EFFECTS AND EFFECTIVENESS OF SPEED CAMERAS

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EFFECTS AND EFFECTIVENESS OF SPEED CAMERAS

- Effectiveness of speed cameras
  - Acceptability of speed cameras
- Behaviour at fixed site 30mph speed cameras
- Caveat: not all drivers want to speed (3 types)
- General deterrent effects of camera housings
- Specific deterrent effects of speeding tickets
- Speed constraint, an integrated approach
  - Road-side (infrastructure, signage, cameras)
  - In-car (ISA, engine management, granny)
  - In-driver!
Automatic speed enforcement, such as by means of speed cameras, is now employed in many countries.

Experience from a range of high-income countries indicates that speed cameras that record photographic evidence of a speeding offence, that is admissible in a law court, are a highly effective means of speed enforcement.

The well-publicized use of such equipment in places where speed limits are not generally obeyed and where the consequent risk of a crash is high has led to substantial reductions in crashes. The cost–benefit ratios of speed cameras have been reported to range between 1:3 and 1:27.

In several countries, including Finland, Norway and the United Kingdom, there has been a high social acceptance of speed cameras.

World Report on Road Traffic Injury Prevention, Ch 4. WHO
International reviews of safety camera installation

Wilson et al. (2006) concluded that the number of personal injury crashes on roads and in areas with fixed or mobile cameras decreased by 7% to 30% compared to similar roads or areas without cameras.

Thomas et al. (2008) shows that the number of personal injury crashes on road sections where fixed cameras were used was reduced by 20 to 25%.

Ercke, Goldenbeld & Vaa (2009) reported a reduction in the number of personal injury crashes of 35% for fixed cameras and 14% for mobile cameras.
Who supports speed cameras?

Percent in favour: F 81% M 67%
(Percent against: F 4% M 18%)

‘Overall, I am in favour of speed cameras’: Strongly Agree; Agree, NAD, Disagree, Strongly Disagree

Average Speed Cameras (Duncan Kay)

• Safety / Social:
  • National Safety Camera Programme report (2005):
    • 53% reduction in vehicles exceeding the speed limit
    • 100% reduction in those exceeding by more than 15mph
  • A14 Huntingdon to Cambridge results (July 2009):
    • 41% reduction in collisions resulting in personal injury
    • % of collisions causing death or serious injury down from 13% to 2%
    • Anecdotal evidence points to improved reliability in journey times, smoother traffic flows, less close-following, less aggressive driving and improved fuel consumption.
  • On average, better than 70% reduction in deaths and serious injuries across all sites using average speed cameras
Average Speed Cameras
(Duncan Kay)

- Environmental
  - Carbon Savings - 1.4 million tonnes of CO$_2$ emissions savings - *Committee on Climate Change*
  - We urgently need quick, fair and effective ways of reducing carbon emissions from transport
  - Strict enforcement of speed limits on main motorways was tested in France in 2004: 19% reduction in carbon emissions; 30% reduction in collisions
  - Other potential benefits – air quality improvements, reduced noise
Corbett and Simon’s (1999) work on observed driving in an urban environment: drivers can be categorised into four groups depending on their speed and camera related driving behaviour.

**Conformers** who always or nearly always comply with speed limits

**Compliers** who reduce their speed at cameras and remain at or below the speed limit

**Manipulators** who slow down for the camera then speed up once beyond the camera

**Defiers** who exceed speed limits and do not reduce their speed
Respondents were shown a diagrammatic representation of a car before, at and after a fixed speed camera on a road in a built-up area with a 30 mph speed limit and were asked to indicate what speed they would be going at each point (approaching - passing - having passed).

<table>
<thead>
<tr>
<th>Category</th>
<th>Speeds</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conformers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conformers</td>
<td>30-30-30</td>
<td>45%</td>
</tr>
<tr>
<td>Nervous conformers</td>
<td>28-25-28</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Compliers</strong></td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>Compliers</td>
<td>35-30-30</td>
<td>13%</td>
</tr>
<tr>
<td><strong>Manipulators</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full manipulators</td>
<td>40-30-40</td>
<td>16%</td>
</tr>
<tr>
<td>Released manipulators</td>
<td>30-30-40</td>
<td>6%</td>
</tr>
<tr>
<td>Partial manipulators</td>
<td>40-30-35; 35-30-32</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Defiers</strong></td>
<td></td>
<td>27%</td>
</tr>
<tr>
<td>Defiers</td>
<td>40-40-40</td>
<td>1%</td>
</tr>
</tbody>
</table>

Percent of cars exceeding speed limit and exceeding speed limit by 5 mph at 30 mph sites in free flowing traffic, Great Britain 1998-2008

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>% exceeding limit</td>
<td>69</td>
<td>66</td>
<td>59</td>
<td>53</td>
<td>48</td>
<td>49</td>
<td>?</td>
</tr>
<tr>
<td>% exceeding limit by 5 mph</td>
<td>32</td>
<td>25</td>
<td>22</td>
<td>18</td>
<td>18</td>
<td>?</td>
<td></td>
</tr>
</tbody>
</table>
Drivers indicated how often they had in the previous 3 months:

- ‘Driven in a built up area (where there is a 30 mph limit)’ at
  - 35 mph
  - 40 mph
  - 50 mph

- ‘Driven on a single carriageway A road (where there is a 60 mph limit)’ at
  - 70 mph
  - 80 mph

- ‘Driven on a dual carriageway (where there is a 70 mph limit)’ at
  - 80 mph
  - 90 mph.

Responses were made on 6-point scales from 1 ‘Most days’ to 6 ‘Never’.

784 respondents had driven on all 3 road types within the previous 3 months and their responses were analysed.

Exceeding the speed limit: extent of

Average number of speeding opportunities taken at least once in previous 3 months (max=7)

![Graph showing the average number of speeding opportunities by age group and gender.](image-url)
Exceeding the speed limit: extent of

‘Within the last 3 months, how often have you …’

<table>
<thead>
<tr>
<th></th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driven at 35 in a 30 limit</td>
<td>20%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Driven at 40 in a 30 limit</td>
<td>no</td>
<td>33%</td>
<td>80%</td>
</tr>
<tr>
<td>Driven at 50 or more in a 30 limit</td>
<td>no</td>
<td>no</td>
<td>25%</td>
</tr>
<tr>
<td>Driven at 70 on a single carriageway A road</td>
<td>12%</td>
<td>40%</td>
<td>95%</td>
</tr>
<tr>
<td>Driven at 80 or more on a single carriageway A road</td>
<td>no</td>
<td>4%</td>
<td>48%</td>
</tr>
<tr>
<td>Driven at 80 on a dual carriageway</td>
<td>12%</td>
<td>40%</td>
<td>92%</td>
</tr>
<tr>
<td>Driven at 90 or more on a dual carriageway</td>
<td>no</td>
<td>no</td>
<td>50%</td>
</tr>
</tbody>
</table>

Average no. of exceeds (of 7) 1.62 3.76 6.09

% of sample 52% 33% 14%
Membership of Excessive Speeding cluster: Male and Female car drivers by Age group

- 17-24: Male 46%, Female 33%
- 25-34: Male 26%, Female 14%
- 35-44: Male 21%, Female 10%
- 45-54: Male 24%, Female 1%
- 55-64: Male 9%, Female 3%
- 65-74: Male 2%, Female 0%
- 75+: Male 0%, Female 0%

Legend: □ Male  ▢ Female
## Problem Speeding scale

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel more comfortable driving fast than slow</td>
<td>&lt;1</td>
<td>11</td>
</tr>
<tr>
<td>I think that speeding will always be a problem for me</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>My passengers sometimes ask me to drive more slowly</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>I enjoy driving fast but sometimes I do drive a bit too fast</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>I really enjoy driving fast</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>I speed whenever I think it is safe to do so</td>
<td>2</td>
<td>29</td>
</tr>
<tr>
<td>I like to put my foot down on open roads &amp; motorways</td>
<td>3</td>
<td>30</td>
</tr>
</tbody>
</table>

**Strongly Agree with at least 1 Problem Speeding item**  
11%

**Female**  
7%

**Male**  
15%

<table>
<thead>
<tr>
<th>Age Group</th>
<th>17-24</th>
<th>75+</th>
<th>1.0 litre engine</th>
<th>2.0+ litre engine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17%</td>
<td>3%</td>
<td>6%</td>
<td>17%</td>
</tr>
</tbody>
</table>
6 30mph sites identified
- NO camera housings
- NO road markings
- NO camera
- NO new camera signs

All 6 sites:

number of vehicles over posted speed limit

sites identified
camera housings installed
• NO road markings
• NO camera
• NO new camera signs

All 6 sites:

number of vehicles over posted speed limit

2nd Nu-metrics Survey
July 2000
3rd Nu-metrics Survey
October 2000

- Sites identified
- Camera housings
- Road markings
- Camera operational at 4 sites
  - NO new camera signs

All 6 sites:

Number of vehicles over posted speed limit

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>12am</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2am</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4am</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6am</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8am</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10am</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12noon</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2pm</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4pm</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6pm</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>8pm</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10pm</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Speed of vehicles

All 30mph limit sites:

number and speed of vehicles

<table>
<thead>
<tr>
<th>MPH</th>
<th>Number of vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>75</td>
<td>0</td>
</tr>
<tr>
<td>70</td>
<td>0</td>
</tr>
<tr>
<td>65</td>
<td>0</td>
</tr>
<tr>
<td>60</td>
<td>0</td>
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<tr>
<td>55</td>
<td>0</td>
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<tr>
<td>50</td>
<td>0</td>
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<tr>
<td>45</td>
<td>0</td>
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<tr>
<td>40</td>
<td>0</td>
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<tr>
<td>35</td>
<td>0</td>
</tr>
<tr>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>25</td>
<td>0</td>
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<tr>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

STUDY

April 2000
July 2000
October 2000

Data unavailable for Sandwood October 2000
Effect of a speeding ticket on driver behaviour

Since I got the ticket …

**SPEED SENSITIVE**
- I keep more of a look out for speed limit signs
- I pay more attention to my speed while driving
- I look at my speedometer more often

**CAMERA SENSITIVE**
- I keep more of a look out for speed cameras
- I slow down when passing any speed camera

**INSENSITIVE**
- None of the above

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Crash severity

The greater the speed at impact, the more energy must be absorbed by hard metal, soft flesh and brittle bone.
Flashed:
How many times have you been flashed by a speed camera in the past 3 years?

RTA:
How many road traffic accidents have you been involved in as a driver in the past 3 years? (N = 2022)

Injury Accident:
As a driver, how many times have you been involved in an accident in the past 5 years in which someone was injured? (N = 1134)
### Car driver crash involvement for speeders and non-speeders

<table>
<thead>
<tr>
<th></th>
<th>Non-speeders</th>
<th>Speeders</th>
</tr>
</thead>
<tbody>
<tr>
<td>% RTA involved last 3 years</td>
<td>12%</td>
<td>22%</td>
</tr>
<tr>
<td>% involved injury accident last 5 years</td>
<td>4%</td>
<td>8%</td>
</tr>
</tbody>
</table>

These people need help

Cameras spot crash magnets
Why do drivers speed?

Because … ... they can

Car, road geometry, traffic flow, cameras, traffic management, weather, etc..

“In modern cars it’s very difficult to drive at less than 35 mph.”
At what speed would you feel safe driving on the motorway?
“Well, in the right circumstances, about 95" High-mileage F.

Because … ... they’re pressed to

Obligations, time and schedule pressure, expectations, etc..

“I’ve got a friend and she’s just passed her test, okay all respect to her she did have a crash, but she’ll drive 5 mph under the speed limit everywhere and it’s just so annoying, it really is.” F 17-24.

Because … ... it feels good

Thrill-seeking, competitiveness, boredom susceptibility, progress interrupted, etc..

“I’m a pretty careful driver, but every now and again, it’s cool to go fast and it feels good.” M 17-24.
Make observing the speed limit as easy as possible:

• How fast am I going? Improve speedometer display.

• What’s the speed limit here? Camera warning signs, highly visible cameras, carriageway roundels, all should display the limit that is being enforced.

• How can I drive more slowly? Include procedural advice with Conditional Offer Letter. Re-tune engines.

Periodic Driver Refresher Training

Duration-driven Every 5 or 10 years (57% ‘Agree’: RAC 2002)

Incident-driven Crash-involved; 9 Point Club; Red-runners; DAS; SACs
Drivers (An Integrated Approach)

Those who drive as part of their work should be constrained by Health & Safety At Work legislation. To require employees to break the law - even Road Traffic Regulations - is criminal.

When persons are employed to operate large and dangerous pieces of equipment the following conditions typically apply:

1. there is a rigorous selection procedure
2. there is extensive initial training
3. there is frequent supervision providing fast feedback to the operator
4. there is regular audit and appraisal of continuing competence
5. there is continual updating as operating conditions and equipment change
6. there is retraining and remediation when necessary
7. there are mechanisms for removing those whose manner of operation threatens the safety of themselves or others.


Driver Intervention Courses for persistent speeders and other violators (e.g., red light runners). These people need help.