0.20

7.55 The reduction in casualty numbers is considerably greater than average. The casualty rate is lower than average, and much lower than the '99-'03 Scottish average of 385. The severity ratio is rather higher than average, but considerably lower than the 0.26 experienced during the base years.

7.56 Sub-division by casualty class produces the following:

Casualties aged 11-16years by class			
Ave no. per year for periods			
Class	'94-'98	'00-'04	% change
Driver	11.6	4.6	-60.3
Passenger	20.2	9.8	-51.5
Pedestrian	15.2	17.0	11.8
Total	47.0	31.4	-33

7.57 The reduction in driver/rider casualties may simply reflect decreased bicycle use by members of this group. An increase in the numbers of pedestrian casualties might be expected if modal change is taking place.

7.58 This group contains two particularly interesting sub-groups. The first consists of those who have just left primary school and are adjusting to new routes and means of getting to school. They may need assistance with this. The second consists of those who are about to become drivers. In the 2001 road safety plan it was suggested that this group may be receptive to 'pre-driver training'. It is suggested that, if such training were successful, the consequences would be favourable to all.

7.59 Research⁷, however, suggests that driver education leads to early licensing, and thence to a "modest but potentially important increase in the proportion of teenagers involved in traffic [accidents]".

7.60 The emerging view is that driving experience, not training, is the key to becoming a safer driver. Recent advice⁸ is that "many new approaches are being tried, but they should not be widely applied unless rigorous assessments indicate that they are effective in reducing [accident] risk." Greater involvement of parents is considered necessary.

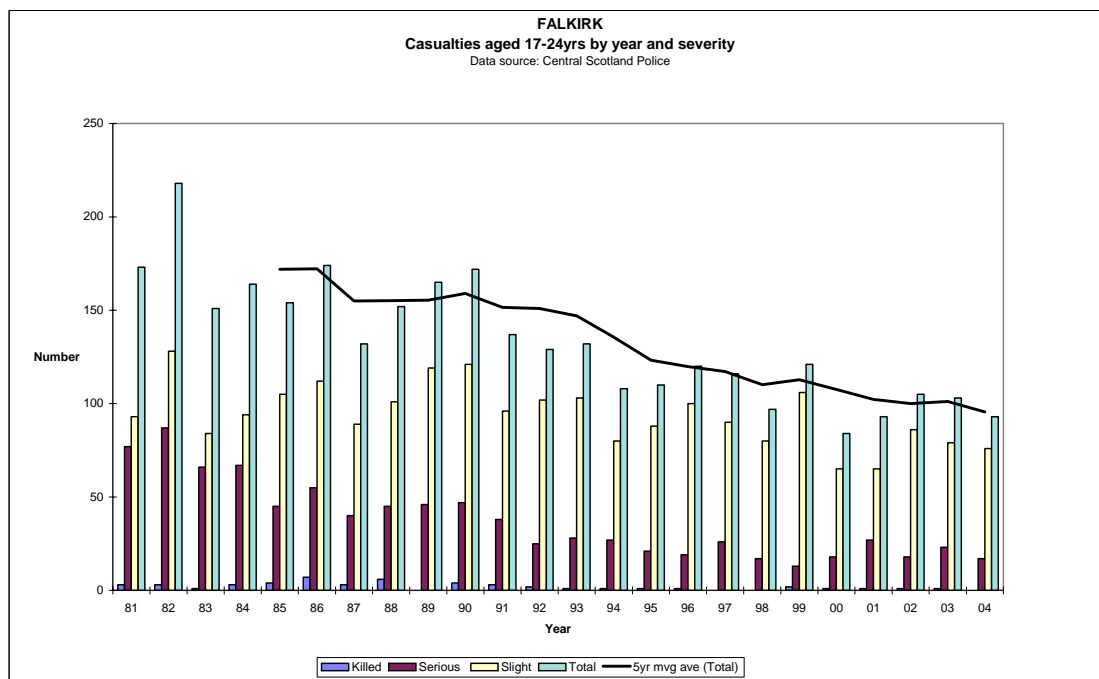
⁷ Achara, S., et al., 2001. Evidence based road safety? The Driving Standards Agency's schools programme. *The Lancet*, Vol. 358, July 21 2001, pp.230-32.

Available at:

<http://www.cemcentre.org/eb2003/lan%20Roberts%20COLUMNS%20WITHOUT%20SHADING.doc>

⁸ Williams, A. F. and S.A. Ferguson, 2004. Driver education renaissance?. *Injury prevention*, 2004, Vol. 10, pp. 4-7.

7.61 Casualties by age group: 17-24years



- 2003 mid-year estimate of population aged 17 to 24years 13,604
- %age of entire population 9
- 5ya %age of all casualties 22
- Estimated 5ya casualty rate per 100,000 pop aged 17 to 24years 703
- Estimated Scottish casualty rate per 100,000 pop aged 17 to 24years 744

7.62 The above diagram indicates the numbers of casualties aged 17-24years injured in road accidents in the Falkirk Council area since 1981. Current statistics are listed below the diagram.

Casualties aged 17-24years by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	0.6	0.8	33.3
Serious	22.0	20.6	-6.4
Slight	87.6	74.2	-15.3
Total	110.2	95.6	-13
KSI	22.6	21.4	-5
Severity ratio	0.21	0.22	9

7.63 Comparing the 17-24years casualty age group with all classes :

- | | 17-24years | all |
|---|------------|------|
| • percentage change in average numbers is | -13 | -11 |
| • estimated number of casualties per 100,000 is | 744 | 307 |
| • severity ratio (number KSI/total number) is | 0.22 | 0.20 |

7.64 The reduction in casualty numbers is slightly greater than average. The casualty rate far exceeds the average, and is equal to the Scottish average. The severity ratio is similar to the average, and slightly greater than the 0.21 experienced during the base years.

7.65 Sub-division by casualty class produces the following:

Casualties aged 17-24years by class			
Ave no. per year for periods			
Class	'94-'98	'00-'04	% change
Driver	65.2	57.0	-12.6
Passenger	36.6	31.2	-14.8
Pedestrian	8.4	7.4	-11.9
Total	110.2	95.6	-13

7.66 As can be seen from the 'trend line' in the histogram above, there appears to have been a considerable change after 1993. In that year the MOT test became more rigorous, consultation began on measures to improve the safety of newly qualified drivers, and a new edition of the Highway Code was published. Although no connection has been established, it may be that one would be found if the necessary research were carried out.

7.67 The continuing reduction in numbers is welcome, but the casualty rate for this age group remains a source of concern. The reason for it is gradually becoming clear from research outwith the road safety sphere. According to neuropsychologists,⁹ brain structure is not fixed at birth. Nature and nurture converge to modulate the size of brain cell populations and the integrity of their connections. The process starts in the womb and proceeds at different rates in different areas of the brain.

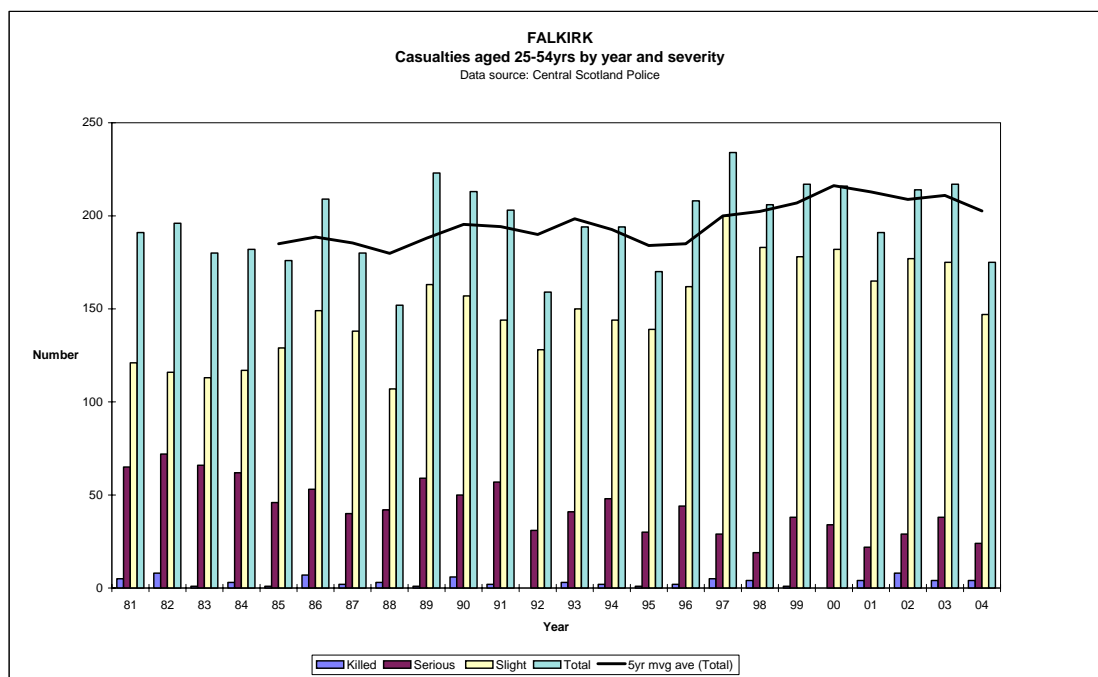
7.68 The functions of the frontal lobes include inhibiting risky behaviour, but these may not be fully constructed until the individual is aged around 25years. This may therefore be a contributory factor in the higher than average casualty rate for this 17-24years age group.

7.69 It has been said¹⁰ that it seems that appropriate safe behaviour cannot be taught. It must be learned by doing. At present, that inevitably means making mistakes on the roadway. An extensive review carried out within the European Union-funded GADGET (Guarding Automobile Drivers through Guidance Education and Technology) concluded that the most effective systems from a safety perspective are characterised by more formal education and training, graduated licensing, increased experience under lay instruction and risk awareness training.

⁹ Broks, P. 2005. Column. Out of mind. *Prospect*, 110, May, 2005.

¹⁰ Fuller, R. & J.A. Santos eds. (2002). *Human Factors for Highway Engineers*. Elsevier Science, Oxford, 2002.

7.70 Casualties by age group: 25-54years



- 2003 mid-year estimate of population aged 25 to 54years 62,337
- %age of entire population 43
- 5ya %age of all casualties 47
- Estimated 5ya casualty rate per 100,000 pop aged 25 to 54 years 325
- Estimated Scottish casualty rate per 100,000 popn aged 25 to 54 years 415

7.71 The above diagram indicates the numbers of casualties aged 25-54years injured in road accidents within the Falkirk Council area since 1981. Current statistics are listed below the diagram.

Casualties aged 25-54years by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	2.8	4.0	42.9
Serious	34.0	29.4	-13.5
Slight	165.6	169.2	2.2
Total	202.4	202.6	0
KSI	36.8	33.4	-9
Severity ratio	0.18	0.16	-9

7.72 Comparing the 25-54years casualty age group with all classes :

	25-54years	all
• percentage change in average numbers is	+0	-11
• estimated number of casualties per 100,000 is	338	307
• severity ratio (number KSI/total number) is	0.16	0.20

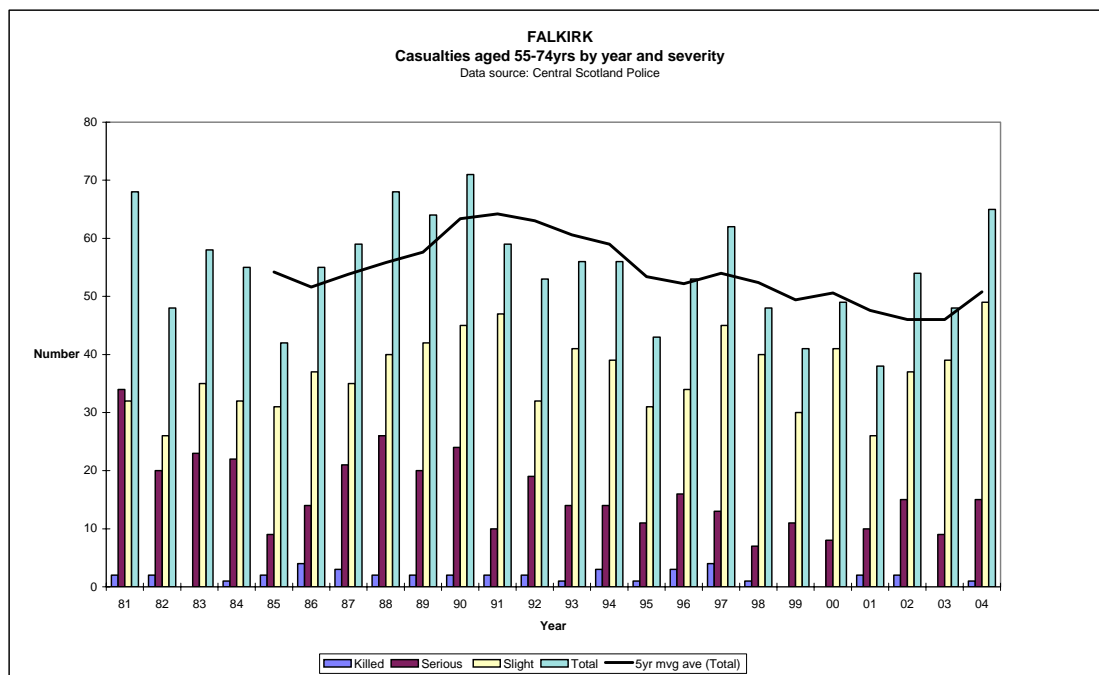
7.73 The increase in the casualty numbers contrasts with the average reduction. The casualty rate is a little higher than average, but is considerably lower than the '99-'03 Scottish averages of 415. The severity ratio is rather lower than average, and slightly lower than that of 0.18 experienced during the base years. It is not clear whether the apparently inexorable rise in casualty numbers in this category has peaked.

7.74 Sub-division by casualty class produces the following:

Casualties aged 25-54years by class			
Ave no. per year for periods			
Class	'94-'98	'00-'04	% change
Driver	144.2	150.8	4.6
Passenger	43.2	38.6	-10.6
Pedestrian	15.0	13.2	-12.0
Total	202.4	202.6	0

7.75 The reduction in severity being experienced by casualties in this group is welcome. Not so is the increase in their numbers, but this may be inevitable. The changes exhibited would be consistent with an increase in the populations of drivers and vehicles, but is one which may have peaked.

7.76 Casualties by age group: 55-74years



- 2003 mid-year estimate of population aged 55 to 74years 30,210
- %age of entire population 21
- 5ya %age of all casualties 12
- Estimated 5ya casualty rate per 100,000 pop aged 55 to 74 years 168
- Estimated Scottish casualty rate per 100,000 pop aged 55 to 74 years 229

7.77 The above diagram indicates the numbers of casualties aged 55-74years injured in road accidents in the Falkirk Council area since 1981. Current statistics are listed below the diagram.

Casualties aged 55-74years by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	2.4	1.0	-58.3
Serious	12.2	11.4	-6.6
Slight	37.8	38.4	1.6
Total	52.4	50.8	-3
KSI	14.6	12.4	-15
Severity ratio	0.28	0.24	-12

7.78 Comparing the 55-74years casualty age group with all classes :

	55-74years	all
• percentage change in average numbers is	-3	-11
• estimated number of casualties per 100,000 is	152	307
• severity ratio (number KSI/total number) is	0.24	0.20

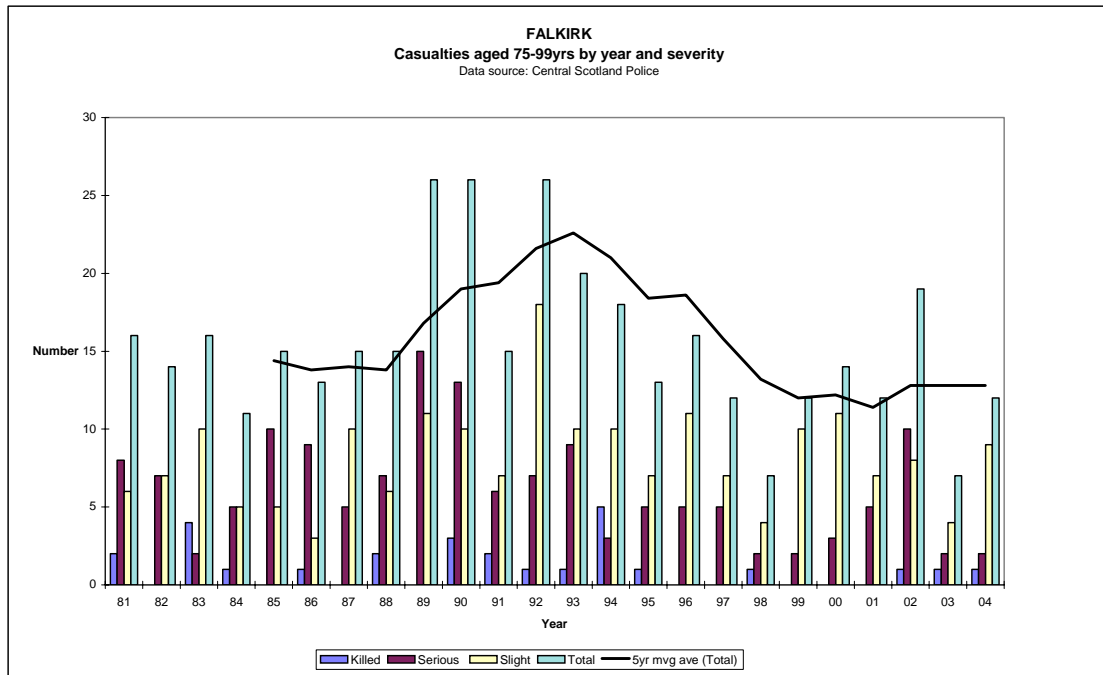
7.79 The percentage change in casualty numbers contrasts with the average reduction. The casualty rate, however, is considerably lower than average and is also well below the '99 to '03 Scottish average of 229. The severity ratio is considerably higher than average, but lower than the 0.28 experienced during the base years.

7.80 Sub-division by casualty class produces the following:

Casualties aged 55-74years by class			
Ave no. per year for periods			
Class	'94-'98	'00-'04	% change
Driver	21.0	27.4	30.5
Passenger	20.6	18.2	-11.7
Pedestrian	10.8	5.2	-51.9
Total	52.4	50.8	-3

7.81 This age group is growing in size because of the tendency towards greater longevity as well as being the result of the post war "baby boom". An increase in driver/rider casualties might, therefore, be expected.

7.82 Casualties by age group: 75-99years



- 2003 mid-year estimate of population aged 75 to 99years 9,955
- %age of entire population 7
- 5ya %age of all casualties 3
- Estimated 5ya casualty rate per 100,000 pop aged 75 to 99 years 129
- Estimated Scottish casualty rate per 100,000 pop aged 75 to 99 years 203

7.83 The above diagram indicates the numbers of casualties aged 75-99years injured in road accidents in the Falkirk Council area since 1981. Current statistics are listed below the diagram.

Casualties aged 75-99years by severity			
Ave no. per year for periods			
Severity:	'94-'98	'00-'04	% change
Killed	1.4	0.6	-57.1
Serious	4.0	4.4	10.0
Slight	7.8	7.8	0.0
Total	13.2	12.8	-3
KSI	5.4	5.0	-7
Severity ratio	0.41	0.39	-5

7.84 Comparing the 75-99years casualty age group with all classes :

	75-99years	all
• percentage change in average numbers is	-3	-11
• estimated number of casualties per 100,000 is	129	307
• severity ratio (number KSI/total number) is	0.39	0.20

7.85 The decrease in casualty numbers is considerably less than the average reduction. The casualty rate is considerably lower than average, however, and it is also considerably lower than the Scottish average of 203 for the 75-99years age group. The severity ratio is well above the average, but a little less than the 0.41 experienced during the base years.

7.86 Sub-division by casualty class produces the following:

Casualties aged 75-99years by class			
Ave no. per year for periods			
Class	'94-'98	'00-'04	% change
Driver	2.2	4.0	81.8
Passenger	5.2	4.4	-15.4
Pedestrian	5.8	4.4	-24.1
Total	13.2	12.8	-3

7.87 Most notable, as far as this age group is concerned, is its apparent reversal of the strong upward trend in the later 1980s. As was stated in the 2001 plan, the most important single event of that decade was the passing of the Transport Act 1985 (bus deregulation). Its effect on the health of older bus passengers remains a concern, but the suggestion¹¹ that further research might reveal some interesting consequences does not seem to have been followed up.

7.88 It is possible that the steady rise in the 5year average number of accidents involving buses in the Central Scotland Police area from the period ending 1984 to that ending 1993, which remains unexplained, may be having an effect on the numbers of casualties in this age range. The reasons for it could be extremely important to the direction of the casualty reduction effort in future, if a return to former high levels of 1992 is to be prevented. It is clear that monitoring of the effects of such changes needs to be carried out, if disadvantage and inequality are to be reduced.

¹¹ Astrop, A., R. Balcombe and D Finch. 1991. *Bus safety and maintenance following deregulation. Research Report 337*. TRRL, Crowthorne 1991.

7.89 Casualties: summary

In the following table:

A **bold underlined** figure in a cell indicates that it exceeds the figure in the same row in the 'Age group 0-99' column ie the specific 'Age group' is worse than the average for the 'All ages' group (0-99).

A **shaded cell** indicates that its value exceeds the figure in the same column in the 'Casualty Class – All' ie the specific casualty rate or class is worse than the average for the 'All Casualties' Class.

A **bold underlined shaded cell** indicates that both of the averages are exceeded.

	Age group (years)							
	0-99	0-4	5-10	11-16	17-24	25-54	55-74	75-99
Population	145920	8050	10666	11098	13604	62337	30210	9955
%age population in age group	100	6	7	8	9	43	21	7
'00-'04 rate (casualties per 105 popn)	307	87	274	283	<u>703</u>	<u>325</u>	168	129
Casualty Class	All Casualties							
'00-'04 ave no. casualties	429.4	7	29	31	96	203	51	13
%age change in 5yr ave	-11	-53	-30	-33	-13	0	<u>-3</u>	<u>-3</u>
'00-'04 ave severity ratio	0.20	0.09	<u>0.22</u>	<u>0.22</u>	<u>0.22</u>	0.16	<u>0.24</u>	<u>0.39</u>
	Driver/rider							
'00-'04 ave no. casualties	249.4	0.4	5.2	4.6	57.0	150.8	27.4	4.0
%age change in 5yr ave	-1	<u>100</u>	-40	-60	-13	<u>5</u>	<u>30</u>	<u>82</u>
'00-'04 ave severity ratio	0.19	0.00	<u>0.27</u>	<u>0.26</u>	<u>0.20</u>	0.17	<u>0.23</u>	<u>0.20</u>
	Passenger							
'00-'04 ave no. casualties	116.8	3	11.6	9.8	31.2	38.6	18.2	4.4
%age change in 5yr ave	-18	-46	<u>9</u>	-51	<u>-15</u>	<u>-11</u>	<u>-12</u>	<u>-15</u>
'00-'04 ave severity ratio	0.15	0.00	0.09	<u>0.22</u>	<u>0.24</u>	0.08	0.16	<u>0.32</u>
	Pedestrian							
'00-'04 ave no.	63.2	3.6	12.4	17	7.4	13.2	5.2	4.4
%age change in 5yr ave	-27	-60	-45	<u>12</u>	-12	-12	-52	-24
'00-'04 ave severity ratio	0.34	0.17	0.32	0.21	<u>0.35</u>	0.33	<u>0.62</u>	<u>0.64</u>

7.90 The above table summarises the data presented in the casualty sections of the plan. The table facilitates comparisons of casualty rates and changes in five year average numbers and severity ratios.

7.91 Comparisons made earlier with Scottish rates are not repeated here, but it will have been noted that the groups considered generate rather lower casualty rates than the equivalent all-Scotland ones.

7.92 It is important to bear in mind the numbers of casualties actually involved in every sub-group. Figures are provided in the table. It may not be sensible to expend resources on reducing casualties in a very small sub-group, unless the measure is likely to be advantageous to members of other sub-groups.

7.93 Looking at the above table in another way, certain “areas of concern” can be identified. These are indicated in the following table. Cells are shaded and their contents emboldened as before.

		Age group (years)							
	Class	0-99	0-4	5-10	11-16	17-24	25-54	55-74	75-99
Rates	All					X	X		
Numbers	All						X	X	X
	Driver/rider		X				X	X	X
	Passenger			X		X	X	X	X
	Pedestrian				X				
Severity ratios	All			X	X	X		X	X
	Driver/rider			X	X	X		X	X
	Passenger				X	X		X	X
	Pedestrian					X		X	X

7.94 Hence, the areas of concern are:

higher than average rates in:

- age groups 17-24 and 25-54years.

lower than average decreases in numbers in the:

- driver/rider class and pedestrian class.

increases in numbers in the:

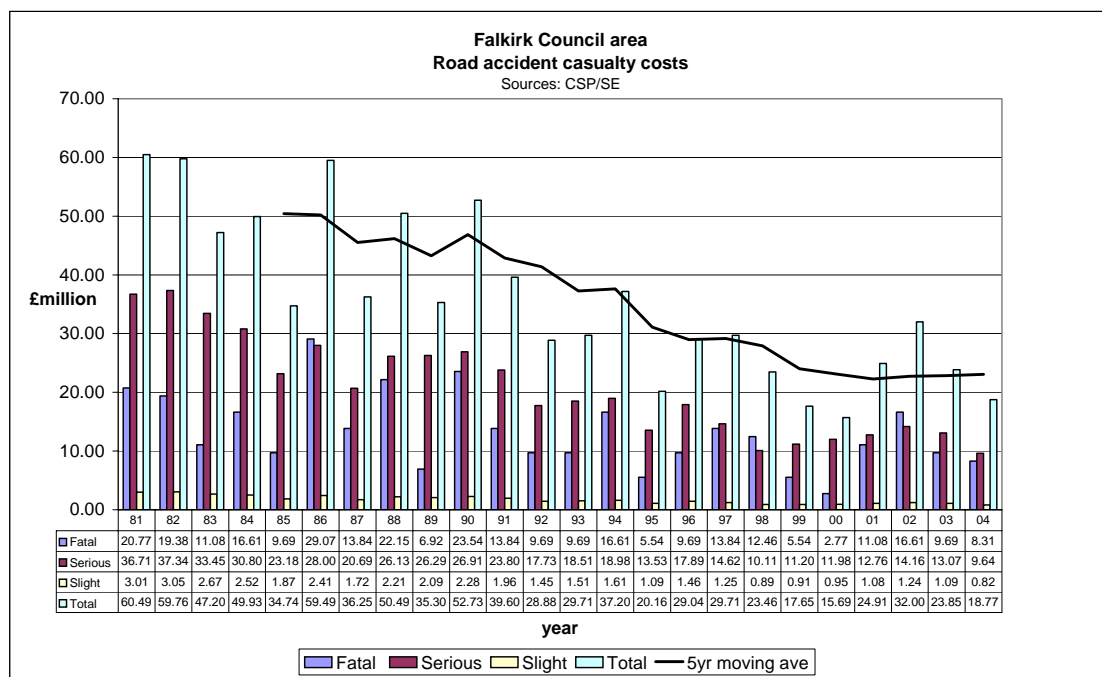
- driver/rider class, age groups 0-4, 25-54, 55-74 and 75-99years.
- passenger class, age groups 5-10years.

higher than average severity ratios in the:

- age groups 5-10, 11-16, 17-24, 55-74 and 75-99years, especially.
- driver/rider class, age groups 5-10, especially, 11-16, 55-74 and 75-99years (those in the 11-16years age group are usually cyclists).
- passenger class, age group 11-16, 17-24 and 75-99years, especially.
- pedestrian class, generally
- pedestrian class, age groups 5-10, 17-24, 55-74 and 75-99years, the last by far the highest severity ratio experienced by any road user group.

- 7.95 Not all of the differences shown above may be significant, but this will be accounted for when deciding upon priorities at a later stage.
- 7.96 Clearly, however, road safety improvement activities must address a wide range of factors that may be peculiar to the different casualty classes, age groups and combinations of these. Physical and mental abilities change as each individual passes through the age groups. Lifestyles change, vehicle and road design standards change. Even the climate is changing, and all these things will impinge upon road safety.
- 7.97 Casualty rates are highest for the 17-24years age group, but their numbers are falling. Severity ratios are highest for the very young and the older, but there is also a problem for those drivers/riders (probably pedal cyclists) and pedestrians in their early teens. Severity ratios might be expected to be higher for the older groups, but more drivers/riders and passengers are being injured and fewer pedestrians.
- 7.98 It is difficult to imagine any single activity that will radically improve road safety in the Falkirk area. It is more likely that a range of measures involving education, enforcement and engineering will be required. These should be designed to tackle the highest priorities first while taking account of the changing social and demographic structure of the population.

7.99 Casualties: costs



7.100 The above diagram indicates the costs associated with casualties resulting from road accidents in the Falkirk Council area since 1981. The diagram is based on 2004 average costs for Great Britain at 2004 prices. These are as follows:

	Casualty severity		
	Killed	Serious	Slight
Cost (£)	1,384,436	155,563	11,994

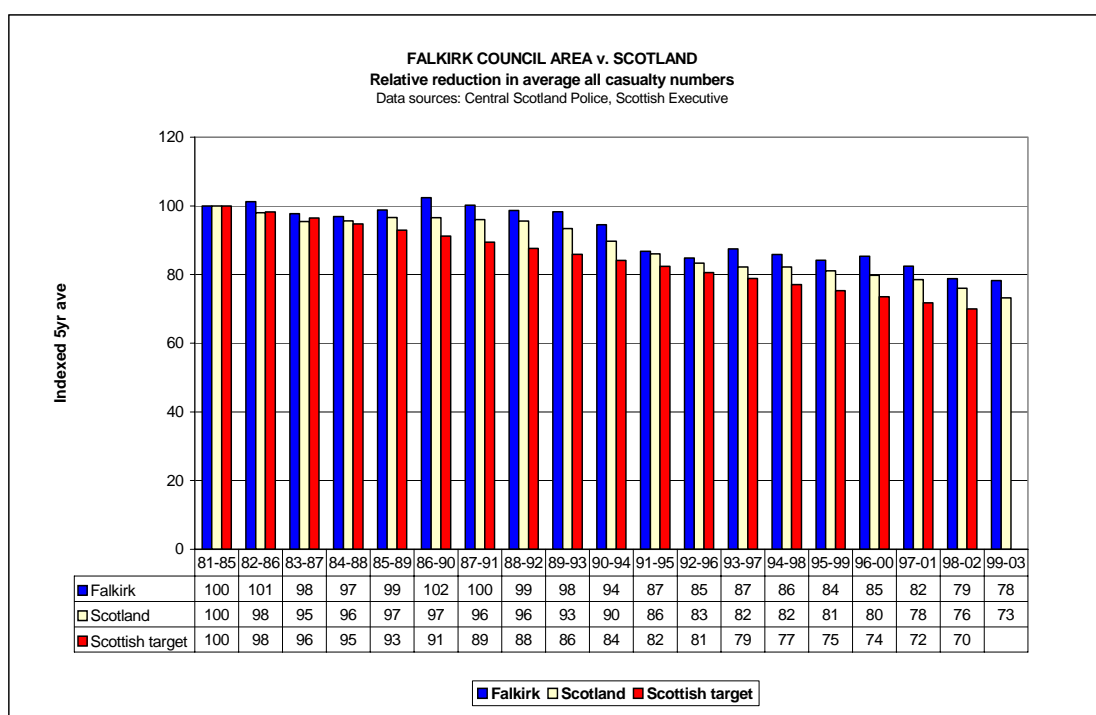
7.101 The valuation of casualty costs calculated for Great Britain for all levels of severity are now based on a "willingness to pay human cost" approach. This is intended to encompass all aspects of the costs of casualties including both the human cost and the direct economic cost. The human cost covers an amount to reflect the pain, grief and suffering to the casualty, relatives and friends, and, for fatal casualties, the intrinsic loss of enjoyment of life over and above the consumption of goods and services. The economic cost covers loss of output due to injury and medical costs¹².

7.102 Five-year average casualty costs have fallen from about £50m at the end of 1985 to about £26m at the end of 2004. Costs are, of course, very sensitive to the occurrence of fatalities.

¹² The Scottish Executive, 2005. *Road Accidents Scotland 2004*. Edinburgh, 2004

8 Targets

- 8.1 In countries where targets have been set, more progress in casualty reduction appears to have been made than elsewhere. A causal link has not been established, but the advantage may be that practitioners can refer to a target in order to deflect conflicting demands upon their time.
- 8.2 The diagram below shows how Scotland and Falkirk Council fared in relation to the target reduction in total casualty numbers of 30% required, from the average number per year sustained in the period 1981-1985. The then Scottish Office Executive Transport Minister set this target in April 1989. The reduction was to be achieved by the year 2000. It was interpreted locally as meaning a 30% difference in the five-year averages, between the mid-years 1983 and 2000.
- 8.3 To arrive at the figures in the diagram, average yearly casualty numbers have been indexed to 100 for the period 1981-1985 (mid-year 1983). The Scottish target trend (in the bottom row of the table), therefore has a value of 70 (30% reduction) for the period 1998-2002 (mid year 2000). By that time period the actual casualty numbers for Scotland had dropped to an indexed value of 76, signifying a 24% reduction nationally, somewhat short of the target of 30%. In Falkirk Council area, indexed casualties fell to 79 (21% reduction).



- 8.4 Whilst this apparent 'failure' to meet the national target is perhaps disappointing to some readers, it should be borne in mind that the casualty rate for Falkirk is 307casualties/100,000population compared with the Scottish rate of 393.
- 8.5 In addition, the figures in Appendix 3 for average casualty rates across all 32 council areas in Scotland show that Falkirk Council area was the third lowest of all the areas.

- 8.6 These apparently conflicting messages of not meeting targets, but showing a good performance when compared to other areas of the country, illustrate that there are certain difficulties with target setting.
- 8.7 Firstly, the Scottish target appears to have been set quite arbitrarily. So, failure to reach the Scottish target may be more of a reflection of the quality of the information and procedure used in defining it, rather than of the efforts of the agencies attempting to achieve it.
- 8.8 Secondly, it is important to note that the Scottish trend is the sum of the local contributions towards it from the thirty-two local authority areas involved. When setting a local target, therefore, practitioners need to know what contribution each local authority activity can be expected to make.
- 8.9 The fact that the indexed trend for Falkirk Council area shown in the diagram above is not identical to the Scotland one is not necessarily a cause for alarm. As discussed above the casualty rate per 100,000 population for Falkirk is less than the Scottish rate and, when estimated per 100million vehicle kilometres figures are examined, Falkirk is third lowest in Scotland.
- 8.10 This begs the question whether another form of target setting altogether might be appropriate. There is a danger that misinterpretation of the current target could lead to distortions in investment, but this matter has not yet been resolved.
- 8.11 Ultimately, it would seem that all the demographic, geographic and meteorological variables likely to affect casualty frequency would have to be identified and their effects assessed before realistic targets for local authority areas could be set. Mathematical modelling may be the solution, but that would require a considerable academic effort. This is beyond the scope of an individual authority.
- 8.12 During the preparation of the first road safety plan for Falkirk Council area, central government was considering new national targets. It was hoped that a major target would be set for overall casualty reduction, and minor targets for casualty severities. Subdivision by severity seemed wise, as it would encourage concentration upon the worst casualties, regardless of the road user group involved.
- 8.13 This has been the policy of successive local road authorities for the Falkirk Council area for many years. It is only natural for practitioners, working within the bounds of their different remits, to wish to address those factors producing the most severely injured casualties first. Hence, the needs of the most vulnerable are automatically prioritised, whether their vulnerability stems from age, gender, infirmity, or other exposure to higher risk.
- 8.14 It was recognised that the choice of sub-groups for which targets might be set must be made with care. Groups containing relatively large numbers should be used because:
- statistical difficulties arise when small numbers are involved
 - practitioners must not focus on particular (small) groups to the detriment of others
 - a selective approach to data collection may inadvertently be encouraged
 - a wide view of the casualty situation must be maintained.

8.15 It was hoped that any sub-targets produced would relate to the broadest casualty classification, severity, and that further division beyond this should be avoided.

8.16 In 2000, central government published new targets for Britain within a statement of its road safety strategy¹³. The phrase contained within the title given to the strategy document (safer for everyone) seems to endorse the equitable approach to casualty groups referred to in this plan. Similarly, the main target contained within the strategy document endorses the recognition within this plan that factors producing the most severely injured casualties should be addressed first.

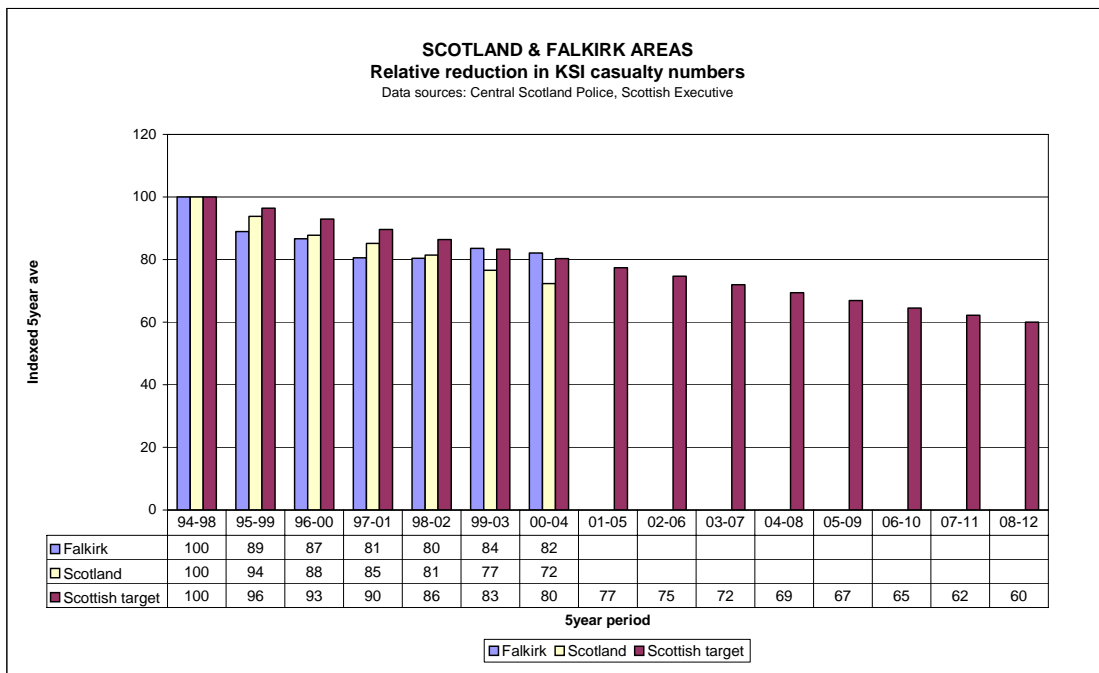
8.17 The **British** targets have therefore been set as:

- a 40% reduction in the number of people killed or seriously injured in road accidents
- a 50% reduction in the number of children killed or seriously injured; and
- a 10% reduction in the slight casualty rate, expressed as the number of people slightly injured per 100million vehicle kilometres.

8.18 These targets are to be measured from a new base, namely the average yearly number of casualties sustained during the period 1994-1998. They are to be achieved by 2010. As before, the percentage differences quoted have been interpreted, locally, as those between five-year averages. In this case, the relevant mid-years are 1996 and 2010.

8.19 Despite the establishment of these new targets, the difficulties for those wishing to set credible local targets remains. The national targets were derived using methods that cannot be applied below the British level¹⁴. Despite this, the Scottish Executive has adopted the same figures.

8.20 A similar diagram to that at the beginning of this section, but restricted to casualties seriously injured or killed (KSI), is shown below. This relates to the first of the new targets.



¹³ Great Britain. DETR, 2000. *Tomorrow's roads: safer for everyone*. London, HMSO.

- 8.21 In this instance, it is important to realise that the killed and serious casualty rate for Falkirk is approximately 59.1KSI/100,000 population, whereas the Scottish one is 17% higher, at 69.1.
- 8.22 Regarding the second target, which relates to children seriously injured or killed, the Falkirk Council area five-year average number fell, by 47%, from 23.2 to 12.4 during the period illustrated above. The five-year average for all Scotland fell by 42%.
- 8.23 Regarding the third target, which relates to the slight casualty rate (in this case casualties per 100million vehicle kilometres), this fell by 19% within the Falkirk Council area and 15% within the whole of Scotland during the period illustrated above.
- 8.24 Appendix 3 further illustrates the position of Falkirk Council area in terms of traffic (as opposed to population) based casualty rates. On that criterion, the Falkirk Council area rate of 31.22 casualties per 100million vehicle kilometres is 33% lower than the Scottish average of 47.03, within a range from 25.00 to 81.67casualties/100mvkm.
- 8.25 The objective of this plan is to maintain the long-term rate of reduction in casualty numbers. It can be shown that the reduction within the Falkirk area since 1981 (shortly after accident investigation work began in earnest), amounts to approximately seven fewer casualties every year. This is a slightly higher figure than the reduction suggested in the first plan.
- 8.26 Given that there has been a reduction, nationally, in the rate at which casualties are being saved every year, however, it seems reasonable to aim at maintaining the initial rate of reduction.
- 8.27 Falkirk Council's local target, therefore, will remain at **six casualties fewer per year**.
- 8.28 The Council's "worst-first" approach will be maintained and so this should ensure that the casualties will normally be saved from the fatal and serious sub-groups, so maximising its contribution to the first national target.

¹⁴ Broughton et al. 2000. *The numerical context for setting national casualty reduction targets*. TRL Report 382. Transport Research Laboratory. Crowthorne.

9 Issues for further consideration

General

9.1 From the information already provided in this review, there are a number of issues which appear to require further examination. These can be categorised under the following sub-headings:

- the road environment
- the road user
- the vehicle
- what works?
- the data

The road environment

9.2 **Traffic management and the road hierarchy.** Traffic management is the art of making the best possible use of the space available within a road, whilst taking into account the need to move people and goods efficiently and safely. Conflicting objectives often have to be catered for, and therefore priorities have to be established too. The prime determinant of these will usually be the function of the road. For example, there are:

- country lanes, which provide access to adjacent land only
- residential roads, which may have to double as play areas
- high streets, which have mixed functions
- distributor roads, which carry mainly vehicular traffic between populated areas
- motorways, to which vehicular access is restricted in the first instance.

9.3 Safety objectives are more easily pursued where the context is clear, and so there is merit in identifying the locus of each road in a functional hierarchy. In the medium term, speed limits for each type of road will need to be decided.

9.4 **EuroRAP.** The Department for Transport (DfT), Scottish Executive and most roads authorities provide technical assistance and/or data to the European Road Assessment Programme¹⁵. This is an organisation led, in the UK, by the Automobile Association's Motoring Trust. The Trust believes that the power of the consumer needs to be mobilised if roads authorities are to be enabled to invest sufficiently in accident reduction work. The organisation recognises that drivers are merely human, and takes the view that mistakes should not result in death or serious injury. Its objective, one shared by roads authorities, is to try to make roads more "forgiving" of users' mistakes. The Trust produces, annually, a range of tables of risk ratings for selected A-roads throughout Great Britain. A map is also produced.

9.5 **Development control.** Developments occasionally provide opportunities to improve road safety. Typical means are by providing the safest appropriate junction where access is required, and by closing junctions in order to concentrate conflicts. The Council's development control powers can sometimes be used to facilitate such actions and to improve the road environment in many other ways. Appropriate geometric and construction standards can be provided for all categories of road user.

9.6 The visual environment can be improved as well. This is important from several points of view, the safety one being based on the realisation that driving is largely a visual

¹⁵ www.eurorap.org

task, and that the view from most vehicles is generally rather more restricted than many realise. Limiting the distracting visual “noise” created by some developments can reduce unnecessary driver stress, and will improve the safety of those adopting the more vulnerable modes of transport.

- 9.7 **External to vehicle driver distraction.** In respect of this form of distraction it was suggested that the then Scottish Road Safety Campaign (now Road Safety Scotland (RSS)) pursue the matter further. In response to its suggestion, RSS facilitated the production of a comprehensive literature review¹⁶. This relatively inexpensive work reviewed all relevant material published in English since 1945. It concluded that the risk involved was serious and suggested that clear guidelines are required on the number and types of signs (including traffic signs) that might be placed at certain particularly dangerous locations. Measures are already included in the Council’s Local Plan and the detailed guidelines are being reviewed.

The road user

- 9.8 **Risk compensation.** There is some evidence that human beings adapt their behaviour to the level of risk they judge to exist. It is therefore important that the relevant agencies work to ensure that their schemes do not lead road users to judge the level of risk to which they are exposed to be lower than it actually is.
- 9.9 **Driver behaviour.** This is a function of many pressures, including the driver’s own, not necessarily conscious, assumptions about what is acceptable in any given circumstance. A driver’s attentiveness varies as he/she drives, and may not always be appropriate for a particular situation. Drivers are human beings, with varying moods and passions. Their performance varies through time, and is bounded by natural limitations in sensation, perception, information processing ability, memory and decision-making ability. In addressing road safety, therefore, account must be taken of human factors as well as objective environmental factors. Human behaviour is an extremely complex field, however. Understanding is growing, but even when the main “cause” of an accident can be attributed to human mistake or impairment, the most effective remedy may lie elsewhere. Road safety engineering measures, for example, work largely through influencing human behaviour.
- 9.10 Vehicles can become extensions of their owners’ personalities. This may be dangerous if a particular individual is under some negative influence such as anger, tiredness, the wish to attract attention, or is otherwise distracted. Most drivers (as many as 98%) consider themselves of above average ability. Their apparently strange belief, however, is not necessarily one that should be changed, even if it could be. As with many aspects of behaviour, it may be a “survival” mechanism. It may provide insulation against depression, for example.
- 9.11 The above is intended only to signal the existence of the most complex aspect of the road safety situation. A road safety plan must take cognisance of this complexity. Mere belief, however sincerely held, is not enough. Experience has shown that considering current research, rather than relying exclusively on intuition may lead to surprising solutions and insights. For example, while the case for training has been shown effective in other domains, there is very little evidence that shows that it is so for any aspect of driving. Where expenditure of scarce resources is concerned, it is important to be as confident as possible that a measure will actually bring the expected benefits.

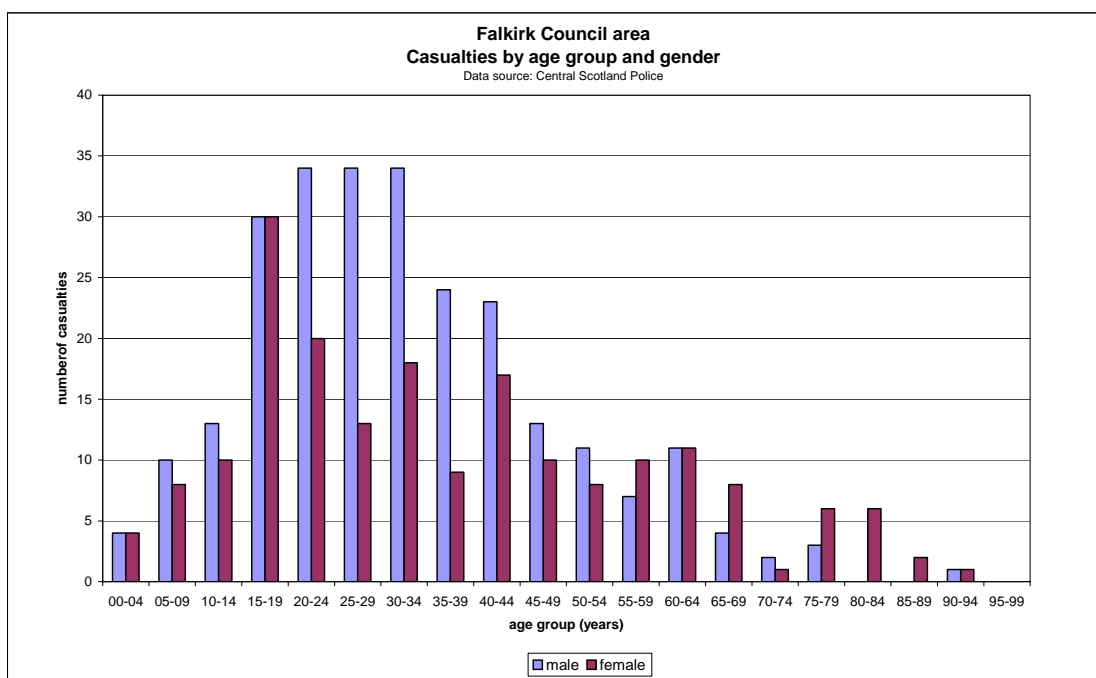
¹⁶ Wallace, B. 2003 *External-to-vehicle driver distraction*. Scottish Executive Social Research. Edinburgh.

9.12 **Gender.** There are basic differences between the genders. In the context of criminality, gender is the single largest factor which shows a relationship to crime. Approximately nine out of ten “crimes” are committed by one gender which, it has been suggested¹⁷, is at a “constitutional disadvantage”. Males are disproportionately represented in dysfunctional groups from stammerers to suicides. They will be far more likely to die in automobile accidents, firearms accidents, falls and drownings. The situation relevant to road accident casualties in the Falkirk Council area in 2003 is illustrated below:

Casualties	Gender		Total
	Male	Female	
Severity			
Fatal	18	7	25
Serious	146	92	238
Slight	563	477	1040
Total	727	576	1303
Casualty severity ratio	0.23	0.17	0.20
Fatality ratio	0.025	0.012	0.019

9.13 Both the indicators, casualty severity ratio (fatal+serious)/all and fatal/all emphasise the tendency for males to be injured more severely. Most importantly, the male fatality ratio is slightly more than twice that of the female one.

9.14 The 2003 situation, in terms of age and gender is illustrated below:



9.15 The diagram indicates that there are usually more male casualties than female ones in each age group. It does not however provide any indication of exposure to risk. It may be that males do more travelling than females. The fact remains, however, that males do tend to be injured more severely when they are involved in an accident.

¹⁷ Moir, A. and D. Jessel. 1995. *A mind to crime*. Penguin Books, 1997.

- 9.16 **Speed.** The speedy movement of goods and people is of enormous material benefit to society. It should be recognised that a driver's goal will often be 'unimpeded and speedy progress'.
- 9.17 However, the Transport Research Laboratory has commented, in its description of an accident recording system,¹⁸ on the pairing of a primary contributory factor "excessive speed" with a precipitating factor "loss of control of vehicle". This occurred in 4.04% of a sample of 2795 accidents. The pairing is second from the top of a list of such pairings, and so the occurrence of "excessive speed" merits study.
- 9.18 As the kinetic energy of an object in motion increases in proportion to the square of its speed, a relatively small increase in speed can make a very large increase in the energy to be dissipated should an accident, particularly one involving a collision, occur. This, in turn, will increase the severity of injury likely to be sustained by a casualty, particularly those outside the protective shell of a car. These will include pedestrians, cyclists and motorcyclists, the last of whom are the most vulnerable to injury in an accident.
- 9.19 Interestingly, the average speed of cars in free-flowing traffic on non-urban single carriageway roads rose from 44miles/hr to 47miles/hr in the thirteen years from 1983 to in 1996¹⁹ and thence to 48miles/hr in 2004²⁰. The percentage of cars exceeding the speed limit for these roads rose from 5% to 10% during the 1980s, but it has remained at about that ever since. Furthermore, the percentage of such cars exceeding the speed limit by more than 10miles/hr has remained stable at around 2% during the period for which records have been published, 1997-2004.
- 9.20 Unfortunately, the speed survey does not explore the effect on casualty figures or the appropriateness of the limits in force at the locations where the measurements were taken. However, given that average casualty numbers in Great Britain have fallen by about 6.3% since the 1981-1985 period²¹, it is clear that speed is only one factor contributing to their number.
- 9.21 It is known that there is a correlation between speeds above average and accidents, however this is often regarded in isolation. Attention requires to be directed to the matter of the characteristics of the roads involved. The "fastest" roads in the country, motorways, are also those where the overall accident rate is lowest. Most accidents happen on urban roads, where accident rates are higher, but vehicle speeds are generally much lower.
- 9.22 Some researchers reckon that speed is the major factor in about 10% of accidents. Unfortunately, the matter has been confused by claims that speed is a major contributory factor in about one-third of all road accidents²². This has led to a widespread demand for simplistic solutions – such as reduced traffic speeds, which may not be appropriate in every situation. Undoubtedly the matter requires a great deal more research. The compulsory fitting of "black box" recorders to all road vehicles would help to increase knowledge and understanding. Although this is a matter for central government, it is something that local roads authorities should plan to support.

¹⁸ J Broughton et al. 1998. *A new system for recording contributory factors in road accidents. TRL Report 323*. Transport Research Laboratory, Crowthorne.

¹⁹ DETR June 1998. *Vehicle speeds in Great Britain 1997*.

²⁰ DfT, May 2005. *Vehicle speeds in Great Britain 2004*.

²¹ DfT, December 2005. *Road Casualties Great Britain: 2004*.

²² DETR, March 2000. *Tomorrow's roads – safer for everyone*.

- 9.23 Since the publication of the Road Safety Plan 2001, the government has completed its review of speed policy²³ but this appears to have had minimal impact to date except perhaps in the controversial arena of automatic enforcement (camera detection). The difficulty of managing speed, however, is made abundantly clear, and perhaps the review can only be regarded as a starting-point.
- 9.24 Amongst the more interesting results of the review to date are the guidelines on the use of vehicle activated signs²⁴. Another is the publication of the prior information notice of the proposal to set up a national speed limit database²⁵ and a third the continuing work on Intelligent Speed Adaptation (ISA).
- 9.25 ISA in some form or another is likely to become the norm in the future. This will ensure that speed limits will not be exceeded, but it does not mean that drivers will stop driving at inappropriate speeds for the prevailing conditions, or that accidents will cease. After all, most accidents happen at speeds below the posted limits. Automatic headway control, which prevents vehicles driving too close to the one ahead may be of benefit to accompany ISA.
- 9.26 Where speed will remain a problem is in situations where an accident involves a pedestrian or cyclist. Local authorities will therefore continue to create circumstances that reduce speeds in areas where the more vulnerable road users are at risk. While vehicle speeds remain solely under the driver's control, authorities should ensure that high differential speeds are not encouraged.
- 9.27 The main influence on the choice of speed made remains the driver's perception of the road environment and what feels "fast enough" at any particular time, under whatever pressures. Changes to the environment may be easier for a roads authority to achieve than changes to personal pressures on individual drivers, and much work has now been done on "natural" or "psychological" traffic calming.
- 9.28 In urban areas, "natural" traffic calming is particularly compatible with paragraph 124 of the review of speed policy, which states that:
"All speed management schemes should be designed to be sympathetic to their surroundings and, whenever possible, used to enhance an area aesthetically. This would be in keeping with the government's aim to make cities and towns desirable and attractive places to live."
- 9.29 Concerning rural areas, much research work has been done on how to influence drivers' speeds on inter-urban links, but little has been put into practice. This may be because some of the work relates to trialing innovative road markings, however as markings are prescribed²⁶, authorisation would be required for trial schemes of alternative markings.
- 9.30 It is important to note that large changes in mean speeds will not always be necessary, and will not usually be observed. It is often simply a reduction in the, usually small, proportion of vehicles travelling at very high speeds that makes the "safety" difference. Speeds and circumstances should be compatible, or rendered so, if a road is to become safer.

²³ DETR, March 2000. New Directions in Speed Management.

²⁴ DfT, March 2003. Traffic Advisory Leaflet 1/03. Vehicle activated signs.

²⁵ http://dft.g2b.info/cgi-gen/profile.pl?action=view_notice&other_user=610¬ice=33999&type=040&oid=626&ctype=1

²⁶ *The Traffic Signs Regulations and General Directions* SI 2002/3113

- 9.31 **Modal choice.** Falkirk Council aims to encourage drivers to choose more sustainable modes of transport, including walking, cycling and public transport, when these are appropriate. A 1998 survey²⁷ based on two-week travel diaries, found the following:

Distribution of all (n=12042) trips during
two-week survey period in 1998

Mode	%age of 12042 trips
Car (driver)	54.0
Car (passenger)	9.0
Pedestrian	24.0
Bus	7.0
Rail	1.2
Bicycle	1.1
Taxi	1.4
Motorcycle	0.4
Goods vehicle	0.5
Other	1.4

- 9.32 It appeared then that there was room for a considerable modal shift, and that modal shift will be accompanied by shifts in relative risk. That the more vulnerable road user groups are likely to suffer was recognised, but that the risk may be worth taking was suggested by the anticipated improvement in health. This issue is explored in some depth, relative to motorcycling, in Chapter 6.5 of the Local Transport Strategy document where some of the risks to which these vulnerable road users are exposed are illustrated. There is also an examination of the potential for an increase in the casualty numbers or rates which may result from any modal shift toward motorcycling. The issue of motorcycle casualties across the CSP area will be subject to further examination by CSRAIU.
- 9.33 In fact, the British Medical Association has suggested²⁸ that the beneficial effect of regular aerobic exercise on cardiovascular and mental health outweighs the risk of injury and death due to a road accident. However, it tempers this with advice to joggers and cyclists to wear reflective or light coloured clothing to enable drivers to more easily see, and hence avoid them.
- 9.34 The British Medical Association regards the potentially very serious problem of child pedestrian casualties as having been addressed by educational methods such as those associated with traffic clubs. Their conclusion seems to be that keeping children and traffic apart will improve safety. Routes to School projects offer the opportunity to achieve this provided they are implemented appropriately and reflect local conditions.

²⁷ System 3: 1998. *Falkirk Council Household Survey*.

²⁸ Health in Scotland 1994

9.35 That the problem of modal choice is a serious one is emphasised by the table below. Its content is based on a table which is produced yearly in the Rail Safety and Standards Board (RSSB)'s Annual Safety Performance Report. Although "passenger trip" might be a more relevant denominator than 10⁹ passenger kilometres, the order is probably correct. Certainly, the most vulnerable road user is the motorcyclist, a fact that is often forgotten, and one that will not be easy to change.

Passenger fatality rates per billion passenger km by transport mode					
	Year				Basis for 2003
Mode	2000	2001	2002	2003	
Motor cycle/moped	130	123	111	114	DfT (2003 data)
Foot	48	47	44	42	DfT (2003 data)
Pedal cycle	30	35	30	25	DfT (2003 data)
Car	2.8	2.9	2.8	2.7	DfT (2003 data)
Van	1.0	0.9	1.0	1.0	DfT (2003 data)
(Rail	0.49	0.48	0.47	0.45	DfT (without vehicle occupant adjustment (1999-2003 average))
Rail	0.32	0.33	0.31	0.295	DfT adjusted to be vehicle occupant basis (1999-2003 average)
Air	0.8	0.8	0.32	0.294	ETSC (trend analysis as at 2001/02 projected to 2003/04)
Water	0.40	0.28	0.27	0.27	DfT (1994-2003 average)
Bus or coach	0.29	0.28	0.30	0.26	DfT (1999-2003 average)
Source: DfT figures from Transport Statistics of Great Britain 2003; ETSC figures from EU Transport Safety Council Report, July 2003 projected (to 2003) using reported trends; RSSB for vehicle occupancy adjustment. Rail figures also adjusted to a calendar year basis					

9.36 Nonetheless, an increase in the use of powered two wheeled vehicles is to be expected in future as a counter to increasing congestion. Motorcycles have been a feature of the roads for over 100 years and, in that time they have served as a basic mode of transport, an economical alternative to the car, a workhorse and even a lifestyle icon²⁹

9.37 **Equity.** It could be argued that schemes should be developed to achieve a more equitable balance of risk between road users. Although this will sound reasonable to many, there is clear evidence that some road users either do not share this ideal or, more likely, have not considered it. The preservation of their own safety seems the sole preoccupation of some. This is expressed in many ways. For example, in the type of vehicle chosen and the fitting of bull-bars. Fortunately, many of these matters are being addressed by such bodies as the European New Car Assessment Programme (Euro NCAP), an organisation of which the Department of Transport is a member³⁰ and which carries out standardised laboratory impact tests on new vehicles to provide consumer information on the relative safety of different models.

9.38 Central government publishes statistics³¹ on the risk of injury to drivers of various cars. If everyone considered "equity" a priority, then purchasing might be restricted to the

²⁹ Institution of Highway Incorporated Engineers 2005. *Guidelines for Motorcycling*.

³⁰ <http://www.euroncap.com/index.php>

³¹ Cars: Make and Model: The Risk of Driver Injury in GB: 1996-2000. London: HMSO 2003.

small/medium group of cars, where the (uncorrected) estimate of risk of injury to drivers in two car accidents is close, at 60% to the 61% estimated for all of the cars examined. Clearly, and perhaps naturally, equity is not a priority. The evidence for this is the growing number of large four-wheel drive vehicles where the driver's risk of injury is closer to 40%. Not only does this render some drivers more equal than others, but also the effect on pedestrians appears to be to double their risk of death which is already vastly greater than that of any driver.

9.39 There seems, therefore, to be a widening "equity" gap between road users for which a technological "fix" will, almost certainly, be required. In the meantime, however, drivers need to be kept aware of the need to concentrate while engaged in the driving task. Amongst other things, they can be observed reading, eating, drinking, smoking and/or carrying on telephone conversations as they "drive". There is clearly a need for education in matters of risk assessment and distribution, particularly where the risks emanating from one's activities have a direct effect on other road users.

9.40 **Routes to School.** National health and transport policies encourage a return to walking and cycling. The aims are to improve individual fitness and lessen the impact of powered vehicular traffic on the environment. Exercise has to be built into the daily routine, and transport policy should be designed to ensure that more people walk or cycle to work. For primary schools, few children live at a greater distance from their school than could reasonably be cycled, if not walked, but the perception is that more are being taken to and from school by car as time goes on. Falkirk Council intends to reverse this perceived trend, starting by creating, where appropriate, Routes to School.

9.41 The aims of creating Routes to School are to:

- reduce motor traffic around schools at opening and closing times
- reduce the number and severity of child pedestrian casualties
- increase the number of children who walk or cycle to school
- obtain a permanent modal shift to walking and cycling
- gain general health benefits from increased exercise
- increase awareness amongst children and parents of the implications of travel choice on health, the environment and road safety.

9.42 Routes to School (RtS) projects involve identifying routes to school and the dangers posed by motorised traffic to children as they use them on their way to and from school. Because of the nature of many of the routes, there are few accident clusters to address, and the projects must therefore take the form of "audits". Education, enforcement and engineering measures are all considered. Where appropriate action follows the completion of a project, another small, but nonetheless essential, contribution to the casualty reduction effort will have been made.

9.43 They may also provide an opportunity for health promotion under the auspices of the health boards. The National Health Service Forth Valley (NHS-FV) board sees that within the context of SRtS, there is a need for a balanced educational input to children and their guardians regarding health, and safety.

- 9.44 **The blame culture.** In many respects, the road accident situation has improved since its low point in the mid-1960s. Part of the improvement might be attributed to the shift from allocating blame for an accident – to a more constructive one – of placing upon local roads authorities the obligation to actually study road accidents, then take action to reduce the numbers occurring.
- 9.45 It is very human to want to blame someone, or to find a scapegoat, and it may even be possible to make money from such a “discovery”. The tendency is to blame the driver, or occasionally the pedestrian who, allegedly deliberately, places himself or, less frequently, herself in a position of danger. However, the obsession with attributing blame has been described³² as a dangerous red herring, and so it remains. More recently, it has been similarly stated³³ that “we did not make any progress to reducing road trauma until we abandoned the concepts of ‘cause’ and ‘blame’”.
- 9.46 To more fully understand why accidents occur, hence take effective action to reduce their numbers, we must increase our level of understanding of the human behavioural aspects involved in being a driver or other road user.
- 9.47 The last decade has seen an important transformation within psychology with the emergence of a new field of scientific investigation termed Cognitive Neuroscience. Its aim is to understand how complex mental functions such as perception, memory, language and emotion are implemented within the brain.
- 9.48 A key factor in the development of this new discipline has been technological advances in methods for non-invasive brain imaging which allow scientists to study the relationship between brain activity and cognitive mechanisms in humans. What defines cognitive neuroscience therefore is an emphasis on understanding high-level mental functions such as cognition and emotion coupled with scientific techniques which allow us to study how these functions are brought about within the brain.³⁴
- 9.49 Given the influence of perception upon the manner in which drivers behave, it seems that this new field may have much to offer road safety practitioners in terms of understanding driver behaviour, in particular.
- 9.50 Falkirk Council’s approach, therefore, should be to accept that the roads authority’s responsibility is to provide a transport infrastructure to accommodate the human, rather than one which requires users to act unnaturally.

³² Leeming, J. 1969. *Road accidents: prevent or punish?* Cassell, London

³³ Ogden, K.W. 1996. *Safer roads: a guide to road safety engineering.* Ashgate Publishing, Aldershot.

³⁴ <http://www.psychology.nottingham.ac.uk/research/neuro/>

The vehicle

- 9.51 **General.** A vast amount of legislation now covers the construction and use of vehicles on the roads. This has, no doubt, played a major rôle in containing casualty rates, as has improved vehicle design. Much remains to be done, and it is to be hoped that Euro NCAP will begin to improve the chances of pedestrians and cyclists surviving a collision. Legislation alone has failed to protect some from the effects of bull-bars, for instance, which were often only fitted because they were 'fashionable'.
- 9.52 The public agencies that are parties to this plan can exert some influence upon vehicle design and legislation through their purchasing power and their readiness to respond to central government consultations.
- 9.53 Those agencies that maintain fleets of vehicles can make that influence felt through the choice of vehicles, specification and the manner in which they are used. Where no direct influence can be brought to bear, parties can lobby government to legislate appropriately.
- 9.54 Where an authority supplies vehicles for its employees' use, such vehicles should be chosen based on the degree to which their performance is equitable in terms of the risk to all those involved in an accident. Neither employees, nor those affected by the use of an authority's fleet of vehicles, should be exposed to a higher risk than normal. Hence, employees should not normally be supplied with powered two-wheeled vehicles, at one end of the scale, or with large four-wheel drive vehicles at the other, unless these are essential to the task required of the employee.
- 9.55 The NHS-FV board has the potential to assist with injury trend and treatment cost identification. An integrated approach to information gathering, through pursuing the matter of matching accident occurrence information gathered by the police, with casualty occurrence information gathered by the health service, may pay dividends.
- 9.56 **Vehicle maintenance.** Those parties with responsibilities identified in the plan may be able to influence this area by ensuring that all vehicles owned or operated by them under contract are properly maintained and equipped. This is possibly most important where school or public transport is involved. In that respect, the Vehicle Inspectorate, Central Scotland Police and Falkirk Council co-operate on the regular inspection of school buses and taxis.
- 9.57 Falkirk Council's Consumer Protection Unit monitors the activities of garages in its area, particularly in respect of the proper conduct of "MOT" tests.
- 9.58 Together, the aforementioned bodies might take small, but important steps, such as the re-positioning of licence holders to a position well out of the driver's field of view, towards reducing danger on the road.

What works?

- 9.59 The road system is fundamental, and it is ubiquitous. Most of us use it daily as drivers, riders, passengers and pedestrians and its presence is taken for granted. So also are its problems. Unlike most other spheres of activity, however, it seems to be assumed that no specialised knowledge is required to solve these problems. Nothing could be further from the truth, and yet the myth survives.
- 9.60 The containment of the casualty situation in Great Britain since 1967 testifies to the wisdom of central government's insistence on a much more scientific approach than that which had been in vogue previously. Well-meaning, but perhaps not well informed, campaigners have their place, but their main function should be to raise issues with the road authorities. Reaction to such issues should be based on sound scientific research. Where that is not available, then whenever possible it should be procured. The public agencies operating within the Falkirk Council area should therefore endeavour to ensure that all their efforts are based on evidence from such research.
- 9.61 In the medical health context, the example of the Cochrane Collaboration is worth following. The collaboration is named after Archie Cochrane, who suggested that, because resources would always be limited, they should be used to provide equitably those forms of health care which had been shown in properly designed evaluations to be effective. In other words, they should endeavour to ensure that interventions are based on knowledge of what really works, rather than on an opinion on what might work.
- 9.62 In particular, he stressed the importance of using evidence from randomised controlled trials, because these were likely to provide much more reliable information than other sources of evidence. In the roads context, however, it is rarely possible to carry out such trials. Other methods of research must be employed, and the need to take account of that research is a principle which should be applied relative to of roads related activity in the Falkirk Council area.
- 9.63 It should become second nature to all practitioners in the Falkirk Council area to consider not only the "positive" effects of any scheme, but also to make strenuous efforts to identify any negative ones, so minimising the risk of scheme failure. This is one area where an integrated approach may pay dividends.
- 9.64 Falkirk Council recognises that the road system has inherent dangers. It will, therefore, endeavour to ensure that no person, or agency, operates in or near the road in a manner that is not as safe as it is currently possible to make it.

The data

- 9.65 Good data are essential to any plan. Problems with the existing data are well documented³⁵ and proposals for improved data collection have been made³⁶. Road accident data are collected using a form referred to as Stats 19, which is reviewed roughly every five years, but the review method is not one that is guaranteed to lead to improvement. However, the review recommendations implemented in 2005, which included the introduction of “contributory factor” data, long eschewed by road safety engineers because of their subjectivity, may do little to improve data quality.
- 9.66 Through its association with the Scottish Executive’s Liaison Group on Road Accident Statistics, Falkirk Council will continue to press for the execution of the necessary reliability tests, to ensure that the arrangement of the data collection system (its taxonomy) is such that different data collectors allocate the same, correct codes to each field.
- 9.67 Falkirk Council and other agencies involved in all forms of data collection, should strive to encourage the same scientific approach to data collection as they apply to all aspects of the road safety work, whether in the education, enforcement or engineering fields.
- 9.68 **Injury classifications.** The injury classification system used in the completion of road accident reports is, of necessity, coarse. Only three degrees of severity are recorded, slight, serious and fatal. Many injuries sustained today are internal, and there is sometimes little to indicate their presence to the layman. It is important, therefore, that a refined injury scale is introduced such as those used by hospitals’ accident and emergency units. Injury type might also be classified. Agreement would be required on the scale to be used and whether and how it could be incorporated into the Stats19 data. Falkirk Council will continue to press for this improvement through its links with organisations such as the Scottish Accident Prevention Council and the Royal Society for the Prevention of Accidents.
- 9.69 **Database linkages.** A more refined system might also relieve the police of the need to record details of the road system, which has been already be recorded elsewhere. It would therefore be possible, having been given an accurate accident location, to extract data relating to many road features from an existing database maintained by the roads authority.
- 9.70 Building on information already available in this way may assist in the development of a wider range of approaches to those areas of concern relevant to each of the agencies involved. Co-operation between agencies will be essential to the success of the above measures, which will become steadily more important as road accident numbers fall.

³⁵ Hutchinson, T.P. Road Accident Statistics : Rumsby Scientific Publishing, S. Australia, 1987

³⁶ Anagnostopoulou, K. *The Contribution of Information Design to Road Safety by Improved Data Collection: a case study.* 9th International Conference “Road Safety in Europe” 1998.

10 Progress and plans

10.1 Progress and plans can be discussed under the following headings:

- education (including training and publicity)
- enforcement, and
- engineering.

10.2 Central government realises that progress also depends on the abilities of local authorities and others to influence local opinion. Hence, the fourth of the headings:

- encouragement

All of these four elements are discussed in the following sections.

10.3 Interactions between activities carried out under one heading may have effects which might be considered to fall under another. This is fortunate, as the human component (of the road traffic system) is the most difficult one to change. It may be easier to “engineer” than to “educate”.

10.4 Specific measures under the (road) engineering heading can usually be evaluated by counting accidents. Activities under the other headings are often directed at minds already bombarded with both complementary and competing inputs. Full evaluation of these activities is therefore more difficult, and is not attempted in this plan. Indeed, it would be impossible. However, Falkirk Council will continue to press for appropriate research in those more difficult areas, in order to be sure that resources are expended effectively.

Progress and plans: education

10.5 The main contributors under this heading are:

- Central government
- Central Scotland Police
- Falkirk Council's Education Service
- Forth Valley Health Board
- Central Scotland Fire and Rescue Service

10.6 **Central government's** contribution includes the development of the framework around which local government can build. Road safety education in schools is not mandatory, but the Scottish Executive's national curricular guidelines for 5-14year-olds identify places for the subject in environmental studies and personal and social development. The Executive largely funds Road Safety Scotland (RSS), previously known as the Scottish Road Safety Campaign (SRSC). RSS promotes The Children's Traffic Club, produces a variety of promotional and educational materials and runs an annual seminar on road safety matters.

10.7 Road safety education has to start early in life, and children depend heavily on the education received by their parents. The Department of Transport (recently known as the Department of the Environment, Transport and the Regions and now known as the Department for Transport - DfT) emphasised the importance of the parent's rôle in its 'Lesson for Life' leaflet, much of which remains relevant. It explains that basic road safety can really only be taught in the street. It reminded parents of their responsibilities, explained where and when accidents involving children were most likely to happen, and described in detail the parent's rôle in succeeding years up to a child's 15th birthday.

10.8 The Scottish Executive published its national road safety plan in July 1995, explaining its place in road safety planning and setting out its plans for the future. Further details of the Executive's intentions in respect of education can be found therein.

10.9 **The Central Scotland Police** contribution to the education effort is facilitated by the Chief Constable being designated as the Road Safety Officer for the Central Scotland Police area. A unit dedicated to accident prevention has been operating in the Road Policing Unit for many years. Within that unit two civilian Road Safety Officers provide support and resources to teaching staff, in the formal educational environment, and also to volunteers in community organisations, across CSP area. This work is supplemented, where appropriate, in both formal education settings and in voluntary groups, by uniformed police officers. Recently, responsibility for some of the educational functions has been allocated to the Community Safety department of the Police. Road safety staff have provided an educational service to a broad spectrum of the population both in terms of age, road user and ability groups. It has been active in playgroups, nurseries, primary and secondary schools, hospitals and clubs, as well as with the young, the elderly, pedal cyclists and young drivers. The unit provides local support for national campaigns, and maintains close links with RSS.

10.10 Cycle training has historically been provided by road safety staff training volunteer instructors, with them then carrying out the front line training of children. Within the past four years however the Education Service's Active Schools Officers have become involved in the front line training. Not all schools participate in cycle training. Out of the schools environment volunteers still carry out the training. All training and testing is carried out to Scottish Cycle Training Scheme standards and is supported by the Scottish Road Safety Campaign.

10.11 Central Scotland Police take great pride in their Young Driver Project, which has now been running for two years. The current format was first used in Alva Academy, in Clackmannanshire and there are proposals to introduce it into those secondary schools in the Falkirk area which have agreed to participate. The project examines the hazards faced by young people about to gain their provisional licence, the problems they may face in buying their first car. Legal aspects are examined as are, perhaps most importantly, peer pressures, attitudes and behaviours.

10.12 Experienced Traffic Officers attached to the Accident Prevention Unit present the courses in sessions, depending on the school's requirements, within the curriculum as part of the pupils' "Personal and Social Education" programme.

10.13 Plans in the education arena for the future include:

- providing more opportunities for cycle training, particularly where "Routes to School" have been introduced.
- extending the Young Driver Project to all schools which wish to participate
- aiming an education and publicity programme at motorcyclists
- continuing the education campaign aimed at older people.

10.14 The above plans address a wide range of groups in terms of age and vulnerability. However, the most vulnerable road-users are motorcyclists. They are heavily over-represented in the casualty total in relation to the number on the road.

10.15 The police commit resources locally to the education and training of motorcyclists, which includes carrying out rider assessments. They support the ethos of national initiatives such as "Bikesafe Scotland", which was launched in 2000, and is due shortly to be reviewed. They have also, in recent years, cooperated with surrounding police forces to provide staff to present road safety information to the large numbers of motorcyclists who pass through their area, particularly in the summer months. This work has also included patrolling identified high risk routes.

10.16 **Falkirk Council's** contribution to road safety education has been made through Education Services, which has endeavoured to adopt the 5-14year-old curricular guidance provided by The Scottish Executive. Local guidelines 'Learning for health-healthy learning' have also been established, which cover a slightly wider age range, and all schools adhere to these.

10.17 Ideally, children should be involved in an appropriate road safety education programme that is continuous throughout their development into adulthood. It should begin at the pre-school stage, where children have little comprehension of the dangers they face. It should continue through the primary school stage, while they begin to understand them. It should be completed, at the secondary school stage when they learn how to minimise the danger they pose to others, for example, as drivers.

10.18 As part of the curriculum, Education Services will:

- continue to provide curriculum guidance and support to schools
- encourage schools to participate in road safety and cycle training initiatives
- support the Young Driver Project of the Police
- support the 'Stay Alive' initiative of the Fire Service

10.19 **NHS Forth Valley's Valley's** health visitors facilitate its contribution to the education effort. They provide an effective conduit for the distribution of educational material. Its Health Promotion Department provides a vehicle in the form of occasional 'safety weeks' and related events.

10.20 Children of pre-school age have very little comprehension of the dangers that they are likely to encounter on the roads. Their safety therefore has to be a matter of protection and training, which only their guardians can provide. The Children's Traffic Club was set up on 6th November 1995 to assist guardians in this vital role, and the health board manages its functions, locally.

10.21 The Club's objective is to reduce child casualty rates, while also:

- influencing their long term behaviour
- increasing guardians' awareness of road safety issues, and, indirectly,
- benefiting other members of the family e.g. older children and guardians, themselves.

10.22 Once a child is registered, the guardians are sent workbooks on its third birthday and thereafter at six monthly intervals until the child reaches five years of age. The booklets are designed to help guardians teach their wards road safety. A high degree of adult/child interaction is involved. The Forth Valley Health Board area has one of the highest uptakes of the Club in Scotland but the board and council would like to see every child in its area registered. This remains, however, a guardian's responsibility.

10.23 The board's plans in the education arena for the future include:

- continuing to support the Children's Traffic Club
- assisting with training at schools where "Routes to School" have been introduced.

10.24 The great difficulty with the educational effort is in assessing its effects. Observation has, however, shown that practice in the field works better than practice within the confines of the school. Similarly, it is still not clear to what extent media campaigns are successful in changing attitudes or behaviour. However, they do draw public attention to road safety, which is essential if road users themselves are to play a part in improving it.

10.25 It is important, however, that attempts to educate are not hampered by misleading information. When considering education and publicity initiatives, as well as all other road safety related initiatives, Falkirk Council will endeavour to ensure that recipients are not misled.

10.26 **The Central Scotland Fire and Rescue Service** currently take the lead role in delivering a 'hands on' safety awareness raising programme called 'Crucial Crew', aimed at P7 aged children. It is has been running for 13 years and covers many aspects of safety which children encounter in the community, including:

- road safety
- safety on or near railways
- first aid
- stranger danger
- water safety

10.27 The Fire Service are also at an advance stage of consultation with other prospective partners regarding a proposal (subject to funding) to run a 'Stay Alive' road show. This road show will be targeted at the 17-24 year age group, which has been identified in this plan as a group most at risk from involvement in a vehicle-related accidents. The prospective partners include Central Scotland Police, Scottish Ambulance Service, NHS and the Education Authorities. The project involves creating an emotive stage show, which leaves no doubt in the minds of the audience of the effects of a serious road accident. The aim of the show is fundamentally to change attitudes and beliefs relating to irresponsible vehicle usage.

Progress and plans: enforcement

10.28 The main contributor under this heading is:

- Central Scotland Police (CSP)

10.29 The force maintains the credibility of the Road Traffic Acts in relation to driving offences. It enforces the various Regulations such as those relating to vehicle use, as well as all the Traffic Orders relating to speed and parking.

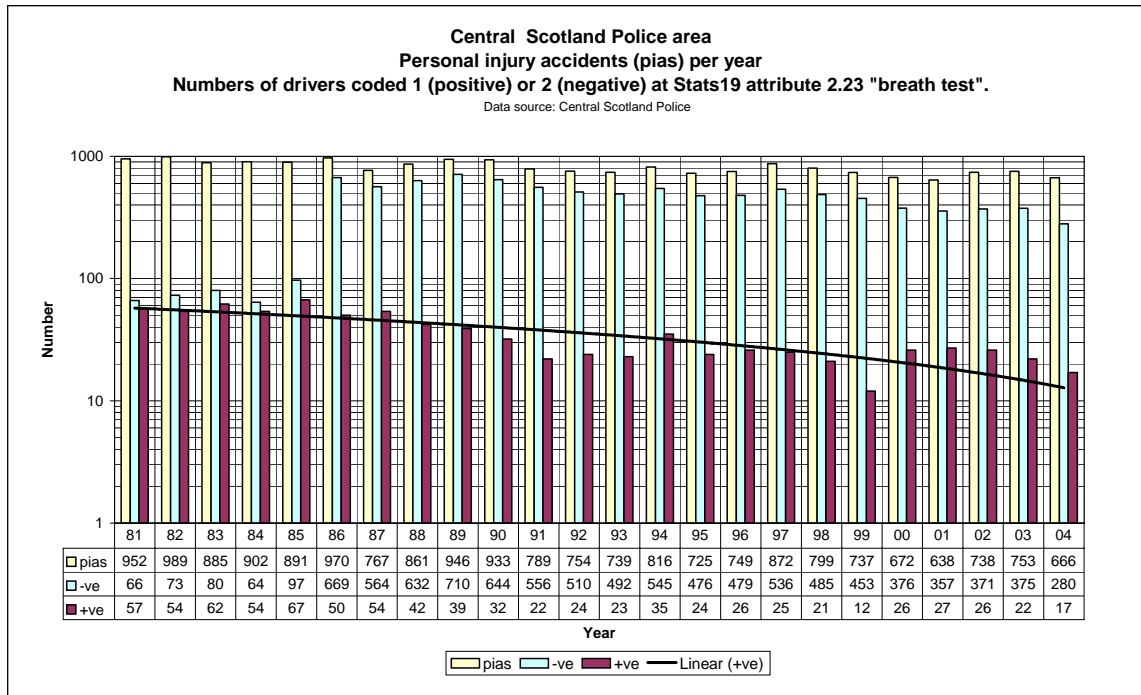
10.30 Around 95% of road traffic accidents involve human error. Consequently, changes in driver attitude and behaviour are essential elements in achieving casualty reduction targets. The enforcement of Regulations made under the Traffic Acts is therefore of paramount importance in many road safety schemes.

10.31 CSP sees inappropriate speed as a major contributory factor in road accidents. The Chief Constable has therefore devoted resources to increasing the level of speed limit enforcement at identified accident locations. In order to utilise these resources most effectively, accident data are supplemented by data collected by means of portable traffic speed and volume monitoring equipment. They are then used to identify days and times when enforcement is required. When resources are available, the force also responds to complaints about speeding made directly to it by members of the public.

10.32 Since 1995 the police have used mobile speed camera equipment to assist with speed limit enforcement. It is regarded as one of a number of tools used for such enforcement.

10.33 A camera enforcement cost recovery partnership was launched in CSP area on 3 April 2006, to assist the police, and all the roads authorities in their area, to reduce speeds, accidents and casualties. The major change which this initiative will bring will be to provide funds, from fixed penalty fines imposed on drivers caught speeding, for specific, targeted publicity and educational programmes aimed at speeding drivers. One of the aims of the national programme, under which this partnership has been approved, is that, through time, speeding will become less acceptable to society, leading to fewer and less severe accidents and casualties. The actual costs of carrying out enforcement (using mobile cameras) will also be funded from fixed penalty fines. Falkirk Council will be monitoring closely the effect of its involvement as a partner in this new initiative.

10.34 Drinking and driving is also a major source of concern to all with a responsibility for, or interest in road safety. However, the diagram below shows changes associated with a change in policy by Central Scotland Police, and perhaps with a change in attitude of



drivers, generally.

10.35 The change in policy occurred in 1986. It resulted in a dramatic increase in the number of drivers breath-tested, when the police began to breath test all drivers involved in a personal injury accident. Naturally, the number of negative results increased, but the success of the change in policy is demonstrated by the fact that five-year average number of drivers who returned a positive breath test result has dropped from 59 to 24, i.e. by 59%.

10.36 Attitudes have undoubtedly changed in respect of drinking and driving. It is now seen by most as socially unacceptable, but there are still those who take the risk. In future the force will breath-test every driver who:

- is involved in a road accident
- has committed a moving traffic offence, or
- is suspected of having consumed alcohol.

10.37 Central Scotland Police have no doubt that the main contributory factor in road accidents is driver behaviour. Poor driving behaviour includes:

- speeding
- driving dangerously
- driving too close to the vehicle in front
- emerging from junctions without due care
- lack of parking discipline.

10.38 Many drivers who park their vehicles:

- too close to junctions
- on yellow lines
- on zigzag lines outside schools, or
- on the footway

do not appear to understand that it puts other users at risk. Parking on the footway creates a hazard, particularly for elderly pedestrians and also damages its surface.

10.39 A small proportion of accidents involves vehicle defects. These are rarely excusable.

10.40 Future enforcement activity will concentrate on the following:

- speeding
- drinking and driving
- dangerous or inconsiderate driving
- failure to wear seat belts.

10.41 Central Scotland Police regard all of the above as major contributory factors to accident occurrence or casualty severity. By concentrating their enforcement of Road Traffic law in these areas, the police hope to continue to make a significant impact on the number and severity of casualties in their area.

Progress and plans: engineering

10.42 The main local contributor under the engineering heading is:

- Falkirk Council

10.43 **Falkirk Council** has the statutory duty of preparing and carrying out a programme of measures to promote road safety. The Council must carry out studies of road accidents in its area, and take steps to prevent them. When new roads are constructed, the Council must take measures to reduce the possibility of accidents occurring upon them. This duty is discharged by the introduction of safety audit into the scheme design process.

10.44 Central Scotland Roads Accident Investigation Unit (CSRAIU) carries out accident studies and safety audits. This is a small team of engineers set up in the wake of the 1996 re-organisation of local government in Scotland to continue the work of the Central Regional Council team. At that time it was realised that the Council areas created were too small to allow for the statistical and experiential needs of a viable unit. It also means that police, health board and accident unit boundaries are coterminous, one-to-one relationships can be maintained, and that there remains in existence a specialised unit that can contribute meaningfully to matters being dealt with at national levels.

10.45 Accidents are relatively rare events, which may occur at random. A vast amount of data has been collected concerning them. Suitable computer hardware and software systems were required before effective work on them could be done. Central Regional Council's engineers developed in house systems in the 1980s, and these have been invaluable in assisting with the identification and prioritisation of road accident blacksites. Currently analyses are assisted by proprietary software, including a recently acquired package supplied by the Transport Research Laboratory to help model anticipated accident occurrence.

10.46 Blacksites treated in the Falkirk area since 1981- the start of detailed accident investigation in CSP area- are listed in the table at Appendix 2. Their accident records are also shown. The three-year before and after periods normally used to judge the effects of site treatments are shown shaded, as is a period when most of the sites were monitored. The periods can be deduced from the table.

10.47 The total numbers of accidents at sites for which full three-year before and after periods are available can be summarised thus:

Summary of 31 treated and monitored blacksites			
Accident Severity	Three year period		
	before	after	monitor
fatal	11	0	2
serious	67	32	15
slight	147	61	61
Total	225	93	78
Monitoring period - 01/01/02 to 31/12/04			

10.48 The total "after" is 41%, the total "monitor" 35% of the "before" total. Assessment of the safety performance of the treated sites is not, however, a simple task. The work is not done in a laboratory, where it is possible to vary one factor, while keeping the others constant. The effects of factors such as weather, vehicle fleet, driver behaviour, costs of repairs, inclination to report or record accidents, etc. are therefore also reflected in the changes noted. These effects may be positive or negative, but they should not be forgotten.

10.49 The fact that sites were chosen for study based on their accident rates having been higher than the norm for the road type involved during a particular three-year period does attract a criticism. This is that the elevated rate may be attributable to such unusual and temporary circumstances that it would settle back to something approaching normal without any treatment. The effect is termed "regression to the mean". However, most sites ultimately selected for study by the accident investigation unit (CSRAIU) have been under observation for many years, and judgements can be made as to whether or not a long-term problem is there to address.

10.50 In addition to the accident remedial sites subject of Appendix 3, Falkirk Council has recently completed work on accident remedial schemes at:

- A9 Edinburgh-Perth. The Hollings bend near Torwood
- A8004 Bonnybridge-Dunipace Bridge The railway bridge bend.

10.51 Traffic calming schemes, carried out for reasons other than accident reduction have been completed at:

- Falkirk Road, Bonnybridge
- Larbert Road, Bonnybridge
- Carronshore Road, Carron
- Carmuir Avenue, Camelon
- Vale View, Stenhousemuir

10.52 Falkirk Council took part in the Scottish national observational study involving the installation of signs and road markings advising drivers that they should limit their speed to 20miles/hr in certain areas. No other adjustments to the driving environment were made.

10.53 As part of the Scottish study, three advisory 20miles/hr areas were set up in the Falkirk Council area, one in each of the towns:

- Dunipace
- Falkirk
- Grangemouth.

10.54 Road safety engineers are well aware that rather more than this is required to achieve permanent and predictable effects on speed³⁷. Physical adjustments must be made to the road environment or external vehicle control systems must be introduced. The Scottish study³⁸ provided confirmation of that, and participants were advised that the signs and road markings might only be retained at around one-third of the trial sites. Most of these experienced average speeds below 20miles/hr in the first place. None were in the Falkirk Council area, and all three Falkirk advisory limits were removed. In future, Falkirk Council will take advice on experimental design and will only participate where this can be shown to be sound. All Falkirk Council schools are currently having mandatory 20mph limits introduced around them as a result of a central government initiative.

³⁷ Mackie, A. 1998. *Urban speed management methods*. TRL Report 363. Crowthorne.

³⁸ Burns, A., N. Johnstone and N Macdonald. 2001. *20mph speed reduction initiative*. SE CRU Edinburgh.

10.55 Future engineering activity by Falkirk Council will include:

- providing accident remedial measures at appropriate locations
- continuing to implement a traffic calming strategy
- continuing safety auditing
- continuing development control work
- identifying the road hierarchy
- developing urban safety management schemes
- providing further "Routes to Schools"
- maintaining a school crossing patrol service.

10.56 Up until 2000 there had been a child car seat loan scheme run by NHS Forth Valley which included Falkirk Council area. At that time it was discontinued, and the remaining seats were distributed amongst the three local authorities comprising the trust's area. Whilst a loan scheme was considered to have been appropriate up to that time, circumstances, including the legislative position, have changed, and there are now considered to be sound reasons why it is inappropriate for public bodies to administer such schemes. There are therefore no current plans for Falkirk Council to become involved in a further loan scheme.

Progress and plans: encouragement

10.57 As was stated in the 2001 plan every organisation in the Falkirk Council area can contribute under this heading and further ideas are welcome.

10.58 Contributions might include:

- actively discouraging drinking alcohol at functions where alternative arrangements to subsequently driving, have not been made available
- providing accident avoidance training
- identifying road accident costs to all operations
- ensuring that vehicles operated are fully equipped with appropriate safety equipment, and are coloured appropriately
- ensuring that employees have a good working knowledge of the Highway Code, and apply it
- ensuring that employers provide road safety training for employees for whom travel is a major element of their work
- ensuring that employers provide road safety training for employees for whom roadside working is an element their work
- ensuring that working practices minimise the need for travel, hence reducing the exposure to risk of accident
- producing "Green Transport Plans" aimed at encouraging car-share schemes, public transport season ticket loans, etc for employees.

10.59 Every opportunity should be taken to spread road safety related messages. Health Clinics, Health Visitors, Pre-natal classes, One Stop Shops, service stations, libraries, etc. all have a part to play.

10.60 **The health board** co-operates in many ways with the other agencies involved in all forms of road safety initiatives. Much effort is put into the planning for coping with road accidents and their consequences. The board currently supports an officer on secondment from Central Scotland Police who has a remit for community safety, which demonstrates both an ingenuity of approach, and also active partnership working.

11 Actions by various agencies

Responsibilities and time scales

11.1 The tables below set out current and future actions by agency involved and time. Many of the activities are 'continuing' ones, i.e. the routine work of the officers involved. Some involve alterations to current practice, and some are rather more in the nature of events, such as a short campaign, or a small construction project.

11.2 A number of abbreviations are used, namely:

Abbreviation	Agency
CSP	: Central Scotland Police
CSRAIU	: Central Scotland Roads Accident Investigation Unit
FC-ES	: Falkirk Council - Education Services
FC-DS	: Falkirk Council – Development Services
NHS-FV	: National Health Service - Forth Valley (Health Board)
RSS	: Road Safety Scotland

Education

ref.	action	by	when
1	Children's Traffic Club implementation administration, and monitoring	CSP NHS-FV RSS	Continuing
2	Child car seat loan scheme	NHS-FV	Continuing
3	Consolidate road safety education within curriculum	FC-ES	Continuing
4	Provide pedal cycle training as requested	CSP/ES	During school terms, continuing
5	Young Driver Programme	CSP	Continuing
6	Develop training for adults	CSP RSS	Continuing

Enforcement

ref.	action	by	when
1	Drinking and driving campaign	CSP	Continuing
2	Footway parking campaign	CSP	Periodically
3	Speed enforcement	CSP	Continuing
4	Seat belt enforcement	CSP	Continuing
5	Drivers' hours law enforcement	CSP	Continuing
6	Vehicle Construction and Use enforcement	CSP	Continuing

Engineering

ref.	action	by	when
1	Initiate "routes to school" schemes	FC-ES FC-DS	Continuing
2	Initiate road safety audit practice	FC-DS	Done
3	Identify blackspots, study accidents, recommend remedial measures, carry out safety audits	CSRAIU	Continuing
5	Initiate urban safety management scheme planning	CSRAIU FC-DS	Commence where possible
6	Control advertising	FC-DS	Continuing but intensifying

Encouragement

ref.	action	by	when
1	Zero Alcohol at Work Policy	FC	Done
2	Identify road accidents costs to organisation	All	As soon as possible
3	Ensure vehicles used are appropriately equipped	All	As soon as possible

Appendix 1

Major Road Safety Milestones and Legislation

1964-1965: Road Traffic Act 1964 - Wider powers for speed limits. Trial 70miles/hr speed limit on motorway and other previously de-restricted roads. Selected roads subjected to a 50miles/hr speed limit during summer.

1967: Seat belts compulsory on new cars. Permanent 70miles/hr speed limit on all, other than "restricted roads", i.e. those subject to a 60miles/hr limit. An offence to drink and attempt to drive with over 80 mg of alcohol per 100 ml of blood.

1968-1969: Transport Act 1968 allowed regulations on length of drivers' working hours. Three year old vehicles need test certificate.

1967: The number of road accident casualties in Great Britain reached a peak in the mid-'60s. Central government responded in 1967 with a white paper³⁹, a main aim of which was to encourage a more scientific approach than had previously been the case. "Road safety" has been a cause for concern since the first automobile appeared, but much of the effort expended on producing remedies had not been well informed. Nearly everyone can contribute to road accident reduction, but contributions will only be effective if they are based on sound scientific findings.⁴⁰

1970: New regulations on lorry and PSV drivers' hours of work.

1973-1974: Safety helmets compulsory for 2-wheeled motor vehicle users. National speed limit of 50miles/hr, later motorway 70miles/hr, dual carriageway 60miles/hr. Vehicle lighting regulations.

1974: Local road authorities are responsible for around 95% of the road length in Great Britain. The Road Traffic Act 1974 therefore placed upon them the statutory duties of studying road accidents and designing measures to promote road safety. The Department of Transport's Road Safety Division provided support in the form of its Accident Investigation and Prevention Manual. This encouraged the more scientific approach required, and the Royal Society for the Prevention of Accidents (RoSPA) has organised courses based upon it ever since.

1975: Temporary 50 and 60miles/hr limits extended.

1976: extension of licensing hours until 11pm under the Licensing Scotland Act 1976 effective from 13 December 1976.

1977: 50 and 60miles/hr limits raised to 60 and 70miles/hr.

1977: extension of Sunday opening under Licensing Scotland Act 1976 effective from October

1978: 60 and 70miles/hr limits permanent. New rules on maximum hours which may be worked by goods vehicle drivers.

1982: New 2-part motorcycle test from 29 March. Application of 2 year limit on provisional motorcycle licence took effect from 1 October.

1983: Transport Act 1981 introduced evidential breath testing and made seat belt wearing law for drivers and front seat passengers of most cars and light vans. Learner motor cyclists now only allowed to ride machines of up to 125 cc.

1984: Regulations introduced requiring spray reducing devices to be fitted to lorries and trailers.

1985: In December, Scottish Police Authorities introduced a policy of breath testing all drivers in an accident wherever possible.

1986: All new cars manufactured from 1 October to be fitted with rear seat belts. Seat belt legislation made permanent. European Road Safety Year.

1987: Legal requirement introduced requiring all newly registered cars to be fitted with rear seat belts or child restraints from 1 April. Government sets a target to achieve a one-third reduction in road accident casualties by the year 2000, from the 1981-1985 average.

³⁹ Ministry of Transport, 1967. Road safety - a fresh approach

⁴⁰ O'Neill B, 1993. Progress in Transport Safety: The U.S. Experience

1987: Central government carried out an inter-departmental review of road safety policy. It was concluded that one-third reduction in casualty numbers could be achieved 200041, from the five-year average for 1981-1985. This was adopted as a national target. It was realised that its achievement would depend not only upon the support of the local road authorities, but also upon all those others who have a rôle to play either directly through their various other services, or indirectly, through their ability to influence local opinion.

1988: The Road Traffic Act 1988 re-iterated the duties of the local road authorities. All coaches first used from 1 April 1974 using a motorway must have 70miles/hr limiters fitted by 1 April 1991.

1989: Penalty points increased for careless driving, driving without insurance and failing to stop after or to report an accident. Seat belt wearing by rear child passengers became law in cars fitted with appropriate restraints. Accompanied motorcycle testing became mandatory.

1989: The Local Authorities Associations (LAA), which includes the Convention of Scottish Local Authorities (CoSLA), prepared a Road Safety Code of Good Practice in response to the 1987 review's conclusions. The objective was to underline the importance which the Associations attach to casualty reduction and their determination to support central government's objective.

1990: Compulsory basic training for motorcyclists introduced and learner drivers banned from carrying pillion passengers. High Risk Offenders Scheme for problem drink-drivers extended. New regulations requiring those accompanying learner drivers to be at least 21 years old and to have held a licence for 3 years. Scottish Road Safety Year.

1991: Seat belt wearing by rear adult passengers became law in cars where belts are fitted and available. New road hump regulations introduced to reduce traffic speed.

1992: after the Road Traffic Act 1991, new road traffic offences and penalties came into force, including retesting of dangerous drivers. The Traffic Calming Act 1992 came into force enabling roads authorities to introduce a wide range of traffic calming measures. Requirement for minimum tread depth of 1.6 mm introduced for cars and light vans. All new goods vehicles over 7.5 tonnes fitted with 60miles/hr speed limiters.

1993: First speed enforcement cameras introduced in Scotland. The MOT test extended, including new checks on mirrors, windscreen condition, fuel tanks, seat and door security and number plates.

1994: First 20miles/hr zones introduced in Scotland. Traffic Calming (Scotland) Regulations came into force.

1995: Pass Plus scheme introduced for new drivers. This encourages new drivers to take more lessons by offering discount on motor insurance. Its effects remain in doubt.

1996: Driving theory test introduced from 1 July for car and motorcycle learners. Road Traffic (New Drivers) Act 1996 - requires newly qualified drivers to retake the driving test if they acquire 6 or more penalty points within 2 years of passing their test - effective from 1 June

1997: Requirement for coaches and minibuses to be fitted with seat belts when carrying children on organised trips, including journeys between home and school - effective from February, 1997. End of concession, where seat belts are fitted, whereby three children could share a double seat.

1996: The LAA published a second edition of their code. This took account of various changes in the arena since the first edition, and re-affirmed the local authorities' position. The Code recommends a strategic approach involving action by local authorities in a number of areas. The first of these is in road safety planning. Diverse individuals and organisations are contributing to a reduction in casualty numbers, but each is not necessarily fully aware of what the others are doing

1996: Reorganisation of Local Government in Scotland increased the number of roads authorities in Scotland from 9 to 32, which resulted in most of the specialist knowledge within the various Regional Accident Investigation Units being split up amongst the 32 new authorities. As a result most authorities now have fewer staff with specialist accident investigation experience. In the Clackmannanshire, Falkirk and Stirling Councils areas the alternative of forming a joint unit was adopted..

1997: New Zebra, Pelican and Puffin crossing regulations introduced, with Puffin crossings prescribed for the first time.

1998: New Road Humps regulations came into force giving local authorities wider powers to establish road humps.

⁴¹ Department of Transport, 1987. Road safety - The Next Steps

1999: Amendment to the Road Traffic Regulation Act 1984 gave local authorities power to introduce traffic calmed 20miles/hr zones and 20miles/hr speed limits, with or without traffic calming measures, at suitable locations. Revised Highway Code published.

2000: The Government announced a new road safety strategy and casualty reduction targets for the period to 2010 in "Tomorrow's Roads - Safer for Everyone". A review of speed policy was conducted and reported in 'New Directions in Speed Management'.

2001: Amendment to the Road Traffic Regulation Act 1984. This made it clear that school crossing patrols can stop traffic for children of all ages and adults and gave local authorities greater flexibility in the times that school crossing patrols can operate. Scottish Executive awarded nearly £15million to local authorities for cycling, walking and safer streets projects, including routes to school schemes.

2002: New Home Zones (Scotland) Regulations came into force. These set out the procedures local authorities must follow when designating home zones.

2003: Revised guidance on school transport issued to local authorities. Scottish School Travel Advisory Group report published. Scottish Executive provided the funding to implement the report's key recommendation to create school travel co-ordinator posts within each Scottish local authority.

Comment

The above list is not exhaustive. It serves to demonstrate the range of actions involved in the evolution of certain aspects of the roads system. It is important to realise, however, that standards evolve also, and it is important to acknowledge the contribution made by the authors of, for example, the Design manual for Roads and Bridges. In the enforcement arena, account should also be taken of the Road Death Investigation Manual, which sets out procedures for investigating the circumstances of, and attributing responsibility to the various parties involved in any road accident which has involved a death, or which the police consider is likely to do so.

It is important to note, also, that not all of the above measures have been thoroughly researched before their introduction, and that not all of their effects will be positive, in terms of accident reduction.

Finally, the work of the Scottish Executive's Transport Statistics Branch is here acknowledged. Many of the above items have been gleaned from Road Accidents Scotland 2003, and are set out here in the hope that they may reach a wider audience. Late in the process of preparing statistical information for this review Road Accidents Scotland 2004 was published.

Appendix 2: Blacksites treated since 1980

Blacksites are those areas where analysis has shown that the accident rate over a length of road, or junction, is higher than the norm for similar lengths of road or junctions. Over the past 25 years or so a dedicated accident investigation unit within successive local authorities' departments with responsibility for roads has, amongst other things, been identifying such sites, recommending treatments, and monitoring the results.

Many such sites were identified based on their performance over a three-year "before" period. After treatment, initial monitoring was carried out over a three-year "after" period. Nearly all sites were monitored again, to the end of 2004.

In the table which follows, the data relevant to these periods are shaded.

Looking at the first blacksite, ref. A904/1695/01, the first shaded area represents a 2-year "before" period, in which there were 0 fatal, 1 serious and 1 slight accident in each of the years '81 and '82. The total number of accidents, 4, is indicated in the fourth of the rows relevant to the blacksite. Moving across the table, the second shaded area represents a 3-year "after" period, with the accident situation indicated similarly. At the far right of the table, the latest monitoring period can be seen to be '02-'04, during which one slight accident occurred.

The overall effect of the treatments applied to the blacksites listed below is tabulated in the section entitled **Progress and plans: engineering**. Where three-year "after" periods are incomplete, the site involved has been omitted from mention at that point. Some of the blacksites treated to date are listed overleaf.

Appendix 2 (continued)

Numbers of accidents at blacksites by severity and year with totals for monitoring																									
Blacksite	Severity of accident	Year																							
		81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
A904/1695/01	Fatal																								
Kerse Lane	Serious	1	1	1	1	1		1																	
Falkirk	Slight	1	1	1			1				3		1		2	1								1	
	Total	4					3																	1	
B9132/1060/01	Fatal										1														
Newlands Road	Serious	1	1	1			1		1		1	1	1	1							1				
Grangemouth	Slight	1	5		1	1		1	1	1		1	2	2	1	2					1		1	1	1
	Total	8					3																3		
A706/1015/01	Fatal			1	1				1																
Linlithgow-Bo'ness Road	Serious	1	1	3				1												1			1		
S. of Bo'ness	Slight	2		2					1	1			1		1	2	1	1				1	1	1	
	Total		10					3															3		
A803/1350/04	Fatal																								
Newmarket Street	Serious	1	3	2	1	1		1	1		1														
Falkirk	Slight	2	3	2		3	4	2	3	1	2	1	2	3	2	1	2	1							
	Total		13				11				5														
A905/1130/01	Fatal																								
Beancross Road	Serious	1			2	1		1			1	1		1	1										
Grangemouth	Slight	3	2		1		2				1		1	1		1		1		1			1		
	Total		6				4																1		

Extensive changes to town centre road layouts - monitoring discontinued

Numbers of accidents at blacksites by severity and year with totals for monitoring																									
Blacksite	Severity of accident	Year																							
		81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
A904/1385/05	Fatal																								
The Mains	Serious		5	1	1			1		2	1														
	Slight			2		2	1		1	2			1	1	1		1		2		2	2	3		2
	Total			9				3															5		
A904/1505/04	Fatal																								
At Oxgang Road	Serious	1	1			1												1			1				
Grangemouth	Slight		3		2			1					1										2		2
	Total			6				1															4		
B9132/1032/02	Fatal													1											
Newlands Road	Serious			1	1	2		3	2	1		1	1	1	1								1		
Grangemouth	Slight		3	1	3	4		1		1	2							1	1		2		1		2
	Total			9				6															4		
B8028/1130/02	Fatal																								
Falkirk-Avonbridge Road	Serious	1			1		2	2		1							1	1				1	1		
Easter Pirleyhill	Slight			1	1	2	2	1			1	1	2	1	1			3	2		4	1		1	3
	Total			5						2													5		
C50/1090/01	Fatal																								
Carmuir Ave	Serious	2			1	1	2																		1
Camelon	Slight		1	2	3	3	1	3		1	2		1	1		1			1				1		1
	Total				10					4														3	
M876/1251/01	Fatal																						1		
Dennyloanhead-Kincardine	Serious							2				1		1			1		1		1			1	
Kinnaird House Interchange	Slight											1	1			1	1	3	1	1				2	
	Total					0					0													4	

Numbers of accidents at blacksites by severity and year with totals for monitoring																									
Blacksite	Severity of accident	Year																							
		81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
B9132/1060/03	Fatal																								
Abbots Road	Serious			1			2		1	1			1								1				
G'mouth	Slight	1	2			1			3	1		1	2	1									1	1	1
	Total					3					3												3		
M80/1058/01	Fatal				1	1			1																
Bend at M876 Overbridge	Serious			1	1	1			1			1	2	1		1	1								
Bankhead	Slight			1					1	3		1				1	1		1					2	
	Total					3					2												2		
A9/1050/04	Fatal																								
Edinburgh-Perth Road	Serious						1				1	2				1			1						
Lochlands Loan, Larbert	Slight			2	1	2			1	1		2	1	1	1		2		2	1	2				
	Total					3					6												0		
A803/1175/09	Fatal										1														
Salmon Inn Road	Serious					2	2	1			1	1				1									
Polmont	Slight		1	1		1	2				2		1		2	1	1	1	1			1	3	1	1
	Total					8						2											5		
A905/1540/05	Fatal																								
Main Street	Serious			1			1		1	1															
Airth	Slight		1		1	1	1		1										1			1			
	Total					3					0												0		
B902/1370/03	Fatal																								
Grahams Road	Serious	1			1		1					1	2	1	1						1				
Falkirk	Slight			1	3	1		1	1	1		1		2		1			2	2	1		1		1
	Total				3		3				3												1		

Numbers of accidents at blacksites by severity and year with totals for monitoring																									
Blacksite	Severity of accident	Year																							
		81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
B8028/1150/01	Fatal																								
Main Street	Serious		1	2				1																	
Shieldhill	Slight			1		1		1									1	1							
	Total					3				0													0		
A803/1415/08	Fatal									1															
Camelon Road	Serious			1				1				1							1						
Falkirk	Slight	3		1	1	1			2					1			1		1		1				
	Total							3				1											0		
A803/1520/07	Fatal				1					1															
Glasgow Road	Serious	3	1	1				1	1		1									1					
Camelon	Slight		1		1	2	1		2	1	3		1		1			1		2			2		
	Total							5				2											2		
A905/1220/04	Fatal								1	1															
Glensburgh Road	Serious	1	2	1	1			1		2	1	1	1			1	1		1					1	
Grangemouth	Slight		1		1	2	1		4	1					2	3		2	3		2	2	1	1	1
	Total								10						6								4		
A993/1160/02	Fatal																								
Dean Road	Serious			1	2	1	1		1			1		1		1			1	1	1			1	
Bo'ness	Slight	2	1			1	1	4		5	2	1	3	3	1	1	1		1	1	2			1	
	Total							10								3							2		
130950/1010/01	Fatal							1																	
David's Loan	Serious		1	1						1	1	1		1									1		
Falkirk	Slight		2			2		3	2	1	2							1							
	Total							8						1									1		

Numbers of accidents at blacksites by severity and year with totals for monitoring																									
Blacksite	Severity of accident	Year																							
		81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
A803/1495/05	Fatal										1														
Main Street	Serious	1	1	1	1		1	1	1	1	2	2		1	2	1						1			
Camelon	Slight		1	3	1	2	2	1	4	1	2		2	1		2	1			1	1		1		
	Total									11								1					2		
B805/1320/01	Fatal									1															
Redding Road	Serious		4	1					1			2	1					1				2			
Brightons	Slight							1	2	5		3		2		1	2								
	Total									9				3									2		
A803/1700/10	Fatal									1									1						
Main Street	Serious	4	1				1	1			3		3										1	1	
Bonnybridge	Slight	1	3	1		1	3			5	1	2	2	4	1	2	3	2	1	2			2	2	1
	Total										12							6					7		
A803/1990/11	Fatal											2													
Edinburgh-Glasgow Road	Serious		1																		1				
Auchincloch, Banknock	Slight				1		2						1		1							1			
	Total										2			1									1		
B905/1040/03	Fatal																								
Larbert-Denny Road	Serious					1	2				1	2													
W. of Larbert	Slight			1					2	2	1	3	2						1	1					
	Total										9					0								0	
B8080/1002/01	Fatal																								
Corporation Street	Serious		1	1						1		1		1	1		1	1			1			1	
Falkirk	Slight		2		1	2		1	1	3	5	2	2	2	4	1		1	2	1	1	3	3	1	1
	Total										12						4							6	

Numbers of accidents at blacksites by severity and year with totals for monitoring																									
Blacksite	Severity of accident	Year																							
		81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04
141740/1070/01	Fatal																								
Kersiebank Ave	Serious		2													1	1							1	
G'mouth	Slight		2		2	2			1	2	3	4	2	1	1		1	1		2				1	3
	Total										9					4								5	
A883/1280/03	Fatal													1											
Falkirk-Denny Road	Serious	2	1	1	1		1			1	1	1	1		1					1					
Lochlands Loan	Slight				1	3		2	3	1	4	1	1	2		3	0	1	1		1	1			
	Total											10					2							0	
A706/1010/01	Fatal													1											1
Linlithgow Road	Serious	1	1		1		1				1		1	1	1							1			
Bo'ness	Slight			1		2	2	1	1	1	2		4	3	2	2	2		2	2	1	2		1	
	Total												9				5							2	
A872/03	Fatal																								
Stirling-Dennyloanhead Road	Serious	1																							
Wellsfield	Slight		1			1										2	1	4	1						
	Total																7							0	
A9/09	Fatal																								
Edinburgh-Perth Road	Serious			1																					
Merchiston-Rosebank, Falkirk	Slight					1	2		1			3			2			4	4	3	2	2	2	1	1
	Total																	8						5	
A9/10	Fatal																								
Edinburgh-Perth Road	Serious		1														1				1	1		1	
Lauriston Bypass	Slight													1	1	3	1	3	2	2			1	2	
	Total																8						5		

Numbers of accidents at blacksites by severity and year with totals for monitoring																								
Blacksite	Severity of accident	Year																						
		81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
A9/11	Fatal																							
Stirling Road	Serious						1				1	2				1				1				
Lochlands Road, Larbert	Slight			2	1	2			1	1		2	1	1	1		2		2	1	2			
	Total																5					0		
A803/12	Fatal																							
Edinburgh-Glasgow Road	Serious			1					1											1	1	1		
Princes Street, Falkirk	Slight			1							1	2		1	2				3	1			1	1
	Total																		5				3	
A9/12	Fatal													1					1					
Edinburgh-Perth Road	Serious			1			1		1			1			1				1	2	1		2	
The Hollings	Slight		1	1	1		1		1										1			2	1	
	Total																			5				

Appendix 3: 2000-2004 average casualty rates

The table below has been derived from RAS 2004 tables 36 and 41. It should be noted that the traffic volumes (which are estimates) are not National Statistics. They provide only a rough indication of the likely total volume of traffic on roads in each area. For further information, please see the note on the Traffic Estimates in the Introduction to Road Accidents Scotland 2004.

Council areas are grouped by police force area.

2000-2004 average casualties per 100million vehicle kilometres (estimated)

Police force area	Council area	Casualty severity				Casualty rates			
		Killed	KSI	Slight	Est traffic volume (mvk)	Killed	KSI	Slight	All
Northern	Highland	29	261	764	2,406	1.21	10.85	31.75	42.60
	Orkney Islands	0	9	38	126	0.00	7.14	30.16	37.30
	Shetland Islands	2	11	36	188	1.06	5.85	19.15	25.00
	Eilean Siar	4	20	58	181	2.21	11.05	32.04	43.09
Grampian	Aberdeen City	6	77	408	1,335	0.45	5.77	30.56	36.33
	Aberdeenshire	31	180	591	2,592	1.20	6.94	22.80	29.75
	Moray	13	74	211	686	1.90	10.79	30.76	41.55
Tayside	Dundee City	4	78	365	842	0.48	9.26	43.35	52.61
	Angus	10	109	327	965	1.04	11.30	33.89	45.18
	Perth & Kinross	21	182	476	2,192	0.96	8.30	21.72	30.02
Fife	Fife	22	235	801	2,670	0.82	8.80	30.00	38.80
Lothian & Borders	Edinburgh City	14	221	1,781	2,880	0.49	7.67	61.84	69.51
	West Lothian	8	80	593	1,614	0.50	4.96	36.74	41.70
	Midlothian	3	46	285	612	0.49	7.52	46.57	54.08
	East Lothian	7	51	270	791	0.88	6.45	34.13	40.58
	Scottish Borders	11	113	507	1,123	0.98	10.06	45.15	55.21
Central	Clackmannanshire	4	35	87	289	1.38	12.11	30.10	42.21
	Stirling	8	111	286	1,124	0.71	9.88	25.44	35.32
	Falkirk	7	86	342	1,371	0.51	6.27	24.95	31.22
Strathclyde	Glasgow City	18	367	2,301	3,267	0.55	11.23	70.43	81.67
	Argyll & Bute	15	128	320	842	1.78	15.20	38.00	53.21
	West	4	50	275	596	0.67	8.39	46.14	54.53
	Dunbartonshire	3	41	247	528	0.57	7.77	46.78	54.55
	East	3	39	267	520	0.58	7.50	51.35	58.85
	Dunbartonshire	3	39	267	520	0.58	7.50	51.35	58.85
	Inverclyde	8	108	536	1,275	0.63	8.47	42.04	50.51
	Renfrewshire	2	39	170	606	0.33	6.44	28.05	34.49
	East Renfrewshire	14	172	1,031	2,890	0.48	5.95	35.67	41.63
	North Lanarkshire	15	187	974	2,210	0.68	8.46	44.07	52.53
	South Lanarkshire	6	81	371	700	0.86	11.57	53.00	64.57
	North Ayrshire	11	91	332	957	1.15	9.51	34.69	44.20
East Ayrshire	9	90	355	929	0.97	9.69	38.21	47.90	
South Ayrshire	9	90	355	929	0.97	9.69	38.21	47.90	
Dumfries & Galloway	Dumfries & Galloway	13	129	459	1,874	0.69	6.88	24.49	31.38
Scotland		323	3,501	15,865	41,180	0.78	8.50	38.53	47.03