Road Safety Factsheet

March 2021

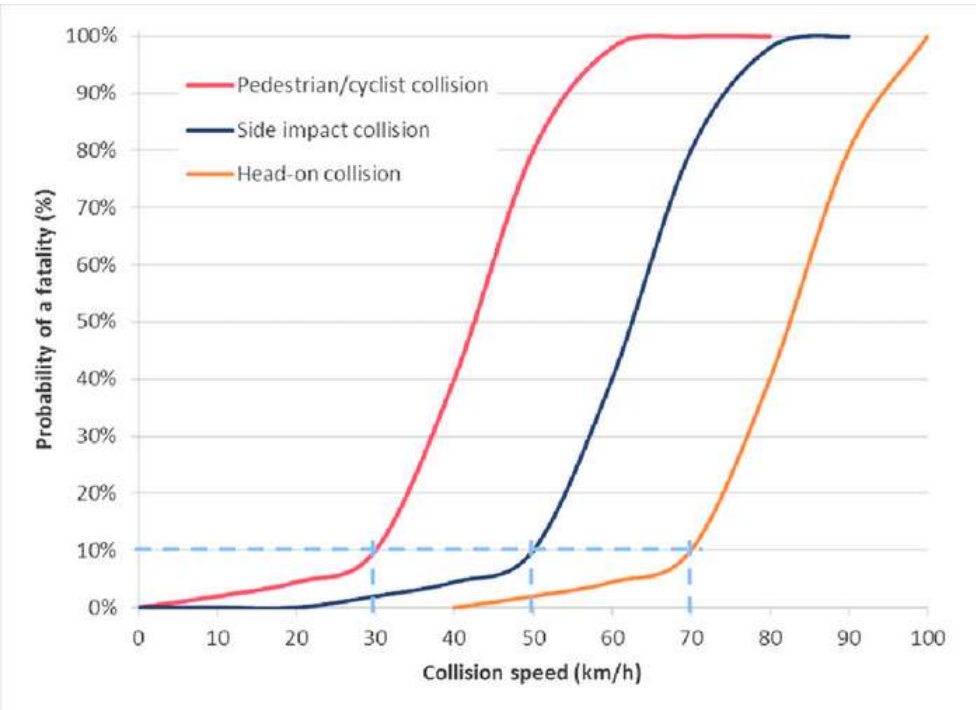
Speed Cameras

Drivers travelling at higher speeds have less time to identify and react to what is happening around them. It takes longer for the vehicle to stop, and the crash will be more severe, causing greater injury to the occupants and any pedestrian or rider hit by the vehicle.

Higher speeds also increase the severity of an injury in a collision. Approximately two-thirds of all crashes in which people are killed or injured happen on roads with a speed limit of 30 mph or less.

For car occupants, the risk of being killed in a collision with another vehicle increases with speed. The risk is much higher in a side impact than in a frontal impact. For pedestrians struck by cars, the risk of fatality increases slowly until impact speeds of around 30 mph. Above this speed, risk increases rapidly (between 3.5 and 5.5 times from 30 mph to 40 mph)[1]. The graph above, Wramborg's model, illustrates the probability of a fatality in pedestrian and cyclist collisions, side impact collisions and head-on collisions at different speeds.

Figure 1: Wramborg's speed model, showing probability of a fatality by collision speed (km/h)[2]



Speed and reported accidents in the UK in 2019*

In 2019, inappropriate speed (exceeding the speed limit and travelling too fast for the conditions) contributed to 12% of all accidents, 13% of serious injuries and 24% of deaths on the road. Almost 350 people are killed each year on Britain's roads, and over 2,500 are seriously injured, because drivers and riders travel too fast.[3]

In 2019, exceeding the speed limit alone resulted in 15% of all fatal road accidents, 7% of all serious accidents and 6% of overall accidents. This means that 215 people died as a result of speeding during that year.[3]

Unfortunately, most drivers exceed the speed limit at some time. In 2019, 54% of car drivers exceeded the 30 mph limit in urban areas during free flowing traffic and 86% exceeded the limit on 20mph roads.[4]

For information on staying within the speed limit, read RoSPA's Top Ten Tips for Staying within the Speed Limit.

Speed cameras

The Road Traffic Act 1991 enables Courts to accept evidence of speeding from type approved cameras accompanied only by a certificate signed on behalf of the relevant police force.

Fixed speed cameras are located at selected roadside sites, typically a yellow box on a grey pole. Usually, there are white markings on the road to help calculate vehicles' speed and give extra warning to drivers of the camera's presence. Signs in the area warn motorists that speed cameras are present and discourage them from breaking the speed limit. On roads that do not have speed limit repeater signs, the warnings are often combined with a reminder of the speed limit. Mobile speed cameras are moved from site to site according to local accident data.

Newer, average speed cameras involve pairs (or networks) of cameras, which are used to measure vehicles' average speeds along a clearly defined and accurately measured stretch of road that could be anywhere between a few hundred metres and many miles in length. Automatic Number Plate Recognition software is used to identify and record vehicles at the start and end of the enforced area of road with their entry and exit times, which, together with the known distance travelled, is used to calculate an average speed. If a vehicle is travelling faster than a pre-set threshold, its details and a colour image are digitally recorded. Digital cameras can send this information directly to a computer that generates the penalty notices.

Average speed cameras are clearly distinguishable from fixed speed cameras, and are usually mounted on gantries or cantilever poles high up to enable the automatic number recognition cameras to work effectively. The most visible use of these cameras is at roadwork schemes with temporary lower speed limits, where they have become a common sight over the last decade[5].

Average speed cameras were typically used to enforce speed along higher speed routes, but are now being used to measure speeds in urban 30mph and 40mph routes, as in Birmingham.

Belief in the efficacy of speed cameras has been rising steadily since 2007, with 60% agreeing in 2017 that they save lives. Only 29% of people thought that there were too many speed cameras, down from 47% in 2008[6].

Using income from speeding fines to fund speed cameras

Revenue from court fines and fixed penalties normally goes to the Consolidated Fund of the Exchequer. However, in April 2000, a pilot trial of a new system to enable fines from speed and red light cameras to pay for the costs of camera enforcement (known as 'Netting Off') began in eight areas: Cleveland, Essex, Lincolnshire, Nottingham, Northamptonshire, South Wales, Strathclyde and Thames Valley. In effect, this meant that the cost of providing and operating the cameras was paid for by drivers who exceeded the speed limit, rather than by all taxpayers. The results were so positive after one year, that the government decided to extend the scheme and introduced the necessary legislation in Section 38 of the Vehicles (Crime) Act 2001.

In April 2007, the Department for Transport changed the funding arrangements[7] so that the fines from cameras stayed with the Treasury (as they do with all fines) and created a separate road safety fund for local road safety partnerships that could be used for a wider range of road safety activities, as well as paying the cost or providing and operating the cameras. This was intended to give local authorities, the police and other local partners greater freedom and flexibility to use a locally agreed mix of road safety measures and to give greater local accountability for the deployment and operation of cameras.

Following the General Election in 2010, the new Coalition Government announced it would no longer provide funding for new speed cameras, and will require local authorities and the police to publish data about speed cameras, including accident and casualty figures, speed levels and numbers of offenders given fixed penalties, prosecuted or offered remedial training.

Since 2010, Road Safety Partnerships have consolidated their activities. However, camera enforcement has remained a key tool in 'speed management' in many areas.

Effectiveness of speed cameras

Cameras are a very effective way of persuading drivers not to speed, and thereby reducing the number of people killed and seriously injured.

Studies in the UK

An independent review[8] of more than 4,000 safety cameras over a four-year period showed conclusively that cameras significantly reduce speeding and collisions, and cut deaths and serious injuries at camera sites.

The review found:

Cameras cut speeds

- The number of vehicles exceeding the speed limit at fixed camera sites fell by 70%. The reduction at mobile camera sites was 18%.

- Excessive speeding (15 mph or more above the limit) fell by 91% at fixed sites and by 36% and at mobile sites.

- Average vehicle speed across all new sites fell by 6% overall.

Cameras save lives

- The number of people killed or seriously injured fell by 42% at camera sites. This means there were 1,745 fewer people being killed or seriously injured at the camera sites per year – including 100 fewer deaths per year.

- The number of people killed and seriously injured fell by 50% at fixed sites and by 35% at mobile sites.

- There was a 32% reduction in the number of children killed and seriously injured at camera sites.

- The number of pedestrians killed or seriously injured fell by 29% at camera sites.

Cameras prevent crashes

- There was a 22% reduction in collisions involving (fatal, serious or slight) personal injury at camera sites. This equated to 4,230 fewer personal injury collisions per year.

A review of the evidence of the effectiveness of speed cameras in 2010[9] examined data from the above four-year study plus many other UK and international studies along with data on traffic speeds, collisions and casualties. Taking into account other factors that might reduce speeds, and speed-related crashes and casualties, such as the downward national trend in casualty numbers, regression to mean (as many cameras were installed at sites with untypically high numbers of casualties, casualties might have fallen back towards the average level anyway) and drivers diverting to avoid cameras, concluded that in the year ending March 2004, cameras at more than 4,000 sites across Great Britain prevented some 3,600 personal injury collisions, saving around 1,000 people from being killed or seriously injured (KSI).

The report also concluded that if safety cameras were decommissioned about 800 extra people across Great Britain could be being killed or seriously injured each year.

There has also been a recent report published by the RAC Foundation on the effectiveness of average speed cameras. Information relating to 51 permanent average speed camera sites, installed between 2000 and June 2015, was collected as part of this study. 25 average speed camera sites were then analysed in detail.

On average, the permanent average speed camera sites analysed saw a reduction in injury collisions, particularly those of a higher severity:

- Fatal and serious injury collisions fell by 25-46%

- Personal injury collisions fell by 9-22%

The report also suggested that average speed cameras are becoming more cost effective. In 2000, average speed cameras were estimated to have cost up to £1.5m per mile, in comparison to the £100,000 per mile cost today. This means that the number of average speed camera sites is likely to increase while the installation costs of the cameras decrease, due to the falling cost of technology and increased competition in the market[4].

This is supported by public opinion. 79% of 2,172 motorists surveyed by the RAC[10] say average speed cameras are better at slowing down vehicles compared to just 9% who felt that single location cameras were more effective. 81% of those who believed that average speed cameras were fairer than fixed cameras claimed that they promoted a smoother driving style and more consistent driving speeds rather than drivers hitting the brakes to conform to the speed limit very briefly when driving past a fixed camera.

A recent London School of Economics research study[11] has also concluded that speed cameras do reduce collisions and deaths. Researchers analysed collision outcomes before and after cameras were installed at 2,500 sites in England, Wales and Scotland. This analysis discovered that accidents fell by 17-39% and fatalities by 58-68% between 1992 and 2016 within 500 metres of the speed camera. It was also predicted that by adding 1,000 new cameras, there would be annual savings of 1,130 collisions and 330 fatalities. However, it must be noted that the effects of speed cameras are localized and there could be a 'kangaroo' effect as reductions in casualties fade as motorists travel further away from the camera site. Those surveyed by the RAC also cited this 'kangaroo' effect. While 70% of those asked felt that traditional fixed speed cameras were effective at encouraging drivers to slow down at their specific location, 80% said they made little difference beyond while they were cited[8]. However, the London School of Economics study found that although there was a slight increase in accidents further away from the camera site, the positive effects of the camera outweigh this.

Furthermore, a 2005 study found that speed cameras are a more effective enforcement method than physical policing, particularly in terms of reducing mean speeds and accident rates. However, the enforcement effects of speed cameras seem to be limited to where they are situated: the minimum distance halo (the distance to which the effects of the enforcement last) of physical policing is around 5 times greater than that of speed cameras.[12]

Expanding on the idea of a distance halo, or "halo effect", one study of New York City looked at how to enhance the effectiveness of speed cameras based on their quantity and placement. The study used a Markov model (a framework used to model scenarios) to simulate increased and decreased speed camera installations across New York, using hypothetical participants to calculate Quality Adjusted Life Years (QALYs) – a representation of health, as well as the costs associated with injury prevention. It was found that, similarly to vaccines, the cameras have a "herd immunity" effect, wherein as more cameras are installed, injury rates fall and Quality Adjusted Life Years increase until an optimal number is reached, and after this they produce a minimal return on investment. This relates to the halo effect because of the fact injury rates will only fall within a certain radius surrounding the speed camera. If many cameras are present in one area, these radii will overlap, meaning the injury rate will fall by little to nothing as more cameras are added.[13]

Previous research

The first speed cameras in Great Britain were installed in West London in 1992. In the first three years of operation[14], at the camera sites they:

- Reduced the number of people killed by 70%
- Reduced the number of people seriously injured by 27%
- Reduced the number of people slightly injured by 8%.

A 1996 study[15] found that speed cameras reduced casualties by about 28%.

Initial evaluation of the netting off pilot schemes[16]

An evaluation of the eight pilot areas of the 'Netting-off' scheme over the first two years of their operation found that, on average:

- the percentage of drivers exceeding the speed limit fell from 47% to 20%.
- the percentage of drivers exceeding the speed limit by more than 15mph fell from 7.4% to 0.3%.
- average speeds at the camera sites fell by 10% (3.7mph).
- 35% (280) fewer people were killed and seriously injured.
- 56% reduction in pedestrians killed or seriously injured at camera sites.
- there were 14% (about 510) fewer crashes.

Three year review[17]

This Review of cameras in 24 areas over a three-year period found they significantly reduced speeding and collisions, and had cut deaths and serious injuries at camera sites by 40%.

International reviews

There have been two systematic reviews and one meta-analysis (a technique that compiles the results of all the published studies on a topic to produce an overall estimate of effect) which reviewed the published international research on speed cameras and speed enforcement.

The first systematic review of controlled trials and observational studies into the effects of speed cameras, published in the BMJ in 2005[18], showed consistently that there were reductions in accidents at camera sites, including:

- a 5% to 69% reduction in collisions,
- a 12% to 65% reduction in injuries, and
- a 17% to 71% reduction in deaths

The Cochrane Collaboration published a second systematic review in 2006[19], which was updated in 2010[20]. These studies only included before-and-after trials with comparison areas and interrupted time series studies. The Cochrane reviews again showed that speed cameras reduce road traffic crashes and related road injuries and deaths. All of the studies that looked at speed as an outcome found a reduction in average speeds following the introduction of speed cameras.

The papers included in the latest study reported that at camera sites there was an:

- 8% to 49% reduction in collisions, with most studies reporting between 14% to 25% reductions.
- 8% to 50% reduction in injury crashes, with most studies reporting between 11% to 44% reductions and
- 17% to 58% reduction in fatal or serious crashes, with most studies reporting between 30% to 40% reductions.

The Handbook of Road Safety Measures includes a meta-analysis[21], of research studies that compared camera sites with similar sites that did not have cameras. This produced a best estimate of the effect of fixed visible cameras, which was a reduction in 24% of all accidents and a 39% reduction in fatal accidents. When the authors attempted to control for the potential of bias due to only the more positive results being published, the reduction in all accidents dropped to 16%.

In locations where fixed speed camera enforcement was more than doubled, there was a 35% reduction in accidents and in locations where fixed speed camera enforcement was increased, but not as much as being doubled, there was only a 17% reduction in accidents.

A meta-analysis of mobile, hidden speed cameras found a best estimate of their effectiveness was a reduction in 10% of all accidents and 16% of fatal accidents.

Conclusion

The evidence for speed cameras shows that they are effective at reducing speeds and preventing accidents, especially in preventing more serious and fatal accidents.

The UK evidence shows large reductions in deaths and injuries where speed cameras have been deployed.

The magnitude and consistency of the results across different countries and types of road provides a high level of confidence that the introduction of speed cameras does reduce accidents at the sites where they are located.
While more research would strengthen the evidence base, the studies demonstrating their effectiveness are the strongest evidence available and must be used to inform decision making.

CAMERAS SAVE LIVES

For more information on speed, read RoSPA's Top 10 Tips for Staying within the Limit, Inappropriate Speed and 20mph Zones and Limits factsheets.

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***Due to changes in severity reporting across some police forces since 2016, newer statistics are not comparable to earlier years. Therefore, the DfT provides both adjusted and unadjusted casualty figures in their statistical data tables. RoSPA uses adjusted figures as the DfT states that they are recommended "for the analysis of trends over time".**