Speed enforcement programmes in France and Queensland: First elements for a systematic comparison

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Abstract

Speeding is one of the main contributing factors to road crashes. The use of Automated Speed Enforcement programmes (ASE) appears to be one of the most promising interventions to change driver behaviour and reduce road trauma. International experience has shown clear benefits from such programmes. The French government implemented ASE in late 2003. Currently, 2000 radar devices are deployed throughout the French territory, with an emphasis on fixed cameras. The Australian state of Queensland implemented ASE in May 1997 with 500 initial camera sites. The number of sites and operational camera hours has increased since the programme's inception and recently, fixed speed cameras were introduced. This paper compares the approaches taken by the French and Queensland Governments regarding implementation and management of ASE. The first section summarises the historical background of both programmes and highlights the role of political leaders in the road safety arena. The second section addresses organisational dimensions, including how the programmes are deployed and operated. Finally, we compare the performance outcomes of each system. We conclude by highlighting that there appears to be no single best way to implement speed enforcement measures in a 'whole-of-jurisdiction' approach. Rather, lessons from the deployment of individual enforcement methods and related outcomes internationally, together with considerations of political and organizational factors, should inform speed management strategy choices.

Keywords

Automated speed enforcement, public policy, speed cameras, traffic safety, speeding, deterrence

Introduction

Speeding is one of the major contributing factors to road crashes and a large body of international literature acknowledges the risks associated with increased driving speeds (GRSP, 2008). Camera-based speed enforcement has been shown to be a very effective intervention to reduce crashes and associated trauma in many jurisdictions around the world (Cameron, 2008). However this type of traffic law enforcement is also a sensitive topic because of its potential to directly impact on road users in the form of high monetary fines, loss of demerit points and the potential for eventual licence and/or vehicle loss. Moreover, public sensitivity surrounding ASE programmes can relate to public concerns about the motivations of authorities (i.e., perceptions of ASE being motivated by revenue raising for governments, rather than by safety concerns for the general driving public). It can also relate to concerns about the technologies used and the way in which they are implemented, operated, and maintained. For a more in-depth discussion of issues relating to the four main dilemmas associated with speed enforcement programmes as identified by Goldenbeld (2002)

(social, legitimacy, implementation and credibility dilemmas), see Delaney, Ward, & Cameron, 2005.

Most of the existing research on speed camera programmes has, justifiably, focused on their effectiveness in reducing crashes (fatal, injury, and total) and travel speeds. Around the world, there is a great deal of variety in the type of equipment (e.g., mobile/fixed cameras) and the deployment mechanisms used (e.g., overt/covert operations). The research findings suggest that there is no one single best way to design such a programme. Despite the fact that different countries have developed different policies and technical approaches to implementing speed camera programmes, there has been limited systemic research investigating the policy aspects of camera-based enforcement. Traffic law enforcement is a complex social action involving many players including government agencies, elected political representatives, the judiciary, researchers, industries, the community, and individuals. It involves a particular system of governance, which, we believe, warrants detailed analysis. This paper takes the first step by offering points of analysis in two quite distinct operational ASE programmes.

Queensland and France are different in many dimensions. In terms of geography, Queensland covers 1,852,642 km², making it 3 times larger than France (674,843 km²). In 2007, France's population was roughly 64 million, more than 15 times greater than the population of Queensland (4 million). The political organizations are also different in many regards. Queensland is one of Australia's most decentralized states and belongs to the Commonwealth of Australia. Each Commonwealth state has its own legislature. France is part of the European Union, but keeps an important autonomy. Moreover, its administrative organization shows a strong influence of central government. Concerning the traffic safety situation, in 2006, the fatality rate per 100,000 km traveled in Australia and France was the same, 7.7. However Queensland's fatality rate was higher at 8.29. This information provides an initial snapshot of the current situation in both countries. To expand upon this, our paper focuses on the policy aspects of speed camera deployment and contrasts the approaches taken by France and Queensland. The first section of the paper provides an historical overview of speed camera programme development and identifies the role that political intervention has played in implementation. The second section details deployment characteristics of the two programmes. The last section discusses the outcomes obtained by each system.

Speed camera policy frameworks

The deployment of an effective speed enforcement programme requires involvement of all road safety stakeholders. The implementation of a speed enforcement programme is an important decision for a government. It represents a major change for road safety public policy. There are different objectives and approaches for installing speed cameras, illustrating different political considerations and operational strategies.

The French strategy: political priority and breaking with past practices

In July 2002, France's president Jacques Chirac decided to make road safety a priority for his term in office (Carnis, 2007). This political commitment from the top executive level was the main catalyst for initiating an important change in the public policy of road safety. The support of the President has undoubtedly contributed to the success of the policy change in terms of effectiveness (it has operated since 2003) and outcomes (high reductions of fatalities and injuries). The political impulse was a determining factor for having a good understanding of the implementation process. Road safety issues were put at the forefront of the political agenda. Moreover, it was supported by previous legal decisions and technical investigations

that made it possible to rapidly establish a system of Automated Control (CA) (Carte Blanche Conseil, 2003). This work was done at the interministerial level, which requires considerable efforts to coordinate the interventions of the different Departments involved in this policy (e.g., Justice, Interior, Transport).

The introduction of CA can also be interpreted as a reaction to past practices of deterrence in general, and speed enforcement in particular. Indeed the public policy of deterrence, as it was implemented, was a *highly ineffective* one. For instance, before the introduction of the CA, the likelihood of detection was very low (0.33 infringements per hour of surveillance in 1998) (Carnis, 2001). Furthermore, issues of enforcement tolerances and leniency were evident and served to undermine the deterrence principles of certainty and severity of punishments. For example, the exercise of tolerance (a detection threshold of 30 km/h over the speed limit was applied[1]) (Carnis, 2001) and leniency (e.g., prosecutions abandoned) were widespread (Zauberman, 1999; Pérez-Diaz, 1998). The use of these practises was well known and seemed ultimately to be accepted unreservedly by all (politicians, public decision makers and the driving public). In fact, these behaviours, perceived as 'humane practice' by police officers, constituted important means for managing their police interactions with road users (who are also citizens and voters). Indeed for some officers, their work (traffic policing) was conducted in the very jurisdictions in which they lived (Carnis, 2007). Moreover, the recovery rate for fines was low, with an average of 2 offenders out of 3 avoiding payment (Carnis, 2001) and some offences not leading to prosecution. Together, this emphasizes the low priority given to Highway Code offences by the judicial process at the time.[2] Thus, a speeding offender benefited from impunity and, if caught, the probability of punishment was very low. Therefore, the French CA can be viewed as an essential departure from past practices and as an important executive decision to introduce a modern, effective and fairer enforcement system. When the programme was first introduced, emphasis was given to the fairness of the system. This is likely to account for the high level of social acceptance that the program now experiences (Ragot, 2006).

The implementation of CA began with an experimental phase in the beginning of 2003. Six different sites were chosen where automatic radar devices would operate. The results, in terms of reduction of speed and number of speed offenders, encouraged further developments of CA (Carnis, 2008). In November 2003, 80 first-generation radars were deployed. From 2004 to 2007, the number of devices increased, and 2000 operating radar devices were planned for the end of the period. During this time, more than 1800 radars are operational to fulfil the objective of covering the whole national territory. The authorities also decided to enlarge the scope of the system[3]. When the CA was launched, only speeding offences were targeted. In 2006, the introduction of red light cameras and some devices to enforce the inter-distance between the vehicles to avoid tailgating accidents was planned. In the near future, the system will manage the automation of illegal parking enforcement. In February 2008, Prime Minister Fillon announced the instalment of 500 additional radar devices each year over the 2008-2012 period. This will result in 2500 new radar devices and represents a total of 4500 operational

[1] For example, 80 km/h in a 50 km/h urban zone: a margin of tolerance of 40%! Such practices were noted during field investigations.

[2] We wish thank T. Godefroy who provided the figures enabling us to determine this rate.

[3] See « 3 questions à Jean-Jacques Debacq, Préfet directeur du projet interministériel Contrôle automatisé », www.securite-routiere.gouv.fr/data/revue152/onenparle

units. It was decided also to toughen the punishment associated with repeat offences[4] and to aim for less than the 3000 fatalities for 2012 across the jurisdiction[5].

The Queensland strategy: initial successes, and the role of political intervention
The strategic framework for road safety strategies is based on the National Road Safety Strategy (2001-2010) and the Queensland Road Safety Strategy (2004-2011). There are a number of key players in the road safety arena in Queensland. The Queensland Police Service (QPS), Queensland Transport (QT) and the Department of Main Roads are lead agencies and play a major role in implementing the Queensland Road Safety Strategy. Additionally, the Queensland Parliament created a Parliamentary Travelsafe committee in 1990. This body consists of elected Members of Parliament, reports directly to Parliament, and is responsible for monitoring and investigating all aspects of road safety and public transport issues across the entire state of Queensland.

A speed management strategy was initiated in 1993 with the release of a Speed Management Issues Paper (Queensland Transport, 1993). Speed camera legislation was ratified by the Queensland parliament in 1996 and implemented in May 1997 with the deployment of cameras at 500 sites[6]. These sites were located only on roads controlled by the State, at locations with a prior crash history and on roads where a speed limit review had been completed (Newstead & Cameron, 2003). In December 1991, prior to the introduction of speed cameras in Queensland, a Police enforcement programme called Random Road Watch (RRW) was initiated. The important features of this initiative were the manner in which police resources were randomly allocated to attain maximum road safety benefits, and the large proportion of the road network that was included. In particular, the random allocation of resources across the system aimed to reduce the ability of motorists to predict or anticipate the timing and location of enforcement activities (Newstead, Cameron, & Leggett, 1999; Watson, Fraine, & Mitchell, 1994). Random allocation also became an important feature for deployment when the speed camera programme was eventually introduced in 1997 (Cameron & Delaney, 2006).

During the 1990's, the road fatality rate fell by 40% from a rate of 13.73 fatalities per 100,000 people in 1992, to a rate of 8.19 in 2003 in Queensland. Unfortunately however, that decrease did not continue in the period beyond 2003. One reason that is signaled as contributing to this is the state's high level of economic growth. From 2001-2005, Queensland experienced the fastest population growth in Australia, as well as the largest increase in vehicle registrations and in the vehicle kilometres traveled (Queensland Transport, 2008). In 2005, the fatality rate had increased to 8.27 per 100,000. This represented an increase of 5.6% on the previous year (Queensland Transport, 2006). Additionally, the period at the end of 2005 was to prove a critical time for the speed management strategy (and road safety more generally) in Queensland. The summer holiday period coincides with Christmas/New Year in Australia. Traditionally, this period sees large increases in the amount of private travel and in distances traveled on the road. It is also associated with escalated police enforcement activity and intense media and public attention on safe driving practices and road crashes[7]. A three-fold

[4] Henceforth, the vehicle can be confiscated for repeat offences
[5] See especially Comité interministériel de la sécurité routière (13 February 2008), accessed 18/02/08, www.securite-routiere.gouv.fr/vos-infos/presse.
[6] This was approximately a decade after the first use of speed cameras in another Australian state, Victoria.
[7] Interestingly, studies conducted on holiday periods in Australia indicate that road fatalities during these times are influenced by random, rather than systematic events, and further, that fatality rates are not any lower or higher than other times of the year when average number of deaths per day are considered (ATSB, 2006).

increase in fatalities during the 2005/2006 Christmas holiday period in Queensland was the catalyst for political intervention.

In February 2006, the then Premier of Queensland, Peter Beattie, called a Road Safety Summit in response to the events that had taken place on the state's roads during the preceding holiday period: 'The reason that the state government called this summit was the increased road toll over Christmas' (Queensland Parliament, 2006, pg 1). The Summit heard presentations from some of Australia's leading road safety research experts and community members on a variety of countermeasures and ideas. The Premier and the two senior Ministers responsible for road safety in Queensland (i.e., Transport and Police Ministers) attended the Summit and promised to consider all suggestions arising from the proceedings. During his opening address, the Premier discussed the option of considering an increase in the use warning signage for speed cameras so as to 'ensure very conspicuous coverage of the road network (Queensland Parliament, 2006, p.2). Additionally, he flagged the need to consider introducing permanent, fixed speed cameras, noting that this suggestion would be unpalatable to some. In late 2007, three fixed speed cameras were introduced in Queensland as one of the outcomes of the 2006 Road Safety Summit (QPS, 2008a). In many respects, this is very similar to the French context. Strong political will, as well as complex coordination at high level of the state government was required.

Policy Comparison

A comparison of ASE in Queensland and France highlights some important points. The size of each country, and the number of total fatalities are not comparable. However, there is a strong convergence between the two jurisdictions. Firstly, ASE devices appear as an obvious solution for both public authorities to fight successfully against illegal speed. It represents a modern intervention tool to obtain a substantial decrease in road crashes. Secondly, political commitment was an important and necessary dimension associated with implementing and/or expanding these programmes. Such programmes are not popular with all sectors of the driving public and need a great deal of political support to be implemented. In fact, it has been suggested that authorities (i.e., government and police) should give careful consideration to managing the risks associated with the social controversy surrounding the introduction or expansion of speed enforcement programmes (Cameron, 2008). President Chirac's support, and the Premier of Queensland's commitment are good illustrations of the political dimension associated with the decision to implement or enhance ASE programmes. Thirdly, the successful implementation of an ASE programme requires coordination among different public bodies. This emphasizes the institutional dimension, which constitutes an important component in operationalizing an automated enforcement system. Obviously there are also key differences in the two programmes. Queensland implemented an ASE programme earlier than France and proceeded in a different manner. In France, fixed speed cameras were introduced first and are the key priority in the French strategy. In Queensland, mobile radar devices were operated initially, with a limited number of fixed cameras introduced only recently.

How these programmes operate

The automation of speed enforcement involves a variety of technological choices regarding the specific type of camera and 'back office' processing equipment to be used. Similarly, choices must also be made about specific deployment strategies (e.g., covert/overt), based on the potential benefits associated with each. Discussion will now turn to the operation of the

French and Queensland programmes because each can demonstrate different aspects of the organizational dimension associated with ASE.

The French CA: an automated system with an original enforcement strategy
The French CA is based on a *quasi-automation* of the process, from detection through to sanction. When the driver commits a speeding offence, the vehicle license number and speed are recorded. This information is transmitted to the National Processing Centre (CNT – *Centre National de Traitement*) in Rennes, which identifies the offender and issues an infringement notice. The use of automated devices makes it possible to centralize the working for the operational dimension. All speed offences detected by an automated device are treated by the CNT according to a unique process and offences are processed quickly, usually within 7 days (Carnis, 2007). Without describing the details of the treatment process[8], it is important to note that the offender can be detected and punished without human involvement. This constituted a huge innovation for the public enforcement policy. Indeed it constitutes an important step towards the *dematerialization* of the judicial process, where greater efficiencies in enforcement resources are achieved through the use of automation.

CA's management system is run by the DPICA (Interministerial Automated Speed Detection Project), which handles strategy and decision-making – location, studies, legal and administrative aspects. It is placed under the authority of a Préfet (a high level representative of the State) and associated members of police forces and civil workers from the Department of Transportation. The management system is also marked by centralized control and constitutes an original organization for the road safety enforcement field in France. Indeed its jurisdiction covers the whole territory and can manage its intervention with relative independence from the other enforcement organizations. The programme is self-funded; the revenue generated by the programme is used to fund the instalment of new devices. In 2007, the revenue amounted to 454 million Euros. The cost of the programme was roughly 117 million Euros. Surplus funds are reserved for funding the maintenance and development of the road network, and for developing different means of land transportation. There are also some financial transfers to the regional areas throughout France.

The automated detection system is composed of two distinct and complementary branches. While the fixed speed cameras in France are totally automatic and function fulltime, the mobile versions function discontinuously. The operation of the latter requires intervention by the police organisation: the *Gendarmerie Nationale* in country and semi-urban areas, and the *Police Nationale* in cities. The decision was made by authorities to utilize a ratio of 2/3 fixed devices and 1/3 mobile devices. The fixed speed cameras are operated overtly and conspicuously signed. Thus, they are used to promote general deterrence. The objective is to modify drivers' speed preferences and to make people more aware of their likelihood of apprehension if exceeding the speed limit. The mobile speed cameras are used to promote specific deterrence because they are routinely operated in unmarked vehicles and without signage. Both types of devices complement the more traditional speeding detection methods (e.g., laser binoculars and handheld radars), which together, form a balanced strategy aimed at deterring all forms of speeding offenders on a range of road environments (Corbett and Simons 1999; Cameron et al. 2003).

[8] See Carnis (2007) for a complete presentation of the operation of the system.

The Queensland system: mobile and overt with revenue used for safety initiatives

The Queensland Police Service (QPS) is the agency with the primary responsibility for delivering traffic law enforcement activities across the entire state. Prior to the introduction of the ASE program in 1997, a review of speed limits on state-controlled roads was undertaken. This resulted in approximately 5% of the 33,000 kilometres of road undergoing a change in the posted speed limit. In the six months prior to the introduction of the ASE programme, a media education campaign was conducted to inform the public about the new enforcement method. A six-week amnesty period was observed prior to the official start date (1st May). During this time, those detected by the cameras were warned about their offence but were not fined (Newstead & Cameron, 2003). This approach aimed to increase public awareness about the introduction of the new devices. As already indicated, the operation of the ASE in Queensland is based on the general deterrence philosophy, as evidenced by the overt nature of the operations.

Road signs advertise the site location where mobile speed cameras operate and clearly marked and highly visible police vehicles are used for speed camera operations. Camera sites require approval according to strict selection criteria, with crash history the primary consideration. Secondary criteria for site selection include areas undergoing road works (to ensure safety of road workers) or areas where public complaints have been documented and validated. All camera sites are approved by local Traffic Advisory Committees that are made up of representatives from QPS, Queensland Transport, Department of Main Roads, RACQ (the statewide motoring organisation), and local authorities (QPS, 2008b). In keeping with the previously established practice of random scheduling of police resources established under the Random Road Watch program, camera deployment locations are generated daily using a computerized scheduling process (Newstead & Cameron, 2003). This is a key component of the system as it operates in Queensland and is 'designed to create the perception in the minds of motorists that speed cameras can be deployed *anywhere, anytime*.' (QPS, 2008b).

The type of mobile speed camera used is the Gatso Radar 24, which employs slant radar and is capable of photographing bi-directional traffic movement (i.e., vehicles moving towards or away from a camera) across multiple lanes of traffic. Offence processing is conducted by QPS's Police Camera Traffic Office that aims to process all infringements within a three-day period. Infringement notices are mailed to the registered owner of the photographed vehicle and a 28-day period is specified for payment of the associated monetary penalty. Demerit points are deducted from the licence holder whose name appears on the notice if they opt to pay the monetary fine. The right to challenge the infringement is available to all, and this option does not require up-front payment of the offence penalty. The vehicle owner can nominate another person as the driver at the time of the offence by signing as Statutory Declaration. The person nominated on this form is then responsible for the offence notice. Non-payment of an offence can lead to the matter being referred to the State Penalties Enforcement Registry or to a Court for determination (QPS, 2008c).

According to the relevant legislation[9] all funds collected from penalties imposed for camera-detected offences, in excess of administrative and operational costs, *must* be used for road safety education and awareness programmes, road accident injury rehabilitation programmes, and road funding to improve the safety of the sections of state-controlled roads where accidents most frequently occur. Queensland Transport and the Department of Main Roads administer the TORUM Act (1995) and financial accounting of speed enforcement revenue is

[9] Transport Operations (Road Use Management) Act 1995 - TORUMS

monitored separately from other consolidated government funds. This is another example of a joint coordinated effort between government organisations. As noted above, the ASE programme in Queensland is largely defined by its overt nature. Three new fixed (digital) cameras have been trialled by QPS as result of the Road Safety Summit recommendations as a new programme. These digital cameras were designed to be installed at sites where mobile camera could not be deployed for technical or safety reasons. Fixed speed cameras are well signed and located at sites that have a history of road crashes, or in areas where current mobile speed cameras are unable to operate (QT, 2008). To the knowledge of the authors, no systematic evaluation has yet been carried out on the recently installed fixed cameras.

Operational comparison

The operation of both systems highlights some interesting differences. The French system uses digital technology. In Queensland, the current mobile devices operate with analogue technology (because the use of ASE commenced in Queensland earlier than in France). There are also differences in terms of the degree of the automation of the system. However, the political willingness to strengthen speed controls in Queensland and to develop a new strategy in the future could perhaps drive a change in the technology used. The strategy followed by each government is also distinct. Queensland initially implemented mobile speed enforcement and turned to the use of fixed controls after over a decade of operation. In France, the public authorities decided to develop a mixed system in which the priority was given first to fixed site controls. Although an intensive installment of mobile devices was used in the second phase of the implementation process, the authorities continue to strengthen the fixed devices, which constitute the core of the French CA programme. The funding schemes seem relatively similar across the two jurisdictions; the revenue surplus is used to fund traffic safety projects. However, further investigations into the exact nature of the deployment of such funds could be used to strengthen public belief in the value of the programmes. Finally, the management dimension of both programmes sees collaborative relationships between police organization(s) and transport authorities.

Some outcomes of ASE programmes in France and Queensland

Specificities of both systems can be also appraised by analyzing their outcomes. We propose here to investigate the impacts of an ASE by focusing on the number of infringements processed by the system, changes that have occurred in driving speeds, the rate of speed limit violations and in road crashes.

The French CA: a deterrent system for speeding offenders

There has been a seven-fold increase in the number of speeding tickets since the implementation of CA. Before it went into operation, the number of speeding offences was approximately 1.3 million annually – a figure that rose to 9.5 million in 2007. This constitutes a real success in identifying and punishing speed offenders. It also emphasizes the programmes ability to deal with huge amounts (numbers) of speeding episodes. Roughly 14.7 million speeding cases were detected, but less than 50% yielded a speed ticket. Factors such as insufficient picture quality, inability of the system to issue infringement notices to foreign drivers contribute to this.

The implementation of the automated speed detection system drove a huge increase in the level of detection for speed offences across the road network. At present, CA issues more than 85% of the speed tickets. Fixed and mobile devices account for approximately 50% each of the output of CA, and 42.5% of total speed infringements. Moreover the number of

infringements detected by traditional means is stable and this method remains an essential component of the system of deterrence. The French experience indicates that these three types of speed enforcement mechanisms appear to be complementary parts of a system that defines an intelligent policing system. Interestingly, CA-detected infringements generally involve less severe violations of speed limits. Over 90% of these offences fit within the category of not exceeding the speed limit by more than 20 km/hour.

Changes in driving speed also constitute an important outcome on which to focus analysis attention. CA has had a significant impact on traffic speeds[10] across various road types and for all types of vehicle[11]. During 2002–2007, the average speed of private cars has fallen by 11.4 km/hour on freeways, 11.9 km/hour on main roads, and over 15 km/hour on secondary roads. The overall indicator for speed per kilometre driven for the various road networks fell by more than 10% for the same period. Over the same period, levels of excessive speed give a more accurate idea of the impact of CA on traffic speeds. The level of excessive speed (speed limit exceeded by up 10 km/hour) has been measured for passenger cars at 16.2% (as against 33% in the end of 2002), 33.2% for motorcycles (as against 53.4%) and 33.1% for trucks (as against 19.6%)[12]. Moreover, it should be emphasized that major speed limit excesses (30–40 km/hour above posted speed limits) currently represent less than one percent of total speed infringement notices. To sum up, these results demonstrate that a real reduction in speed has taken place, together with a marked drop in excessive travel speeds. This confirms the deterrent effect of CA.

There have been few studies evaluating the impact of CA on road safety. Only the assessment published by the National Interministerial Road Safety Observatory (ONISR) suggests that CA would be responsible for 75% of the reduction obtained over the period 2002–05 (ONISR 2006). [13] When the authorities implemented the CA in 2002, the number of road deaths was some 7200, the number of injuries some 138,000 and there were 116,000 accidents involving injury. By 2007, the official figures were expected to show a reduction in deaths to 4700. It appears that the operations of CA has significantly contributed to these substantial decreases. However at present, there is little other available information which allow for accurate levels of interaction between both events to be established.

The Queensland programme: successful deterrence and sustained results

Several independent reviews have been conducted on the ASE programme in Queensland, covering the period of implementation (1997) to June 2001, the period from July 2001 to December 2004, and for the calendar of 2005 (see Newstead, 2006 for a details on each of these). Operational hours and the number of cameras and camera sites have increased substantially over the life of the programme, yielding some real and sustained success across a number of indicators. During 2003-2006, approximately 6000 hours/month of mobile camera enforcement was deployed in Queensland.

In terms of infringement notices issued, there appears to have been a plateau effect in Queensland in recent years. Annual averages show that 300,250 speeding offences per year

[10] Speed measurements rests upon a sample of measure spots spread through the road network. Their location follow accurate criterion in order to produce representative information. Each spot can provide information relative to the mean speed, variance, 85th percentile, percentage of speed violation and distribution of driving speed for different categories of vehicles, and different types of road.

[11] www2.securiteroutiere.gouv.fr/IMG/pdf/observatoire_vitesse.pdf

[12] Quadrimestrial values.

[13] These figures were obtained by applying Nilsson's formula. Some work was done by focusing on the local effects of speed cameras. This showed an important drop in the number of fatalities and injuries.

were detected between 2003 and 2006, and 249,500 infringement notices were actually issued. Throughout the entire life of the ASE programme, the rate of prosecutions for detected offences has increased, and steadied at 83% during the 2003-2006 period. During the same time period, an average of 4.2 offences per hour were detected, and 3.5 notices per hour were issued (Cameron, 2008). It has been noted that during the earlier stages of the ASE programme, higher detection rates were recorded than is the case now. For example, compare the 1998 detection rate of 11.6 offences per hour with 6.4 offences per hour recorded in 2002. Cameron (2008) notes that offence detection rates have stabilized during the 2003-2006 period. Queensland Transport (2008) reports that there has been a general decrease in the number of speed camera notices issued per vehicle. In December 2006, 1 in 206 vehicles travelling past a speed camera was issued a notice of speeding, as compared with 1 in every 146 vehicles in January 2004. In relation to excessive speed offences (31 km/hour + above the posted speed limit), 1.4% of total offence notices were in this category in 2004 and also in 2006. The majority of speeding offences (49.9% in 2004 and 50.3% in 2006) were in the 13-20 km/hour offence category (QT, 2005; 2007).

Crash reductions as a measure of programme success are also evident. Independent evaluations reveal that the initial reductions in fatal and injury crashes within 2 kms of speed camera zones have been sustained over time. The most recent evaluation indicates an estimated reduction of 34% in total crashes within this kilometre radius, and an estimated reduction of 42% for fatal and hospital admission crashes in the same areas (Newstead, 2006). These successes have been attributed to the widespread deployment of cameras across the network (including focused attention on crash sites) and the general deterrent effect of the overt nature of the operation due to the random nature of scheduling with regard to time of day and camera sites (Cameron, 2008). Finally, future evaluations on the recently introduced fixed speed cameras in Queensland will deliver information that will allow continued evaluation of the program overall.

Outcome comparison

Both the systems described in this paper sustain the efficiency of their respective speed programmes in order to deter speeding offenders. In both cases, speed limit violation rates have dropped significantly following the implementation of ASE. Decreasing rates of speeding infringements can be the result of a number of factors. It may be that increased levels of detection over the initial phases of the programme (specific deterrence) have been effective at reducing the incidence of speeding. It may also be that the clear message of general deterrence has been successful in changing driver behaviour. Additionally, site learning (familiarity with camera locations, particularly with respect to mobile deployments) could account for reduced speeding behaviour. However, the results seem to strongly support the capacity of both types of programmes to generally deter speeding offenders through their deployment of technological capabilities. ASE can also be combined with manual speed controls, as per the French experience, and, to a lesser extent, in Queensland. The exact mix of these various devices to promote the most efficient outcomes requires further research attention.

The comparative rate of offence notifications issued per detections is a notable point of difference in the two programs. France's rate of less than 50% is substantially lower than Queensland's 83%. While acknowledging that France would deal with many more international drivers than would Queensland, there appears to be scope for dealing more effectively with detected offences in France to increase this rate.

Finally, an interesting comparison point is the use of different indicators for programme outcomes. The Queensland example emphasizes the number of operational camera hours, the number of infringements per vehicles passing camera sites, crash reductions, and a stronger emphasis on safety-related uses of programme-generated revenue. In France, the authorities focus on reporting the number of installed and operated devices (fixed radars working permanently) and the number of infringement notices issued. Does this reflect different ways for operating a speed enforcement programme, or different objectives of public bodies in charge of their operation? There is a need for a more systematic institutional analysis to further evaluate and establish the relative effectiveness of different strategies.

Conclusion

The objective of this paper was to provide preliminary elements of comparison between the Queensland and French automated speed camera programmes with the view to identifying mutual benefits. This emphasizes the need to develop a systematic approach for comparing (nationally and internationally) the component parts of different speed enforcement systems with a view to identifying best practice initiatives.

We have documented that each ASE system had its own unique history and developmental processes. The contingent political context appears to clearly be a crucial dimension in the implementation and/or expansion of these types of programmes. Public leaders have played a vital role in leading public debate and providing direction on topics that can be unpopular with their constituents. The two ASE examples presented in this paper suggest that strong leadership can enhance the development of these issues. As we move towards the use of intelligent speed adaptation devices and other technologically based countermeasures (e.g., point-to-point speed cameras capable of measuring average speed between multiple camera sites), we should not discount the role of our public leaders.

Results from the review of both ASE's demonstrate clear road safety benefits including reduced travel speeds, reduced total, fatal and injury crashes, and a strong general deterrent effect. Despite these encouraging results, one could ask:

- Are speed cameras the most appropriate intervention to reach official objectives?
- Are fixed speed cameras a good mechanism for increasing deterrence?
- What specific parts of ASE programmes yield the most benefit for specific road environments/types of drivers?
- Do Governments deal sufficiently well with the controversies associated with ASE's including issues associated with the perceived legitimacy, credibility and implementation of automated enforcement?
- Have enough efforts been made to systematically evaluate the various components of ASE programmes?

This paper highlights the need for Governments to periodically review the design and effectiveness of enforcement approaches in other jurisdictions in order to identify opportunities for improvements in their own programmes. Additionally, there is a need for researchers to systematically compare the operation and effectiveness of different enforcement programmes to establish best practice approaches suitable for different traffic/road environments. A 'whole-of-jurisdiction' approach ("one size fits all") to enforcement is not necessarily the most appropriate way to deploy scarce enforcement resources. There is a need to identify which parts of ASE's are most suited to specific conditions within a single jurisdiction so that the most effective use of resources brings the

safest outcomes and the largest possible deterrent effects. This paper constitutes the first step in this direction and opens new perspectives for understanding the complexity of social systems on road safety public policy.

References

Australian Transport Safety Bureau (2006). *Characteristic of fatal road crashes during national holiday periods*, Canberra.

Cameron, M. (2008). *Development for strategies for best practice in speed enforcement in Western Australia – Supplementary Report,* Monash University Accident Research Centre, Report 277.

Cameron, M., & Delaney, A. (2006). *Development for strategies for best practice in speed enforcement in Western Australia – Final report,* Monash University Accident Research Centre, Report 270.

Cameron, M., Delaney, K., Diamantopoulou, K., & Lough, B. (2003). *Scientific Basis for the Strategic Directions of the Safety Camera Program in Victoria*, Monash University Accident Research Centre, Report 202.

Carnis, L (2001). *Entre intervention publique et initiative privée : une analyse économique en sécurité routière, une application aux législations sur la vitesse,* Thèse de doctorat, Faculté des sciences économiques et de gestion, Université de Reims Champagne-Ardenne.

Carnis, L. (2007). The French Automated Speed Enforcement Programme: First Results and Analysis, *Proceedings of Australasian Road Safety Conference Research Policing Education Conference*, 17-19 October 2007, Peer-Reviewed Paper, Melbourne.

Carnis, L. (2008). The Automated Speed Detection and Sanction System (CSA): An Initial Evaluation of its Application in France, *Journal of Intelligent Transportation Systems*, 12(2), 75-85.

Carte Blanche Conseil (2003), *Etude des pratiques du contrôle-sanction automatisé dans différents pays*, Rapport final, Direction de la sécurité et de la circulation routières, Ministère de l'équipement des transports du logement, du tourisme et de la mer.

Corbett, C., & Simon, F. (1999). *The effect of speed cameras : How drivers respond* Centre for Criminal Justice Research, Department of Law, Brunel University.

Delaney, A., Ward, H., & Cameron, M. (2005). *The history and development of speed camera use*, Monash University Accident Research Centre, Report 242.

Goldenbeld, C.H. (2002). *Publiek draagvlek voor verkeersveilisheid en veiligheidsmaatregelen*, SWOV Report No. D-2002-02 (abstract only in English).

GRPS (Global Road Safety Partnership). (2008.), Speed Management: A Road Safety Manual for Decision-Makers and Practitioners. Geneva, Global Road Safety Partnership.

ONISR (2006). *Impact du contrôle sanction automatisé sur la sécurité routière (2003-2005), Évaluation,* Les rapports, Observatoire National Interministériel de Sécurité Routière, Paris.

Newstead, S. (2006). *Evaluation of the crash effects of the Queensland speed camera program in the year 2005,* Monash University Accident Research Centre, Final Report.

Newstead, S., & Cameron, M. (2003). *Evaluation of the crash effects of the Queensland speed camera program,* Monash University Accident Research Centre, Report No. 204.

Newstead, S., Cameron, M., & Leggett, M. (1999). *Evaluation of the Queensland Random Road Watch Program,* Monash University Accident Research Centre, Report No. 149.

Pérez-Diaz, C. (1998). *Jeux avec des règles pénales, le cas des contraventions routières,* L'Harmattan, Collection logiques sociales.

Queensland Parliament, (2006), 2006 *Queensland Road Safety Summit Transcript of Proceedings*, Brisbane.

Queensland Police Service (QPS), (2008a), *Ministerial Portfolio Statement 2007-2008 Budget*, Brisbane.

Queensland Police Service (QPS), (2008b). *Location of speed camera van and site enquiries*, accessed July 2008 at http://www.police.qld.gov.au/Resources/Internet/programs/roadSafety/documents/locationSpeedCamVanSiteEnq.pdf

Queensland Police Service (QPS), (2008c). *Information on infringement notices issued for speed and red light camera detected offences, accessed* August, 2008 at http://www.police.qld.gov.au/Resources/Internet/programs/roadSafety/documents/Introduction.pdf

Queensland Transport (1993). *Speed Management in Queensland Issues Paper,* Queensland Department of Transport, Brisbane.

Queensland Transport, (2005). *Annual Report 2004-2005.* Brisbane.

Queensland Transport, (2007). *Annual Report 2005-2006.* Brisbane.

Queensland Transport, (2008). *Annual Report 2006-07,* Brisbane.

Queensland Transport, (2008). *Fact Sheet, Fixed Speed Cameras*, accessed August 2008 at http://www.transport.qld.gov.au/resources/file/eb1e9e0c9ce8490/Pdf_fixed_speed_camera_factsheet_Mar08.pdf

Ragot, I. (2006). Acceptabilité du CSA : Connaissance, Crédibilité de l'information et efficacité perçue, in *Séminaire Vitesse, apports récents de la recherche en matière de vitesse,* Actes n°105, Les collections de l'INRETS.

Transport Operations (Road Use Management) Act 1995 – Office of the Queensland Parliamentary Counsel – accessed June 2008.

Watson, B.. Fraine, G., & Mitchell, L. (1994). Enhancing the effectiveness of RBT in Queensland, *Prevention of alcohol related road crashes: Social and legal approaches conference*, Griffith University and Queensland Transport, Brisbane.

Zauberman, R. (1998), 'La répression des infractions routières : le gendarme comme juge', *Sociologie du travail*, (1), 43-64.