Point-to-point speed enforcement: Recommendations for better practice

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Overview

• The problem of speeding in Australia
• Point-to-point speed enforcement
• Research methodology
• Recommendations of the research
  – Operational, technological, legislative and privacy, public education, evaluation
• Conclusions
Speeding in Australia
The Speeding Problem

• Positive relationship between speed and crash risk/severity (Aarts & van Schagen, 2006; Kloeden, McLean & Glonek, 2002)

• Speed variability also associated with increased crash risk (Transportation Research Board, 1998)

• A pervasive behaviour in Australia, a major contributor to traffic crashes and related trauma (Australian Transport Council, 2011)

• Arguably, socially acceptable, particularly at low levels over the speed limit (Ipsos Social Research Institute, 2013; Fleiter & Watson, 2006; Hatfield & Job, 2006)

• Punishment avoidance strategies means innovative speed enforcement approaches are continually needed
Point-to-Point Speed Enforcement
Where Is It Used?

- Relatively new approach to Australia and New Zealand
  - Currently operates in Vic, Qld, ACT, SA, NSW (heavy vehicles only) and New Zealand
- More extensively used in the UK, Netherlands, Austria, Italy and some other parts of Europe
- Commonly referred to as ‘average speed enforcement’ or ‘section control’
How It Works?

• At its most basic, a point-to-point system involves:
  – Two or more camera sites along a section of road
  – Cameras may be forward or rearward facing (or both) depending on system requirements
  – Image and vehicle registration data collected at each point and matched using ANPR technology
  – Local processor > Communication network > Back office
  – Average speed calculated by dividing distance between two camera sites by time taken to travel that distance
What it aims to do

• Promote reductions in speed over longer road sections

• Achieve greater network-wide effects than cameras that measure instantaneous speeds
What the Research Says

• **Reductions in vehicle speeds, especially high-range speeding** (Barker, 2005; Cascetta & Punzo, 2011; Charlesworth, 2008; Stephens, 2007)

• **Reductions in speed variability (improved headway)** (Charlesworth, 2008)

• **Reductions in fatal and serious injury crashes** (Galata, 2007; Punzo & Cascetta, 2010; Speed Check Services, 2009, 2010)

• **Homogenised traffic flows** (Cascetta, Punzo, & Montanino, 2011; Collins, 2007; Koy & Benz, 2009)

• **Reductions in vehicle emissions and noise** (Stoelhorst, 2008; Thornton, 2010)

• **High rates of driver acceptance** (Crawford, 2009; Schwab, 2006; Walker et al, 2009)
Status of Current Research

• No evaluations from Australia or New Zealand to date
• Majority of empirical research from UK, Netherlands, Austria, Italy & France
• Poor methodological rigour common
  – Comparison/control sites not used
  – Confounding factors rarely controlled for (exposure, regression-to-the-mean)
  – Statistical significance testing typically not performed
  – Some non-independent studies conducted by equipment manufacturers
• However, consistent positive effects are encouraging
Research Methodology
Stakeholder Consultations

• A total of 46 stakeholder organisations
  – Face-to-face, telephone, survey
  – 24 from Australia & New Zealand
  – 22 international (UK, Netherlands, Austria, Italy, France, Finland, Switzerland, Belgium, Slovenia)

• Organisations included:
  – Police agencies, transport and highway authorities, motoring groups, manufacturers of speed detection equipment, other road safety research centres, and measurement and privacy departments within government
Working Group

• Full-day working group
• Involved key Australian and New Zealand stakeholders
  – Police agencies
  – Transport and highway authorities
• More in-depth discussion of issues emerging during the stakeholder consultations
Operational Recommendations
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• Site selection based on strict criteria
  – Speed-related crash history across a section of road as a minimum
  – Proactive identification of potential crash sites (eg new residential/business developments)
  – Locations where other enforcement not safe/viable (eg tunnels)

• Complementary rather than a replacement for existing methods
Operational Recommendations

- Not a long-term alternative to addressing underlying road design or maintenance issues
- Other enforcement activities within the enforced section should continue
- Jurisdictions responsible for own policies on enforcement tolerances & multiple infringements
Operational Recommendations

• Continue to operate overtly
  – Advance signage; additional signage within long enforcement corridors
  – No signage at end of enforcement corridor may increase deterrent impact

• Enforcement corridors should have:
  – Minimal opportunities for access and egress
  – Relatively high traffic volumes
  – No foreseeable major infrastructure changes (need to resurvey shortest practicable distance)
  – Minimal impact on other parts of the road network
Technological Recommendations
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• Camera mounting approach should maximise capture rates and minimise disruption during maintenance
  – Above lanes (e.g., on a gantry) is best or high side-mounted poles

• Cameras:
  – Should monitor all lanes (incl. emergency lanes)
  – Both rearward and forward facing if feasible, or choice based on requirements
  – Plate camera at minimum; scene camera if feasible (can provide verification for evidentiary purposes)
  – Monochrome digital cameras with infra-red flash
Technological Recommendations

- ANPR processing conducted at camera site
  - Only data on offending vehicles transmitted to the back office
- Appropriate security protocols required to ensure data being transmitted is safe
- All infringements data should be manually verified at the back office – systems should not be fully automatic
Legislative/Privacy Recommendations
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• Prescribed device
  – Equipment approved and gazetted

• Prescribed process
  – Approval of formula to calculate average speed
  – Collection of data from multiple detection devices
  – Average speed as prima facie evidence of actual speed
Legislative/Privacy Recommendations

• Shortest practicable distance
  – Measured independently by a certified surveyor
  – To traceable national standards
  – Re-surveyed following changes to road alignment

• Regular clock synchronisation
  – To a common traceable time source
  – Secondary reference system (to ensure accuracy and safeguard from malfunctions)
Public Education Recommendations
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• Public education campaigns should focus on:
  – How the systems operate
  – How many systems are operating in a jurisdiction

• Should highlight P2P is an effective approach for dealing with persistent, intentional speeders

• While P2P often perceived by drivers as a “fairer” approach, this term should be avoided as it suggests other speed enforcement approaches are unfair
Evaluation Recommendations
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• Evaluation is critical
  – Very few rigorous evaluations conducted to date

• Evaluations should be costed into plans to implement P2P systems
  – Outcome; process; driver acceptance; cost-effectiveness
  – Matched comparison sites; statistical significance testing; control for confounding factors; sufficient baseline and follow-up data periods
Conclusions
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• P2P often seen as a “fairer” approach – scope to improve overall community acceptance of speed enforcement activities

• Determining how P2P fits into the speed management strategy will differ in each jurisdiction

• Existing research supports increased implementation of P2P systems
Conclusions

- Mobile P2P systems represent a new approach that should be explored further
  - Used for temporary purposes (e.g., roadworks)
  - Scope to increase the general deterrent impact of traditional mobile speed cameras
Future Research

• Must improve scientific rigour of evaluations
• Investigate:
  – impact of P2P across the entire road network (e.g., halo effects)
  – utility of mobile P2P systems
  – utility of P2P systems in urban & residential environments
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