MONITORING PROGRESS TOWARDS THE GB CASUALTY REDUCTION TARGET

J Broughton
TRL Limited

1. INTRODUCTION

In March 2000, the UK Government announced a new national casualty reduction target for the year 2010. A key element in preparing the new target was to forecast the number of casualties in 2010, taking account of any factors that might influence this number substantially. These forecasts made use of data up to 1998, and have been described fully by Broughton et al (2000).

The forecasting models provide a framework for assessing progress towards the target, annually re-assessing the likelihood of achieving the target in the light of the recent data. Broughton and Buckle (2006) provide an account of progress towards the targets up to 2004, this paper will present some of the main conclusions of that report.

2. FORECASTING METHODOLOGY

In 1997, the UK Government announced its intention of building upon the experience of the original British casualty reduction target by setting a further target for the year 2010. This paper summarises the methodology that was developed by the group that was established to provide the numerical context for the national casualty reduction targets.

It is important to use a sound methodology to prepare the target for reducing road accidents and casualties. If the methodology is not sound then the target will lack credibility and the efforts for improving safety and saving lives will be jeopardised. Moreover if, as time passes, key people involved in improving road safety come to realise that a poor methodology has produced a target that is too demanding and which cannot be achieved, they will lose motivation and it will be difficult to make progress.

The rate of casualties per billion vehicle-km of traffic is a powerful measure of the risks of road travel. Thus, the general approach consists of assessing how these risks developed in the past, then examining how they might develop in future. Many policies are directed at specific groups, so the approach had to be disaggregate to allow the expected effects of a policy to be linked with its beneficiaries as directly as possible. On the other hand, the forecast for a group of casualties is likely to be more reliable than the forecast for a subgroup, so only a limited degree of disaggregation was appropriate.

It was decided to prepare casualty forecasts for five groups of road user:
car occupants (with an urban/rural road split)
pedestrians
pedal cyclists
motorcyclists (includes users of mopeds, scooters and other two-wheeled motor vehicles)
others (a relatively small and heterogeneous group including people travelling by bus, coach, van or lorry)

Annual casualty rates were calculated for 1983-98 for each group. The consistency with which the rates fell over this period offered a simple way of forecasting casualty numbers in a future year:

1. estimate the casualty rates in a future year by extrapolating these consistent falls to that year,
2. multiply the forecast casualty rates by the volume of traffic forecast for that year to predict the number of casualties.

This approach of ‘trend-extrapolation’ was not sufficient for this application, however, since it took no explicit account of road safety policies. The basic forecasting approach had to be developed to allow assessments of the likely effectiveness of future policies to be incorporated.

It is difficult or impossible to assess reliably the effect of many road safety activities at the national level, for various reasons. Some only affect a relatively small group of casualties, for example, while others such as road safety education are intrinsically difficult to assess. Three areas of policy were identified which had contributed significantly to the casualty reductions of the previous decade and which could be assessed reliably:

- improved standards of secondary safety in cars,
- measures to reduce the level of drink/driving,
- road safety engineering.

These were referred to as the ‘DESS’ measures (Drink/driving, Engineering, Secondary Safety). The combination of all other road safety activities was referred to as the core programme. The effectiveness of this programme and of the ‘DESS’ measures in reducing casualties between 1985 and 1995 were compared. These results suggested that the combination of the DESS measures had been roughly as effective as the core programme in containing the growth of slight casualties. Among KSI, however, the core programme had proved more effective than the DESS measures.

The procedure for forecasting the consequences of a new road safety strategy by 2010 had three stages:

1. estimate casualty rates in 2010 to show what would be expected if there were no further DESS measures and only the core road safety activities were undertaken (at the 1998 level of effect) during the period to 2010; this was done by extrapolating trends from the 1983-98 period,
2. prepare a Baseline casualty forecast using these estimated rates together with predictions of the volume of road travel in 2010,
3. apply the assumed effects of the measures in the new road safety strategy (including any further DESS measures) to the baseline forecast.
There is uncertainty about the future volume of road travel. This is represented in Stage 2 by the concept of a ‘transport scenario’, which consists of a prediction of the level of activity for each of the five groups of road user in 2010.

Since the casualty trends already represented the effects of continuing with existing road safety measures, these Baseline forecasts showed the number of casualties that would be expected if no new road safety measures were to be introduced over the forecasting period. In this context, ‘new’ measures were either innovatory or a substantial expansion of existing measures.

In Stage 3, these forecasts were adjusted to take account of the likely effects of road safety measures that were expected to be implemented by 2010. This involved listing likely new measures in consultation with appropriate experts, and using whatever information was available to assess their potential for reducing casualties. The assessment were done separately for each road user group, since measures designed to protect one group may well provide little or no benefit to others.

The outcome was a range of forecasts of the national casualty total in 2010, one for each transport scenario. 36 scenarios were assessed in total, ranging from

- low traffic growth and large increases in walking and cycling, to
- strong traffic growth and continued decline in walking and cycling.

The numerical targets were set in the light of judgements about the relative likelihood of the various scenarios and confidence that new measures could be introduced.

3. CASUALTY TRENDS

A forecast is not the same as a target, but there are good reasons to build a target on casualty forecasts that are soundly based upon knowledge of what has occurred in the recent past. The casualty changes over these years show what has been achieved by national and local efforts to improve road safety, applying the level of resources that the country’s political system has judged to be appropriate. Consequently, a forecast representing the continuation of recent trends shows what may be expected if these efforts were to continue at broadly the same rate in the coming years. This is the starting point for assessing what may realistically be achieved in future with additional efforts.

The key feature of a scientific approach to forecasting based on past data is to identify consistent relationships among these data that can be projected into the future. Thus, the first step in forecasting casualties is to identify consistent relationships among the available accident data. In view of the inherent unpredictability of accidents and the consequent variability of the accident data, it may seem surprising that such relationships do in fact exist. Naturally, the results do not take account of future developments that cannot be foreseen, but the methodology does provide a powerful means of organising available knowledge and thinking systematically about the future development of road transport.
These relationships involve the casualty rate (the number of casualties of a specific severity per billion vehicle-km of motor traffic). British casualty rates have fallen consistently over the years, in spite of the many changes that have occurred to the road transport system during that period. Research as part of the Sunflower project has found that rates in Sweden and the Netherlands have changed with similar consistency, so the methodology that has been described could certainly be followed in countries other than Great Britain.

4. TARGET SETTING

The forecasting process produced a wide range of results that represented alternative views about the future development of road travel and of road safety measures. This range provided the numerical context for setting the casualty reduction target, not the target itself. When setting the target, attention naturally focused on forecasts for the more plausible alternatives. Several ‘political’ judgements were required, such as:

a) Might it prove difficult to maintain the past rate of progress because some key existing measures may start to lose effectiveness in the coming years? – this would suggest that the target should be less ambitious than indicated by these forecasts,

b) May the assumptions about the rate of introduction of new measures be over-optimistic? – this would also suggest a less ambitious target,

c) Conversely, may there be grounds for greater confidence about the effectiveness of new measures, perhaps involving innovatory systems or technologies? - this would suggest a target that was more ambitious than indicated by these forecasts.

The outcome was that the Government announced a new national casualty reduction target in March 2000 (DETR, 2000):

“By 2010 we want to achieve, compared with the average for 1994-98:

° 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 100 million vehicle kilometres.”

The number of people killed does not appear as a separate item on this list, only as a part of the broader category of killed or seriously injured (KSI). On the other hand, most national casualty reduction targets are expressed in terms of the number of people killed. There were two main reasons for this decision in Great Britain. The casualty forecasts suggested that the percentage reduction in killed that could be achieved by 2010 would be similar to the percentage reduction that could be achieved for KSI, so there was no need for a separate target. There was also concern that the smaller number of
people killed per year meant that a target could be missed because of a poor performance ‘by chance’ in the target year.

5. MONITORING PROGRESS

Progress in reducing casualties has been monitored annually at TRL from 2001 in order to judge whether further measures may be needed to reach (or indeed surpass) the target, and the forecasting methodology has provided a valuable framework for this. As each year passes, the casualty forecasts for that year have been checked against the actual outcome. In the early years, this was mainly been useful for checking the validity of the forecasting equations derived originally. More recently, this has expanded to consider the likelihood of achieving the target, in the light of the latest casualty data, and examining the possible reasons for deviations from previous trends.

The results that are presented in this paper come from the report by Broughton and Buckle (2005) that analysed the data to 2004. Only the principal findings will be presented, many more details are provided in the full report.

Most of the casualty trends identified when producing the casualty forecasts have continued from 2000, giving confidence in the forecasting methodology. The most significant exception is for the rate of car occupant fatalities, which will be considered in Section 5.4.

The three parts of the target will be considered in reverse order, then the trend for the number of people killed will be considered.

5.1 Reduction of the slight casualty rate

The slight casualty rate has fallen since 1997 and the decline accelerated from 2001, with the result that the target for 2010 was surpassed in 2002.

It is well known that there is a degree of under-reporting of road accidents for a variety of reasons. The most recent national study in Great Britain (Simpson, 1996) found that about 59% of slight casualties in 1993 were recorded in the STATS19 database. Even if there is under-reporting, these data would still reliably reflect changes in road safety between years provided that the level of reporting remained broadly consistent. Only specific research similar to the Simpson study could establish the current level of under-reporting, but it does appear likely that this target was achieved so early mainly because the level of accident reporting has declined.

The internal evidence provided by the STATS19 data suggests that this decline has only affected reporting of slight accidents to any appreciable degree, and that reporting of fatal and serious accidents is unaffected. Inevitably, however, such evidence cannot be definitive.

5.2 Reduction of children KSI

The number of number killed or seriously injured per billion vehicle kilometres has fallen steadily since at least 1983. If this continues then the number would fall by almost 60% by 2010, i.e. considerably more than the 50% target set by the Government.
5.3 Reduction of KSI

A simple way to measure progress is to compare the actual changes with what would be required to achieve the 40% reduction by equal annual steps. Figure 1 compares the normalised KSI numbers by road user group with this ‘target’. The overall figure was above this target until 2003, i.e. progress was relatively slow, partly because of the increase in motorcyclists KSI. The major reduction in motorcyclists KSI in 2004 helped to bring the overall figure below this target. Thus, by 2004 progress was faster than required to reach the target in 2010, suggesting that the target would be achieved.

Figure 1: Normalised KSI numbers by road user group

This approach takes no account of how conditions might develop in future, e.g. how fast the volume of traffic is likely to grow. The casualty forecasts described in Section 2 have been updated, and the results suggest that under most plausible scenarios the target reduction will be achieved – and probably exceeded.

5.4 The number of people killed

When discussing the reasons for not setting an explicit target to reduce the number of people killed, it was mentioned that the trend for killed had been falling in parallel with the trend for KSI over many years when the trend analyses were made. Figure 2 illustrates this from 1990, but shows that the two trends ceased to fall in parallel from about 1998. The total number of people killed tended to rise from 1998, in fact, although there was an 8% reduction in 2004.
As Figure 3 shows, the change in trend affected motorcyclists and car occupants principally. The numbers killed in the other road users groups have continued to fall much as before, so only the trends for motorcyclists and car occupants need to be examined.

It was recognised at the time when the targets were prepared that it was especially difficult to forecast motorcyclist casualties as the popularity of motorcycling had varied considerably in Great Britain. The volume of motorcycling has grown strongly since 1997, especially with large machines, and this has increased casualties considerably. The volume of motorcycling fell in 2004, however, leading to a major fall in motorcyclist casualties, especially the number killed. The unusually fine and warm summer of 2003 appears to have boosted the number of fatalities, especially in June and August, and the return to more usual British summer conditions in 2004 contributed to the fall.
The change in the car occupant fatality trend in the mid-1990s has been more difficult to explain, especially as it is clear that improvements in car secondary safety have delivered increasing casualty benefits throughout this period (Broughton, 2003). One factor has been an increase in drink/drive fatalities, following the major reduction in drink/driving that was achieved in the 1980s. Changes in the car fleet have also made a minor contribution to the change, with proportionately more small cars and 4x4s/people carriers and fewer saloon cars. A more appreciable factor, however, appears to have been a decline in driving standards. Evidence for this comes from the STATS19 accident data, which show increasing proportions of casualties in various closely related categories:

- accidents that occur at bends
- cars that leave the carriageway and hit objects such as trees or lamp posts
- accidents caused by loss of control

These data are illustrated in Figure 4.

Figure 4: Proportion of car occupant casualties injured in three types of accident

It is only possible to speculate about the causes of this apparent decline in driving standards. One factor that is likely to have contributed is the lower priority that has been given by British police forces to traffic policing in recent years. One relevant index is the number of screening breath tests carried out each year in England and Wales, which fell by 38% between 1997 and 2003. Over this period, official statistics show that the number of deaths in drink/drive accidents has increased considerably (Department for Transport, 2005). To put the total of 534,300 screening breath tests carried out by the police in 2003 into context, this represents about 1 test per 55 drivers in that year.

6 Conclusions

The analyses summarised in this paper suggest the targets for reducing road casualties in Great Britain will be achieved by 2010. The success in reducing
the number of people killed or seriously injured has, however, drawn attention away to some extent from the far smaller reduction in the number of people killed that has been achieved. Progress in this respect has been far slower in Great Britain than in neighbouring countries such as France and the Netherlands, and there is undoubtedly scope to learn from their success.

Bibliography


