

THE ROYAL SOCIETY FOR THE PREVENTION OF ACCIDENTS**PRESENTATION FOR THE HOUSE OF COMMONS - 23 JANUARY 1996****BRIFEN WIRE ROPE SAFETY FENCE****INTRODUCTION**

The Royal Society for the Prevention of Accidents (RoSPA) is Europe's largest and most comprehensive safety organisation. RoSPA's purpose is to enhance the quality of life by exercising a powerful influence for accident prevention. Where we see opportunities for improvement in regulation, enforcement or innovation, in product design or practice, we will campaign to promote the Society's views to achieve change for the better.

Highway safety has always been an important issue, and anything which helps reduce accidents and fatalities involving road users must be looked at closely. Safety barriers are seen as an investment in helping to reduce accidents and save lives. Safety barriers on the median (central reserve) of motorways and dual carriageways are necessary to provide a barrier between opposing flows of traffic. The primary function of a median barrier is therefore, to restrain and redirect out-of-control vehicles; the ideal barrier will also redirect the vehicle parallel to the normal flow of traffic and the vehicle will sustain minimal damage from the collision.

In December 1987, in recognition of the importance of such barriers and their contribution to safety, the then Minister for Transport, Mr Peter Bottomley, announced in Parliament that central reservation fencing was to be provided on all new and existing all purpose dual carriageway trunk roads.

DEVELOPMENT OF BRIFEN WIRE ROPE SAFETY FENCING

Originally a two rope safety barrier, the Brifen fence has been redeveloped as a four wire barrier in association with the Road Research Laboratory and the Motor Industry Research Association. The system is widely used around the world in countries such as Canada, Denmark, Switzerland, Cyprus, Qatar and the United Arab Emirates. In December 1988, Mr Bottomley announced that the new four wire system had been accepted and was covered by Departmental Standard TD32/89 (now TD32/93).

The criteria for motorway and dual carriageway safety fences demand a deflection of no more than 2m for a 1.5 tonne vehicle impacting the fence at 70mph at a 20 degree angle. The specification for wire rope safety barriers is based on the original tests, which requires a hard median with a minimum width of 4.6m and a minimum radius of curvature of 848m. Both the two and four rope systems are suitable for median and verge applications, the selection depends on the available clearance.

SAFETY PERFORMANCE

The wire rope safety fence (WRSF) comprises wire ropes tensioned so that a fence on a motorway or dual carriageway acts as a shock absorber on impact, its posts collapsing progressively to allow the ropes to absorb the momentum of a crashing vehicle and bring it safely to rest. As the wire rope barrier affords a relatively soft impact it is possible that there is less physical shock to occupants.

Most of the WRSF in the UK has been installed on trunk roads and although it is not designed to restrain large goods vehicles (LGVs), so far when these accidents have occurred the deflective action of the fence has prevented the impacting LGVs crossing the central reserve onto the other carriageway

Terminal posts are designed to collapse on impact and therefore are not a problem if struck. Posts have a black plastic cap and can be covered with high visibility materials as an added road safety feature if necessary.

Additional safety checks are incorporated in testing procedures to show that the windows and windscreen of a vehicle are not broken in an impact and that the doors of the vehicle should be able to be opened from the outside when the vehicle comes to rest. It is generally expected that in most cases, vehicles can be driven away after the impact.

Other benefits of the WRSF are that it does not obstruct wind-blown snow and therefore prevents the creation of drifts which would require clearing. The Society understands that when life cycle costs are estimated the system is more economically viable than available alternatives. Maintenance engineers state that it is simpler to erect and is quick and easy to repair after an accident resulting in much lower maintenance and repair costs. Following an incident it is possible to repair the WRSF immediately, avoiding the need for further traffic management at a late stage. If posts are knocked down after an incident the wire rope still offers protection between opposing flows. Also, the WRSF can be designed to accommodate quick-release sections to allow emergency vehicles to cross the central reservation.

Performance Indicators

Following development and testing in the Road Research Laboratory a 10km length of the two rope design was installed in June 1971 on the Pennine section of the M62 in West Yorkshire. After the first two years experience on the M62 a report was compiled in the early 1970s and although less than 12 incidents had occurred none of the vehicles crossed over on to the opposing carriageway. There were no personal injuries recorded and damage to vehicles was slight in every case. Similar reports supported this encouraging news and claims that the Brifen Wire Rope Safety Fence would save thousands of lives by judges awarding it the Prince Michael Award for Road Safety in 1992 were therefore met with interest by RoSPA when approached by Bridon.

RoSPA were commissioned to carry out a comprehensive study into the safety performance of the WRSF. This involved collating recorded road traffic accidents from areas where the WRSF had been installed in the UK. Direct comparisons with TCB (tensioned corrugated beam) and OBB (open box beam) were not possible because of the limited lengths of wire rope safety fence installed. Preliminary statistical analysis was not significant due to the comparatively low number of reported injury accidents involving a vehicle striking a WRSF, none of which were fatal.

However, where maintenance engineers were contacted they reported evidence of vehicle impacts attributed to damage only accidents. If the fence was damaged repairs had usually been carried out while the incident area was still under the control of the police, reducing maintenance costs and the risk of further incidence.

In all instances the wire rope was performing as designed. Since the study we have kept an interest in the performance of the WRSF and documented reports and case histories indicate that the barrier continues to prove its effectiveness. The kinetic energy of the impacting vehicle is absorbed by both the wire ropes and the posts, which collapse on impact. The vehicle is guided along the fence coming safely to rest, thus reducing damage to the vehicle and injury to the occupants.

In over 200 recorded impacts there has never been a fatality or cross-over resulting from a vehicle going through the barrier. To the Society's knowledge, there have been two fatal accidents on a carriageway installed with wire rope safety fencing. Both were on the M4 in Wiltshire and involved the vehicles travelling over the wire rope safety fence, not through it.

Even though the Brifen WRSF is neither designed or tested to restrain large goods vehicles it has performed satisfactorily to date. Case histories are documented in this country and abroad.

MOTORCYCLISTS

No highway safety fence has been designed to protect the motorcyclist. This is of concern to the Society because a motorcyclist is likely to sustain serious injuries if in contact with a safety fence. However, 98% of motorcyclist accidents occur in urban areas where safety fencing is not normally installed. Where the WRSF is installed on highways the motorcyclists are in favour because it will prevent the vehicle from crossing the central reserve and hitting them in the opposing flow.

SUMMARY

The Department of Transport calculates that every death on Britain's roads costs £863,370 (Highways Economic Note 1 1994) . If the incident occurs on a motorway the cost is £990,880 and in all cases the human suffering is incalculable. A damage only incident is estimated at £1000.

Accident statistics indicate that of fatalities resulting from vehicles leaving the carriageway and impacting with a solid object or fence, some 10 per cent involved vehicles hitting road safety fences.

The purpose of a safety fence is to contain and redirect errant vehicles, preventing the vehicle from either crossing the barrier or being bounced back into the traffic flow. A system that can do this effectively will no doubt save lives.

RoSPA welcomes the fact that in Great Britain, WRSF must be specified on all highway contracts as a safety fencing consideration.

DKA January 1996