

**Casualties and Collisions at
Safety Camera sites in Devon and
Cornwall: 2000 to 2008.**

September 2009

SUMMARY

The Devon and Cornwall Safety Camera Partnership originally formed as part of a Department for Transport Programme in October 2002, and has been in its current format since April 2007 funded by road safety grant, rather than through netting off revenue from fines. Work has been carried out since that time to evolve the type of interventions to fit the nature of the violations detected.

The body of this report goes on to look at the relationship between the rate of injury collisions in Devon and Cornwall and how these have changed at camera sites and within the rest of the network.

In this summary it we refer to some of the data shaping the future approach to speed and red light enforcement.

In its recent consultation document the Department for Transport has identified highlighted conclusions from research work on speed as well as other road safety issues.



It includes a number of findings:-

“Research shows a strong link between speed and road casualties. Reducing the average speed of traffic by 1 mph leads to an expected reduction of 5 per cent in the number of collisions on that road, while reducing the speed of the fastest driver has the largest effect on collisions. There is a well understood relationship between the speed of a crash and the impact – and therefore the likely severity of any injuries” (2.23)

“Of 2,946 road deaths in 2007 there were 727 deaths where speed was recorded as a contributory factor.” (2.24)

“In 2007, 16 per cent of fatalities involved drink-driving, and a third of all car occupants who died were not wearing a seat belt. Breaking the speed limit is recorded as a factor in 14 per cent of fatalities (and maybe responsible for many more) – there are a small number of people who are driving at extremely high speeds, though there are many more who routinely drive significantly in excess of the speed limit” (4.7)

“Research commissioned in developing the strategy has assessed the risk of two common accident types at various speeds resulting in death. This research suggests that the risk of the driver dying in a head on collision involving two cars travelling at 60 mph is around 90 per cent. This drops to 65 per cent at 50 mph and 15 per cent at 40 mph.



The same research has also considered typical junction accidents, where the driver misjudges the speed of an approaching car and pulls out from a side road, and is then struck in the driver's side. Where the approaching car is travelling at 60 mph, the risk of the driver of the car pulling out dying in such an accident is around 40 per cent; this drops to around 12 per cent at 50 mph and less than 1 per cent at 40 mph.” (5.11 / 5.12)

The intention of the Partnership has been to focus on controlling the speeds of those who exceed the speed limit by a significant margin and contribute to injury collisions, therefore safety cameras have been deployed at locations where speed related serious injury collisions have occurred.

The findings published in the consultation suggest that reducing speeds throughout the network will also have a beneficial result.

The Partnership's communication work has been carried out in support of the agencies involved in different areas of Devon and Cornwall. Vulnerable road user groups have been identified and prioritised, specifically working with young drivers (Learn 2 Live programme) and motorcyclists (as a founding member of Peninsular Motorcycle Forum) who are disproportionately involved in collision statistics.

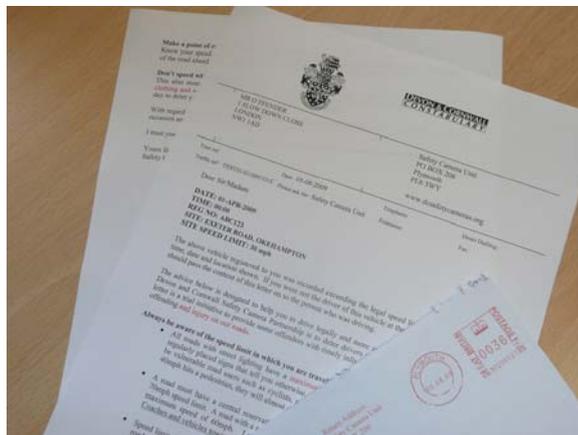


Rural motorcycle operation

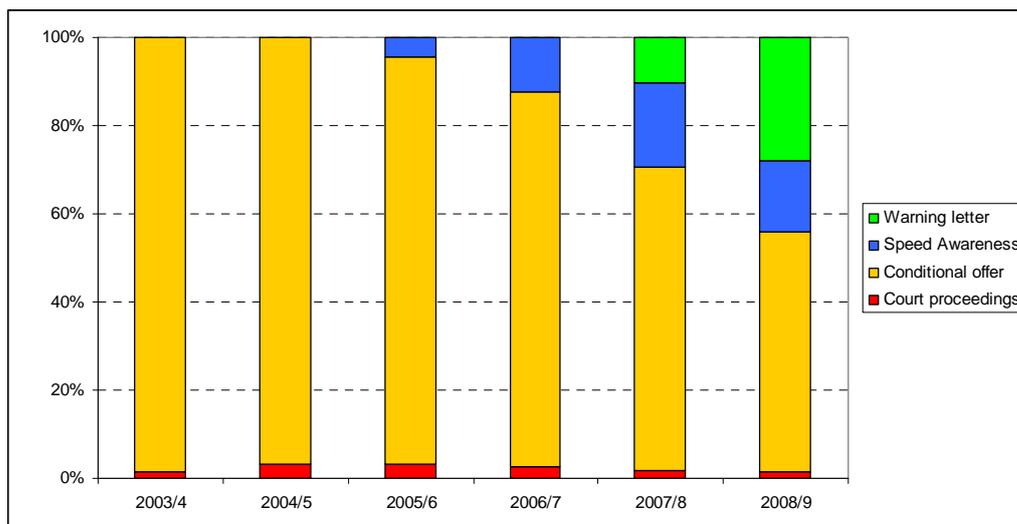


'Learn 2 Live' event

Since the project moved to more local control in April 2007, an increased emphasis has been placed on the education of marginal offenders. For those approaching the threshold of prosecution a warning letter will be issued, and those at the lower end of prosecution are offered the option of a Speed Awareness Course as an alternative to prosecution.



Since the Department for Transport scheme the number of Notices of Intended Prosecution has fallen by approximately 50 per cent. However, in 2008/9, the total number of contacts made with motorists has dropped by only 17%. Of the total contacts made, approximately 16% were dealt with via a Speed Awareness Course offer, and 28% through the issue of a warning letter. This graded intervention approach allows drivers to amend their behaviour before a prosecution is taken.



The ethos of the Partnership is that for those drivers who generally wish to comply with the speed limit we will provide advice and guidance. For those who need to be persuaded, education and the threat of potential enforcement will be used. For those drivers that show a complete disregard for both safety and road traffic law by significantly exceeding the limits, prosecution is both a proportionate and appropriate response.

Communities express considerable concern about speeds in their areas and Devon and Cornwall Constabulary will be expanding the use of 'Community Speedwatch' which involves writing to drivers over the speed limit to warn them of their offence. The Partnership will support this programme as part of an increased opportunity to educate motorists or, if necessary, provide prosecution where drivers fail to respond.



The Data

Analysis of collision data is a complex activity with specific variables in multi factorial events difficult to isolate on an extensive and varied highway network. Data from the camera sites across Devon and Cornwall indicates that a more positive reduction in fatal and serious injury collisions is being achieved compared to other locations.

The body of this report is a collation and analysis of the available Police data on the effects of Safety Camera enforcement on casualty collisions in Devon and Cornwall for the period 2000 to 2008 inclusive.

At the beginning of the Safety Camera study baseline period (2000) the percentage of KSI collisions at all camera sites represented 14.7% of KSI collisions in the whole of Devon and Cornwall; by the end of 2008 this had reduced to 5.7%.

Recorded casualty collisions, both serious and slight, are falling at a significantly faster rate within Safety Camera sites than in the rest of Devon and Cornwall. Over the 9 year period 2000 to 2008 KSI collisions at camera sites fell by 75% (32% reduction for the region), and all injury collisions fell by 39% (15% reduction for the region).

In the counties of Devon and Cornwall the number of KSI and PIA collisions has fallen (including camera sites and other areas)

There appears to have been a change in the dispersion of injury collisions as a result of the success of road safety interventions, with far fewer “clusters” being identifiable.

Collisions on rural roads remain a significant area for investigation where over 60% of fatalities occur, with particular concerns on those single carriageway roads where the national speed limit is imposed.

The on-going challenge for Safety Camera enforcement within the area of Devon and Cornwall is to optimise deployment to address the changing patterns of collisions and road safety threats facing our communities. As a result routes for casualty reduction have been identified.

Since 1995 both population and traffic volumes have grown faster in the SW than the national average. The report does not attempt to establish a link between significant traffic growth and the number of injury collisions in the region, and no attempt has been made to correct the collision data for traffic volume growth.

The Safety Camera Partnership will continue to work with their partners to identify new techniques to improve road safety through the deployment of Safety Cameras and related activity.

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1 INTRODUCTION

This report summarises the data on Safety Cameras areas in the Devon and Cornwall (D&C) Partnership area from January 2000 to December 2008 inclusive, and to track their potential contribution to the reduction of injury collisions. The start date corresponds to the 3 year period prior to the inception of the Partnership under the Department for Transport Netting Off scheme in October 2002. This report covers the period up to the end of 2008 although the former Partnership ceased in March 2007 as a result of changed Government policy. At that time speed enforcement by camera became part of the range of Road Safety measures under the control of local agencies.

It is important to note that several camera sites were installed in the Devon and Cornwall area prior to the Partnership's existence and would already have achieved some casualty reduction effect. All sites are now operated through the funding passed on to the Safety Camera Partnership by the individual Local Authorities.

2 DATA SOURCE

The data reproduced here include all collisions and casualties reported via the STATS19 reporting system for Devon and Cornwall.

The source data for this report are the STATS19 data collected by the Devon and Cornwall Police Authority and extracted from the Buchanan® database during April 2009. The data fall into two main categories; firstly, the collision and casualty figures for the whole of D&C and, secondly, the collision and casualty figures for the camera sites only (usually a 1km length of road which includes the camera location).

The DfT report in May 2005 reported that the D&C Partnership had reduced *KSI-collisions* by 67.5% and *PIA-collisions* by 30.6% at its approved sites. However, that conclusion was based on a reduced sample of sites that met the DfT comparison qualifying criteria. This report includes a full review of all core sites.

Following the careful checking of collision reports the Local Authority may make changes to the precise location or detail of a collision incident (validation). These changes are only included here if they were implemented on the Buchanan database before April 2009.

3 DEFINITIONS

The collisions data are limited to RTCs (road traffic collisions) which were reported to the police, or at which the police attended. At the scene of a collision a standard form (STATS19) is completed by a police officer to record details of the collision and its immediate consequences. RTCs reported at a police station result in a STATS19 form being completed by a station officer.

The severity categories used are defined by the DfT guidelines. *PIA-collisions* (personal injury accidents – collisions) are the all-inclusive group of all road traffic collisions that resulted in one or more personal injuries. *KSI-collisions* are a sub-group of the above and identify the *PIA-collisions* that resulted in one or more persons being killed or seriously injured. The injuries may have been suffered by an occupant of a vehicle, a cyclist or by a pedestrian, but are deemed to have been caused by the RTC. It is worth noting that the injury severity is that recorded as an opinion by the attending police officer at the scene and may be subject to later validation when a medical

examination of the injured persons has taken place. Damage-only collisions (DOC) are sometimes recorded, but are not included in this report.

The definitions of PIA-casualties and KSI-casualties follow similar criteria to the above for collisions, except that a collision involving multiple vehicles is counted as a single collision whereas the total number of injured persons is counted as casualties. Therefore, there may be a greater number of casualties than collisions.

4 ENFORCEMENT STRATEGY

Under the DfT scheme the enforcement strategy followed the published guidelines. The guidance was developed for a time when, and in locations where many collisions occurred in “clusters”. These clusters were relatively easily identified and analysed for the optimum corrective actions, which included road engineering, signing changes or, where other means were not effective or practical, camera enforcement was considered.

From April 2007 the Local Authorities assumed responsibility for funding the Safety Camera team as part of their overall road safety budget. As a result, enforcement activity for each Authority’s area of responsibility is determined by a joint discussion between the Local Authority and their partners. The strategy is set at management, budget and site levels.

Coincident with the change of management the Local Authorities and the Safety Camera team recognised that collision locations have become more dispersed. The enforcement at “cluster sites” had helped to reduce collision rates and is generally in a maintenance mode. Collisions are now viewed as occurring along routes (between two places) such as the A3047 from Redruth to Camborne in Cornwall, and the A377 from Exeter to Barnstaple in Devon.

Some routes can be viewed as ‘areas’ such as the Falmouth/Penryn. Here certain road users had become engaged in anti social behaviour using a number of routes and some high profile injury collisions were associated with this.

Each route should be defined and analysed for its collision and speed history and an enforcement approach drawn up. This includes additional enforcement locations being established along the route to supplement existing sites. Recognising that each of these routes has unique properties; location, collision causes, driver profiles etc this approach leads to a specific response in enforcement strategy for each area or route.

5 TREND OF COLLISION RATE

The purpose of this section is to illustrate a different means of comparing collision rates over time. In the following charts the cumulative collisions from January 2000 to December 2008 have been compared with the average rate of collisions during the 3yr period prior to the Partnership inception (2000 to 2002 incl.) extrapolated to the present time. The gradient of each line is a measure of average monthly collision rate and, therefore, a downward diverging camera site line indicates a sustained lower rate of collisions. A parallel line would indicate a return to the original rate after a temporary reduction.

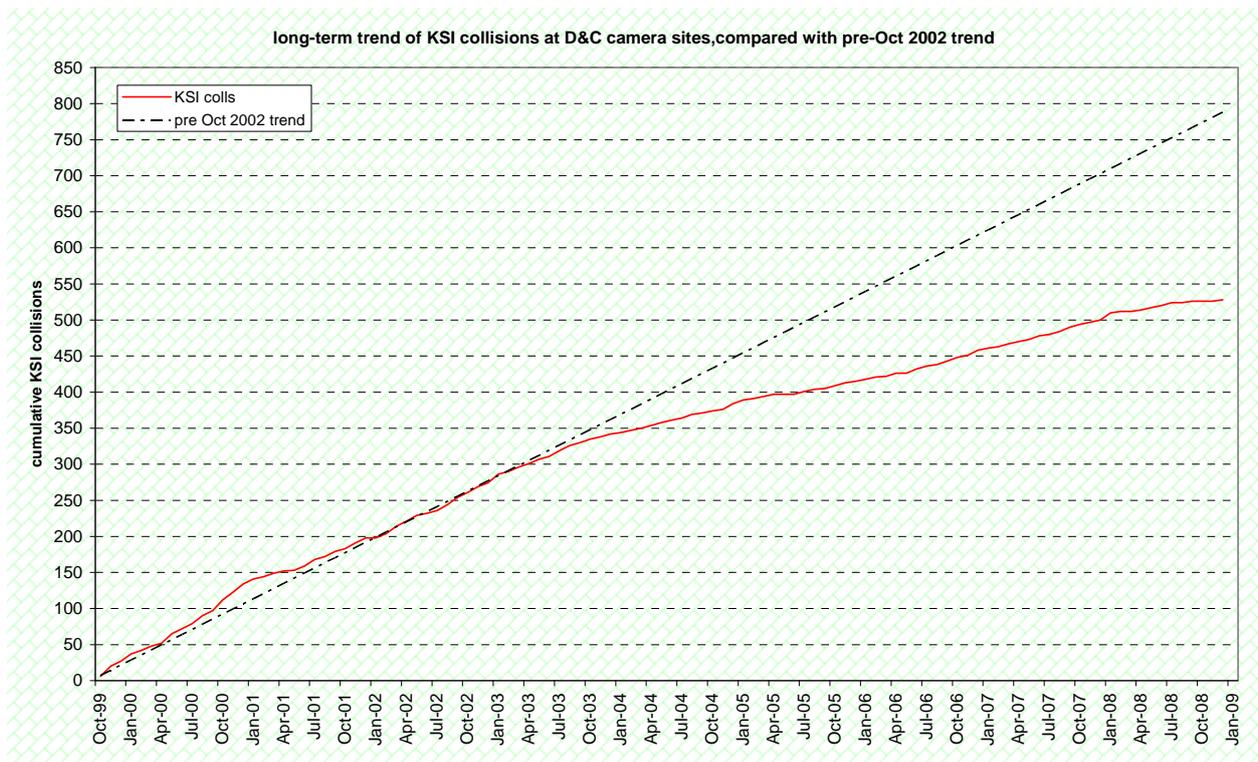


Figure 1: camera site KSI collision rate

Figure 1 and Figure 2 compare the KSI collision rate occurring within 1km of all the camera sites with the overall KSI collision rate in D&C. There has been a significant reduction in the collision rate of KSI collisions since the end of 2002, but the reduction has been far greater in the vicinity of camera sites. If the pre-partnership trend were assumed to have continued without interventions the charts suggest cumulative reductions of 812 KSI collisions in D&C of which 260 would have been at camera sites.

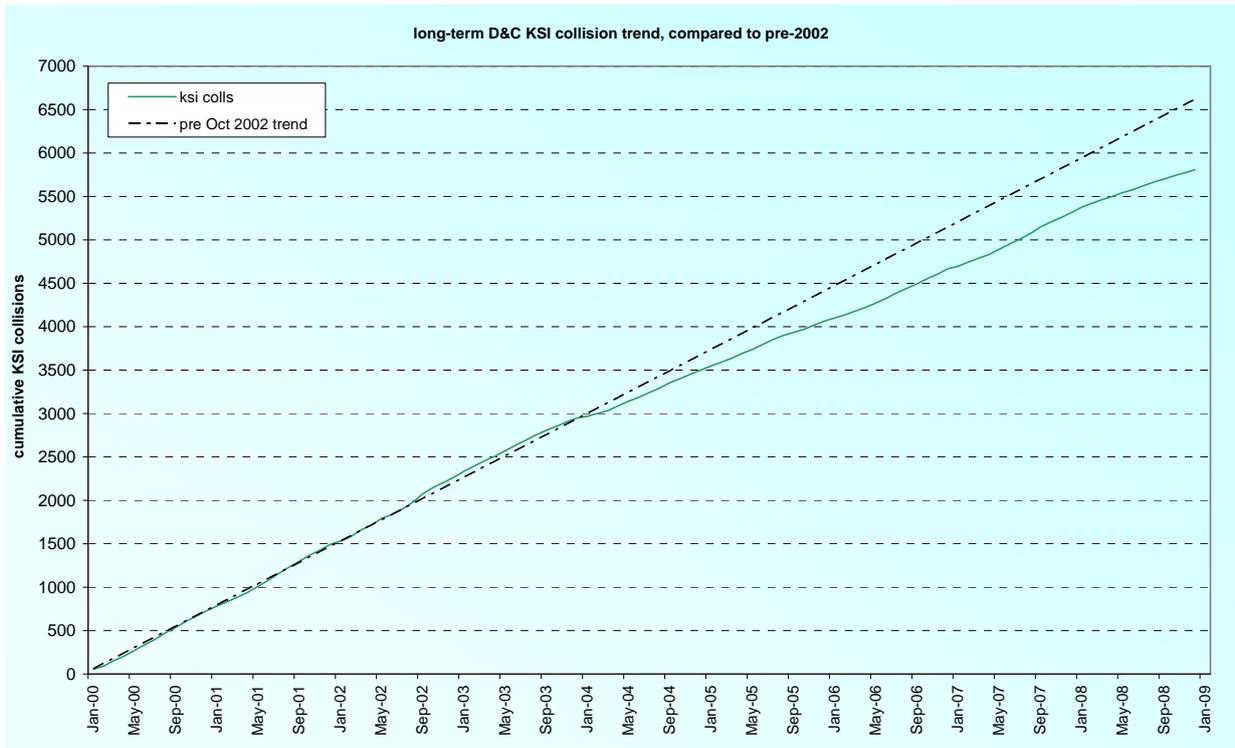


Figure 2: D&C KSI collision rate

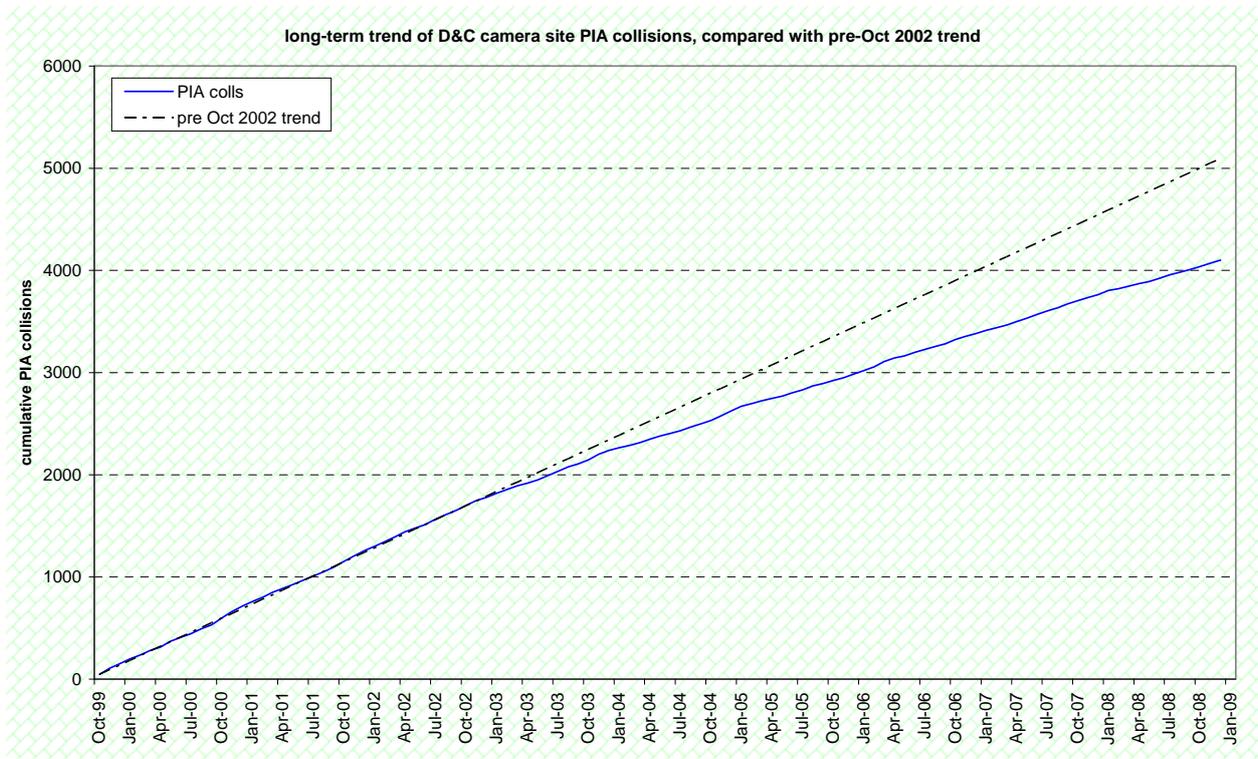


Figure 3: camera site PIA collision rate

Figure 3 and Figure 4 compare the rate of occurrence of PIA collisions at camera sites with the whole of D&C. Figure 3 shows the PIA collision rate in D&C altered very little until 2008 since when there has been a reduction in collision rate. The PIA collision rate at camera sites has shown a significant and sustained reduction since 2003, with a cumulative projected saving of 993 collisions by the end of 2008. It is emphasised that these are the potential reductions if collision rates had continued at the pre-2002 rates, and do not take into account the general trends of increasing population, traffic volume and other factors which might be expected to increase injury collisions.

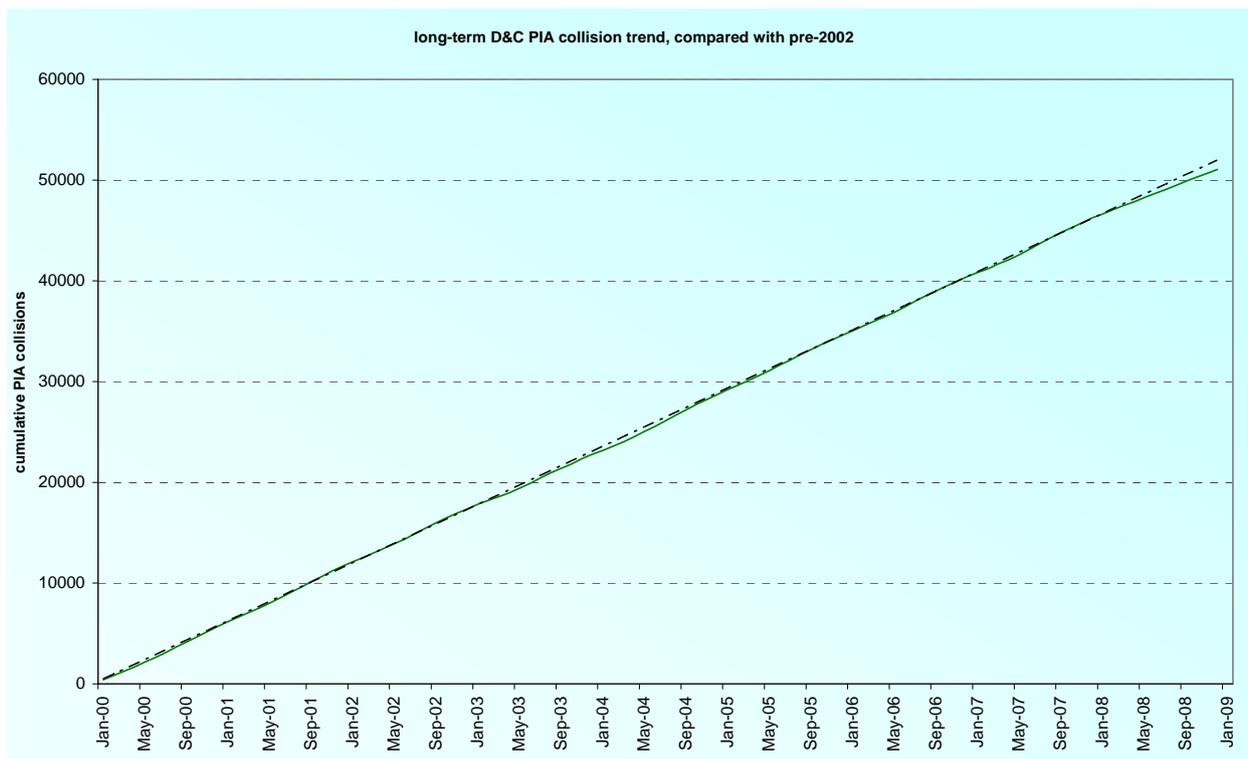


Figure 4: D&C PIA collision rate

6 COLLISIONS

The final assessment from Department for Transport reporting in July 2007 showed the D&C Partnership had achieved a 70% reduction in KSI collisions at camera sites during the Partnership period from October 2002 until March 2007. This was one of the higher casualty reduction rates achieved by the UK Partnerships.

This report utilises STATS19 collision data from 1/1/2000 until 31/12/2008; this includes the 3 year period prior to the Partnership being formed, and 21 months since the end of DfT management.

The D&C Partnership now has a significant number of long-term sites that permit direct comparisons between the officially recorded collision and casualty performance at camera sites against that of the entire Partnership area over the same period.

The recorded data for total annual collisions are shown below in Figure 5 and Figure 6. The use of secondary Y axes facilitates a comparison between the relative changes in PIA and KSI collisions.

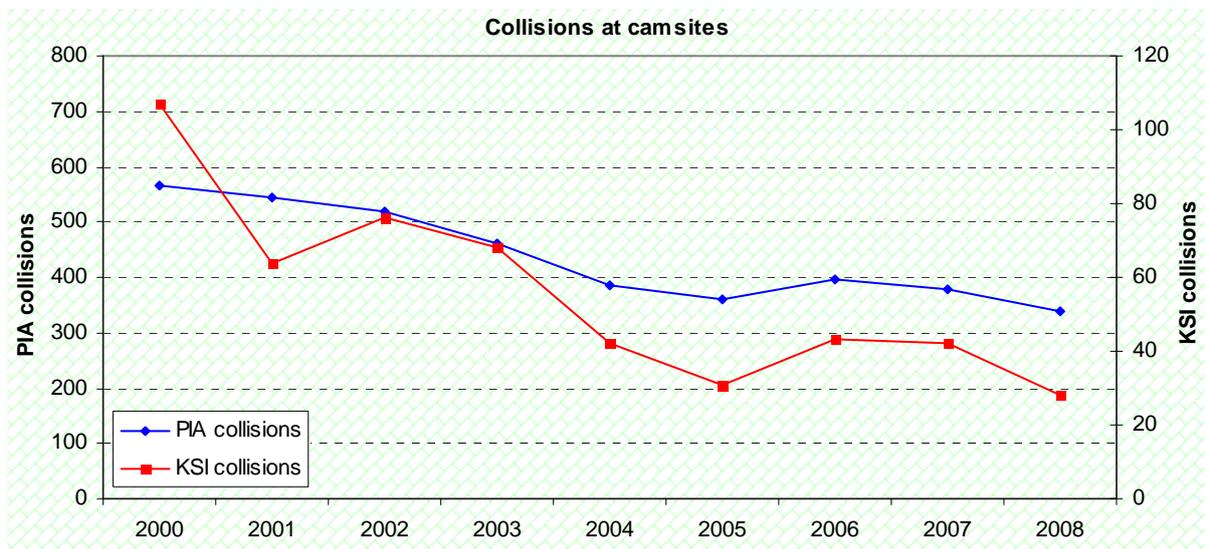


Figure 5: Collisions data at camera sites in D&C

Figure 5 shows that until 2005 there was a strong downward trend of KSI and PIA collisions at camera sites, which was continued in 2008.

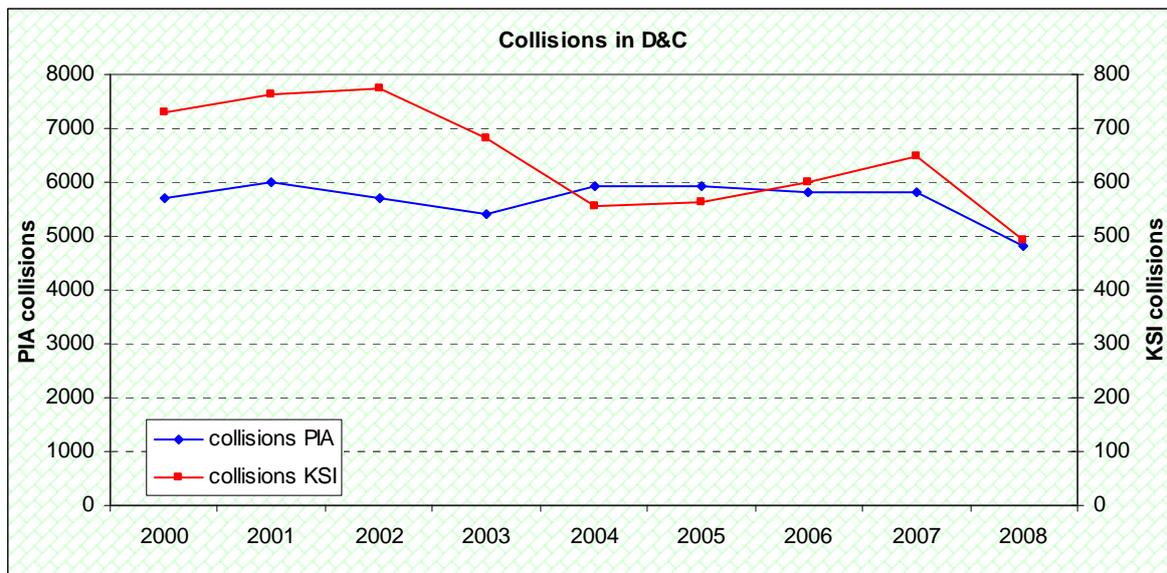


Figure 6: Collision data for whole D&C area

Looking at the whole of D&C over the same period in figure 6 shows the annual number of PIA collisions remained fairly constant until the end of 2007, apart from a small reduction in 2002 and 2003. KSI collisions fell in 2003 and 2004 but then rose steadily until the end of 2007. 2008 showed a decrease in collisions in all categories. At this point it is not clear what has driven the recent significant fall in injury collisions although there has been some speculation that this may be associated with reduced economic activity.

The following table shows the relevant STATS19 data for the above charts.

Calendar year	Camera sites – KSI collisions	Camera sites – PIA collisions	Non-camera region – KSI collisions	Non-camera region – PIA collisions	Total D&C KSI collisions	Total D&C PIA collisions
2000	113	558	617	5130	730	5688
2001	63	549	700	5452	763	6001
2002	78	525	696	5173	774	5698
2003	61	458	621	4939	682	5397
2004	42	368	513	5554	555	5922
2005	33	374	529	5541	562	5915
2006	43	411	558	5398	601	5809
2007	42	380	605	5443	647	5823
2008	28	339	466	4473	494	4812

Table 1: STATS19 data for injury collisions in D&C

For the purposes of this report we will consider the D&C Partnership area in two parts; (a) the *camera site region* is defined as the approved camera sites of approximately 1km road coverage each, and (b) the *non-camera region* that comprises the remainder of the 20,000 km of roads in D&C. The latter region includes sites already identified with collision clusters that are in the process of data collection prior to consideration as future approved sites and other yet-to-be-identified sites that may be evolving.

We can compare the collision history within the two defined regions in two ways; treating them exclusively or inclusively. The exclusive method will directly compare data from the two independent regions, whereas the inclusive method will compare the camera region data with the whole D&C area, including the camera region.

If the camera and non camera regions are treated **exclusively** over the 9 year period 2000 to 2008, the data show a reduction of 75.2% (113 to 28) in KSI collisions at camera sites, compared with a 24.5% (617 to 466) reduction in KSI collisions in the remainder of D&C. During the same period the number of all-injury collisions at camera sites fell by 39.2% (558 to 339), and by 12.8% (5130 to 4473) in the remainder of D&C.

If the regions are treated **inclusively** over the 9 year period, the KSI collisions at camera sites has fallen by 75.2% compared with 32.3% (730 to 494) for the whole of D&C. The number of all injury collisions has fallen by 39.2% at the camera sites and by 15.4% (5688 to 4812) in D&C.

The change in the collision rate in the whole of D&C, including the camera sites, comprises contributions from safety camera enforcement, Regression to Mean (discussed elsewhere in the report) and long-term trend behaviour. The above data suggest that the current 9 year trend of all collisions is downward. However, both these very important parameters are falling significantly faster in the vicinity of safety cameras than elsewhere in the D&C area.

7 CASUALTIES

The STATS19 recorded incidence of casualties as a result of road collisions in D&C is shown in Figure 7 below. The chart shows the casualty rate bears a very close similarity to the respective collision history over the 9 year period. Despite an upward movement in 2006/7, the reduction of KSI casualties from 2000 to 2008 is significant at 36.1% (892 to 570). PIA casualties have fallen by 11.0% (7433 to 6617) in the same period.

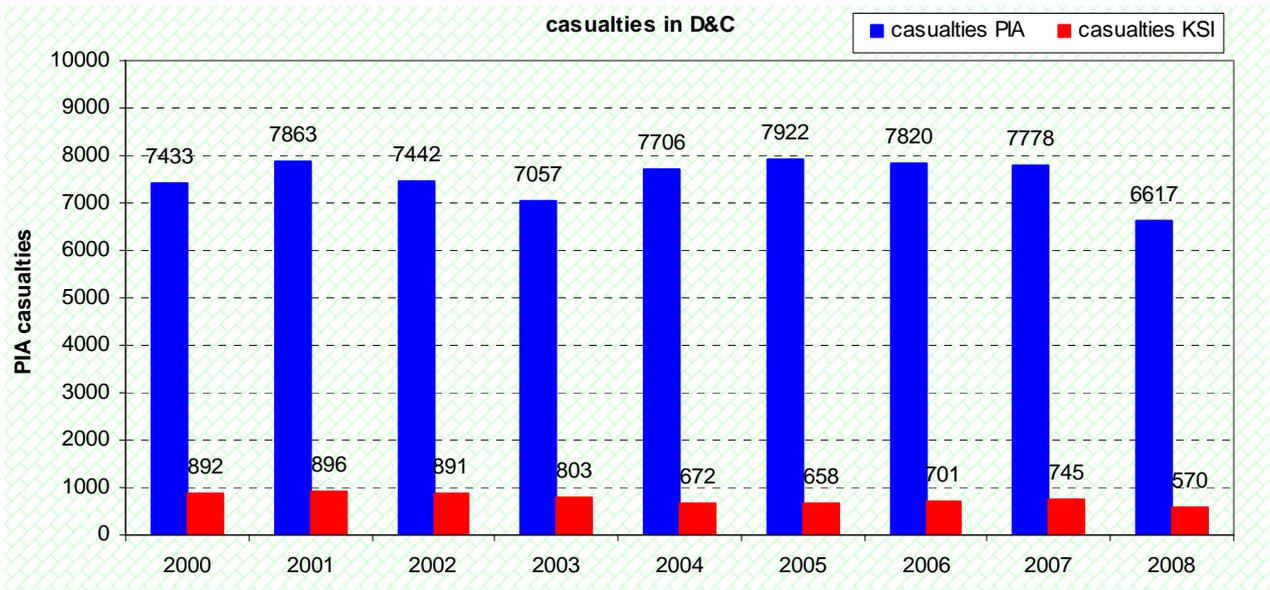


Figure 7: Casualties in D&C area

Figure 8 is the equivalent chart for casualties occurring at camera sites and shows the trend for KSI casualties to have been strongly downward until 2005, since when there was a slight increase in 2006 and a small reduction again on 2007. The 9 year decrease has been 78.0% (136 to 30) whilst slight injuries levelled until a further reduction in 2008, with a 9 year reduction of 42.8% (769 to 440).

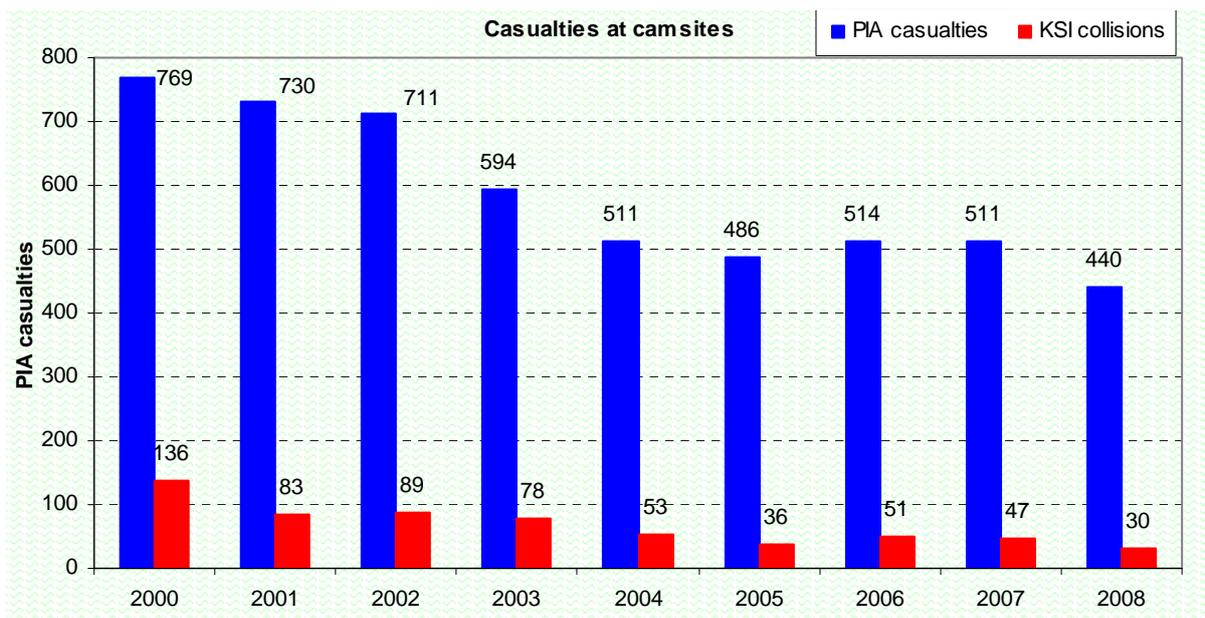


Figure 8: Casualties at all Safety Camera sites

8 SUMMARY OF DATA

In the 9 years 2000 to 2008 inclusive:

- KSI collisions fell by 75.2% in the vicinity of all approved Safety Cameras and fell by 32.3% overall in D&C.
- KSI casualties fell by 78.0% in the vicinity of Safety Cameras and fell by 36.1% overall in D&C.
- PIA collisions fell by 39.2% in the vicinity of Safety Cameras and fell by 15.4% overall in D&C.
- PIA casualties fell by 42.8% in the vicinity of Safety Cameras and fell by 11.0% overall in D&C.
- The underlying trend for PIA collisions and PIA casualties in the whole of D&C has been flat until 2008 since when there has been a fall.
- The underlying trend for KSI collisions and KSI casualties in the whole of D&C is downward.

For the purposes of this report we will consider the D&C Partnership area in two parts; (a) the *camera site region* is defined as the approved camera sites of approximately 1km road coverage each, and (b) the *non-camera region* that comprises the remainder of the 20,000 km of roads in D&C. The latter region includes sites already identified with collision clusters that are in the process of data collection prior to consideration as future approved sites and other yet-to-be-identified sites that may be evolving.

We can compare the collision history within the two defined regions in two ways; treating them exclusively or inclusively. The exclusive method will directly compare data from the two independent regions, whereas the inclusive method will compare the camera region data with the whole D&C area, including the camera region.

If the regions are treated **exclusively** over the 9 year period 2000 to 2008, the data show a reduction of 75.2% (113 to 28) in KSI collisions at camera sites, compared with a 24.5% (617 to 466) reduction in KSI collisions in the remainder of D&C. During the same period the number of all-injury collisions at camera sites fell by 39.2% (558 to 339), and by 12.8% (5130 to 4473) in the remainder of D&C.

If the regions are treated **inclusively** over the 9 year period, the KSI collisions at camera sites has fallen by 75.2% compared with 32.3% (730 to 494) for the whole of D&C. The number of all injury collisions has fallen by 39.2% at the camera sites and by 15.4% (5688 to 4812) in D&C.

The significant reduction of injury collisions at sites where camera enforcement takes place compared with unenforced areas provides an indication that enforcement is a major contributor to overall reductions, though it is acknowledged that there are other factors that may also have an effect.

9 DISCUSSION OF RESULTS

This report summarises the reported data with respect to injury collisions in D&C during the period stated and does not attempt to address the relative contributions of Safety Cameras, RTM and Long-term Trend on collision reduction or growth.

“If the pre-partnership trend were assumed to have continued without interventions the chart suggests cumulative reductions of 260 KSI collisions and 993 PIA collisions at the end of December 2008.” (page 7).

“At all camera sites the reduction in KSI casualties since 2000 has been 75% compared to 32% reduction across the entire D&C region.”(Page 11)

These key summary statements identify the reduction in the casualty rate within the vicinity of cameras - the data generally supports the usefulness of Safety Cameras as a casualty reduction intervention. However there is considerable difficulty in the analysis of camera sites effectiveness due to the wide number of potential variables in road user behaviour.

The stability and cause of longer term injury collision trends is difficult to establish They may be affected by the general perception of enforcement / media coverage of cameras deterring speed as well as cameras specific sites injury collision sites. The 1 km section of carriageway used for camera assessment maybe an overstatement of the length of realistic camera effect and this approach is under review.

One of the challenges of reducing collisions by the use of Safety Cameras is the long period between the identification of a collision cluster and the start of enforcement. This period includes the review of the site by the relevant highways authority to ensure all practical road safety schemes have been considered and implemented. Precise implementation dates are difficult to determine as the effect starts as soon as signs and housings are put up, even before any enforcement takes place.

There have been other factors that may have influenced the performance of the Safety Cameras since the Partnership began. The conspicuity markings were made mandatory on fixed speed cameras in June 2002 which may have affected their effectiveness. Since 2002 there have also been changes to road sign rules intended to improve driver awareness of speed limits and enforcement. In 2006 / 7 the DfT required additional speed limit signing to be placed in the vicinity of camera sites where permitted by TSRGD. Research on the potential effect of this change was not declared by the DfT in advance and the subsequent impact on speed and casualties is difficult to quantify, although it is anticipated speed reduction benefit may have resulted.

Reduction in injury collisions may have many local causes; specific road safety schemes, local industrial or housing development schemes, traffic congestion, Safety Cameras etc. The “National Trend” is the result of a combination of many factors; improved vehicle design (braking systems, impact crush zones etc), roadworthiness, publicity leading to better awareness of speeding and road casualties and gradually increasing congestion that slows traffic for example.

However the data in section 6 and section 7 show that there has been a significant reduction in KSI collisions and casualties since 2000 in the D&C Partnership area. This is in contrast to the generally ‘flat’ trend of PIA (all-injury) collisions.

In 2000 the KSI collisions at new Safety Camera sites represented 14.7% of the total KSI collisions for D&C. After 9 years of Camera enforcement the KSI collisions at Camera sites now represent only 5.7% of the D&C total.

The fact that KSI collisions are reducing across the whole region reduces the potential concern that the concern that Safety Cameras cause the KSI collisions to occur elsewhere. The data show that the occurrence of collisions resulting in fatal or serious injury is falling faster within 1km of Safety Cameras than elsewhere in the two counties.

The reductions in collisions and casualties are significant and can be attributed to four main reasons; Safety Camera enforcement, long-term trends (such as improved vehicle safety and education), any complimentary road safety engineering and Regression to Mean (RTM). RTM is a phenomenon that can have an effect where an area has been selected primarily on the basis of abnormally high data, i.e. collision clusters. If an area is selected at random for study with no pre-knowledge of its parameters then RTM cannot be considered to have an effect. The long-term D&C trend in PIA collisions and casualties is flat whilst KSI collisions and casualties are falling.

The Department for Transport criteria for establishing sites required a threshold of KSI collisions to be met prior to enforcement, which tended to highlight specific lengths of road which had a combination of road features and high traffic volumes for attention. This tended to focus effort on higher traffic volume roads.

As a result of the selection criteria the types least likely to be identified for intervention are the rural roads of which the South West has a higher proportion than any other part of the country. As a result the maximum direct effect of any Safety Camera presence in D&C is on approximately 1% of the network.

There has been a reducing number of new sites in the later years of the programme, so the role of the project team has become more one of maintaining the reduced levels at older established sites, than achieving wider compliance across the network. Identification of strategic routes / areas for casualty reduction and ways of increasing the effectiveness of enforcement at existing sites are the priority for the project team.

There is still the facility to respond to community concerns over speeding through deployment of Safety Camera enforcement. This has, historically, been limited by the Department for Transport rules and guidance, and does not generally initiate a long term enforcement programme.

Collision data across the Devon and Cornwall road network shows that injury collisions have fallen in the vicinity of core enforcement cameras, however whilst data indicates the number and severity of collisions has fallen at cameras sites, extending and maintaining this trend at all locations is likely to be difficult against increasing background trends of population and traffic growth greater than the national average.

The key challenge for the project is to achieve extended influence on the wider road network, rather than just the historically approved locations.