

THE SECRET OF ELECTRONIC STABILITY CONTROL (ESC)

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Abstract

Electronic Stability Control (ESC), an on-board crash avoidance system for motor vehicles, is designed to help drivers maintain control during emergency manoeuvres, such as swerving to avoid an obstacle. International studies have estimated that ESC could reduce the number of fatal crashes by at least 20% to 40%. Despite these enormous potential safety benefits, there seems to be a general lack of awareness of ESC among Canadian road users. The purpose of this study was to measure people's attitudes, awareness and understanding of ESC. TNS Canadian Facts conducted a random telephone survey for Transport Canada in February 2006. Respondents were asked for their general views about vehicle safety, ESC, driving experience and vehicle ownership. Responses were obtained from a representative sample of 1,068 Canadian drivers. Results indicated that awareness of ESC was low. When prompted to identify vehicle safety features, only 1% of the people surveyed mentioned ESC, or a branded equivalent. Sixty percent of drivers had never heard of ESC, and less than 5% had vehicles with ESC. This paper discusses the reasons for this low rate of awareness and the implications this has for road safety. It also recommends strategies for promoting awareness and demand for ESC, and accelerating the availability of ESC.

Résumé

Le contrôle électronique de la stabilité (ESC), un système d'évitement de collision dont certains véhicules automobiles sont équipés, est conçu pour aider le conducteur à conserver la maîtrise de son véhicule lors d'une manœuvre d'urgence, notamment lorsqu'il doit donner un coup de volant pour éviter un obstacle. D'après les études internationales, l'ESC pourrait réduire le nombre de collisions mortelles de 20 à 40 %. Malgré la possibilité de cet énorme gain de sécurité, les usagers de la route canadiens semblent mal connaître ce système en général. La présente étude visait à déterminer dans quelle mesure le public le connaissait et le comprenait et quelle était son attitude à l'égard de l'ESC. En février 2006, TNS Canadian Facts a mené un sondage téléphonique par échantillon aléatoire pour le compte de Transports Canada. Les répondants étaient priés d'exprimer leur opinion générale sur la sécurité automobile, l'ESC, leur expérience de la conduite et la propriété d'un véhicule. Le sondage a été effectué sur un échantillon représentatif de 1068 conducteurs canadiens. Ses résultats indiquent qu'on connaît peu l'ESC. Lorsque les personnes interrogées ont été invitées à nommer les caractéristiques de sécurité d'un véhicule, seulement 1 % d'entre elles a mentionné l'ESC ou un produit de marque équivalent. Soixante pour cent des conducteurs n'avaient jamais entendu parler de l'ESC, et moins de 5 % avaient un véhicule équipé d'un ESC. Le présent document traite des raisons de cette faible connaissance et des répercussions de cette dernière sur la sécurité routière. Il

recommande aussi des stratégies pour favoriser la connaissance et la demande de l'ESC et en accélérer l'offre.

INTRODUCTION

Most drivers have experienced, at one time or other, an occasion when their vehicle does not travel in the direction they had intended it to. Whether because of slippery road conditions, the sudden appearance of an obstacle ahead, or driving too fast for the road type, a vehicle skid can be very dangerous—especially if it leads to a rollover or other type of collision.

Vehicle skids can be one of two types: understeer, where a vehicle continues to travel in one direction despite the steering wheel being sharply turned in another, and oversteer, where a vehicle rotates more than requested by the driver, causing the rear of the vehicle to swerve outwards. Technology now exists that can prevent skidding during emergency manoeuvres or when cornering on slippery surfaces, allowing the driver to better maintain control. Electronic Stability Control (ESC) uses electronic sensors and a microcomputer to continually monitor steering and braking inputs together with wheel rotation, lateral acceleration, and yaw rate. If the sensors determine that a vehicle is becoming unstable by beginning to spin or skid, ESC automatically uses braking at each individual wheel and/or a reduction of engine power to bring the vehicle back under the driver's control.

If, while travelling on a highway, a driver steers his non-ESC-equipped vehicle to exit on a right hand off-ramp, a loss of traction could cause the vehicle to continue travelling in a straight line, possibly resulting in a crash with a roadside object or the bifurcation zone. With ESC, the system would apply braking to the right rear wheel, causing the vehicle to turn more effectively. It might also reduce engine power to shift more weight to the vehicle's front wheels, which would result in improved traction for steering. Transport Canada research has demonstrated the effectiveness of ESC in SUVs, pick-up trucks, cars, and mini-vans on dry, wet, and snow-covered surfaces (D. Boucher, personal communication). Because it intervenes before a loss of control occurs, ESC has the potential to prevent certain types of crash. In particular, ESC should reduce the number of single vehicle crashes that involve loss of control and running off the road, including rollover crashes and collisions with fixed objects.

In fact, statistical and experimental data consistently and conclusively show that ESC reduces the risk of certain types of collision. Using real-world collision data, Dang [1] observed a 35% reduction in single-vehicle crashes for passenger cars and a 67% reduction for sport utility vehicles (SUVs). Farmer [2] and, more recently, Farmer [3], found that ESC reduced the risk of single-vehicle crash involvement by approximately 41%, and single-vehicle fatal crash involvement by 56%. Effects tend to be greater for SUVs than for cars (49% vs. 33% single-vehicle; 59% vs. 53% fatal single-vehicle).

ESC reduces the risk of being involved in other crash configurations as well. For example, the risk of being involved in a fatal multiple-vehicle crash is reduced by 35% for SUVs and 25% for cars [3]. Green and Woodroffe [4], using the Fatality Analysis Reporting System (FARS) and the non-fatal General Estimates System (GES) data bases, determined that ESC reduced fatal run-off-road crashes by 35% for cars and 56% for SUVs, fatal rollover crashes by 40% for cars and 73% for SUVs, and loss-of-control crashes by 55% for cars and 70% for SUVs. Of special interest to Canadian drivers is the finding that ESC is even more effective on non-dry vs. dry roads. For cars, the estimated reduction in odds of a loss-of-control crash was 53% on non-dry

roads vs. 40% on dry roads. For SUVs, the reduction was more than 88% on non-dry roads compared to 53% on dry roads!

One of the only experimental studies of the effects of ESC on driver performance used the National Advanced Driving Simulator (NADS) to investigate how effectively two different ESC systems reduced the loss of driver control that accompanies various challenging driving manoeuvres [5]. One hundred and twenty male and female drivers in three age groups (18-25, 30-40, and 55-65) were required to drive three driving scenarios that involved significant risk of loss of control. Regardless of driver gender or age, ESC was found to reduce the likelihood of drivers losing control of their vehicle in all conditions by 88%.

Despite the motto ‘Safety Sells’, it is unclear whether new vehicle buyers consider ESC and other safety features when making purchase decisions. Vehicle manufacturers have taken steps to equip a number of their vehicle models with ESC as standard equipment; however, these tend to be limited to certain types of vehicles (e.g., SUVs) or to a certain class (e.g., luxury). Although the cost to equip one vehicle with ESC is approximately \$450, when offered as optional equipment it is typically packaged with luxury items such as leather upholstery and a high-end sound system. In 2006, ESC was offered as either standard or optional equipment on 37 per cent of new vehicle models in Canada (D. Boucher, personal communication). It is not currently known whether the public is aware of ESC’s existence and/or function. It is possible that vehicle owners confuse ESC with an earlier, related technology called ‘traction control’, which works to improve friction between a vehicle’s tires and the road but only during acceleration. Branding issues are almost certainly affecting the degree to which people are aware of, and understand, ESC technology. ESC is the industry consensus designation referred to in the Society of Automotive Engineers (SAE) Surface Vehicle Information Report J2564 [6]; however, there are currently so many different brand names for ESC, it would not be surprising if drivers were unsure whether their vehicle comes equipped. Table 1 lists ESC brand names used by most car manufacturers.

Table 1. ESC brand names and manufacturers.

Brand Name	Manufacturer(s)
Electronic Stability Program (ESP)	Audi; Chrysler; Dodge; Hyundai; Jeep; Kia; Mercedes-Benz; Saab; Suzuki; Lamborghini; Smart
Dynamic Stability Control (DSC)	Aston Martin; BMW; Jaguar; Land Rover; Mazda; Mini
Vehicle Stability Assist	Acura; Honda
StabiliTrak™	Buick; Cadillac; Chevrolet (most models); GMC; Pontiac; Saturn; Isuzu; Hummer
Active Handling	Chevrolet (Corvette)
AdvanceTrac™	Ford; Lincoln; Mercury
Vehicle Dynamic Control (VDC)	Infiniti; Nissan
Vehicle Stability Control (VSC)	Lexus; Toyota
Mitsubishi Active Skid and Traction Control (M-ASTC)	Mitsubishi
Porsche Stability Management (PSM)	Porsche
Electronic Stabilization Program (ESP)	Volkswagen
Dynamic Stability and Traction Control (DSTC)	Volvo
Maserati Stability Program	Maserati

Controllo Stabilità (Traction and Stability Control)	Ferrari
Precision Control Plus (PCS)	Oldsmobile
Vehicle Dynamics Control System (VDCS)	Subaru

The present study investigated the general public's awareness, understanding, and attitudes towards ESC. Based on this information, strategies intended to increase people's awareness of, and demand for, ESC were developed, as were methods to accelerate its market availability.

METHOD

TNS Canadian Facts (Ottawa, ON) conducted a random-digit-dialled telephone survey between January 30 and February 22, 2006.

Of the 14 503 telephone numbers initially attempted, 6 565 were invalid, 4151 were unresolved (e.g., answering machine, no answer, hang-up), and 2026 were resolved but not available to participate. Of the 1 761 people who responded, 692 were disqualified because they did not own or drive a vehicle and 1 068 completed the interview, for an overall response rate of 22.2%. Survey data was statistically weighted by age, gender, and region to ensure that findings were representative of the Canadian population aged 16 and over.

The telephone questionnaire was comprised of 28 questions, which took approximately 10 minutes to complete. Besides general demographic, vehicle ownership, and habitual driving data, the survey explored participants' general views and attitudes towards vehicle safety, their awareness of vehicle safety features in general and ESC in particular, their understanding of ESC, the perceived benefits/disadvantages of ESC and, finally, how much they would be willing to spend to have the technology installed on their own vehicle. Questions also assessed how important respondents thought it was that ESC be available on Canadian vehicles, including whether they thought it should be offered as standard equipment on all vehicles, or whether certain types of vehicles and drivers would benefit more from ESC.

The following definition of ESC was provided to respondents mid-way through the interview, when first asked whether they were familiar with the technology. The offer to repeat the definition was made later on throughout the survey, and in particular when respondents were asked how they thought ESC might impact people's driving behaviour and driving experience.

"We are interested in knowing your views on a new in-vehicle safety system. The basic mechanics of this system work as follows: A microcomputer in the car constantly monitors the driver's steering and the direction that the car is travelling. In an emergency situation, if the sensors determine that the car is beginning to spin or skid, strategic braking on different wheels is used to bring the car back under the driver's control. Because it intervenes before a loss of control occurs, this safety system has the potential to prevent certain types of crash, such as running off the road, rollover crashes, and collisions with obstacles. The technology is called Electronic Stability Control, or ESC, but may also be known by its many different brand names. For example, for <insert vehicle manufacturer of respondent's vehicle>, it is referred to as <insert ESC name>."

RESULTS AND DISCUSSION

Awareness of ESC

Overall, awareness of ESC was low. The majority (60%) of respondents had not heard of it before and, among the 40% who had, only 12% reported currently owning a vehicle that was equipped with ESC. When asked to list the safety features available on their own vehicles, only 1% of respondents referred to ESC; however, when the 40% of people who reported having previously heard of the technology were asked if it was available on their own vehicles, 10% of this group reported having it installed. It is possible that, despite being read a definition of ESC, people still may have confused ESC with other, similar, technologies such as Traction Control or antilock brakes (ABS). In actual fact, while 54 people reported owning an ESC-equipped vehicle, at least 17 of these reported models were not available with ESC, even as optional equipment. Regardless, 5% of the 1 068 survey respondents reported owning an ESC-equipped vehicle (Figure 1).

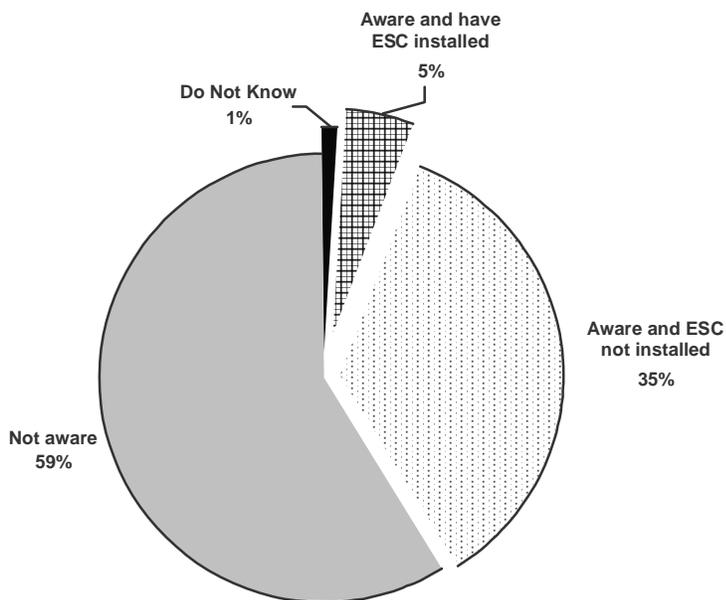


Figure 1. Awareness and ownership of ESC in Canada (February 2006).

Of the people who reported owning a vehicle equipped with ESC, only 24% said that they had been specifically looking for a vehicle that came equipped with ESC. Men were more likely than women (28 vs. 16%) to report specifically looking for a vehicle with ESC, as were drivers from the Atlantic Provinces and British Columbia (50%) compared to those from Ontario (19%).

Perceptions / understanding of ESC

People's perceptions and understanding of ESC was investigated by asking what they perceived as the system's advantages and disadvantages with regards to road safety. As well, respondents who reported owning a vehicle equipped with ESC were asked whether they thought ESC had made it safer or more dangerous for them to drive. Almost all (85%) reported that ESC had made driving either a little or a lot safer, while only 2% felt it had made driving a little more dangerous. Surprisingly, 34% of non-ESC-users and 13% of users could not cite any

benefits to having ESC equipped on their own vehicle. This was despite hearing the definition of ESC, which included a description of how it has the potential to bring the car back under the driver's control in emergency situations. Educated respondents were more likely to recognize ESC advantages than were those respondents with less education. At the same time, 67% of users and 31% of non-users could not cite any disadvantages to using the system. Again, this was related to education level: respondents having graduate/post-graduate degrees were more likely to list no disadvantages compared to those with community college education (82% vs. 51% for users of ESC). Similarly, less experienced (<5 years) drivers of non-ESC-equipped vehicles were more likely to cite disadvantages to the technology than were those more experienced (≥ 6 years) (42% vs. 29%). The perceived disadvantages of ESC are listed in Figure 2.

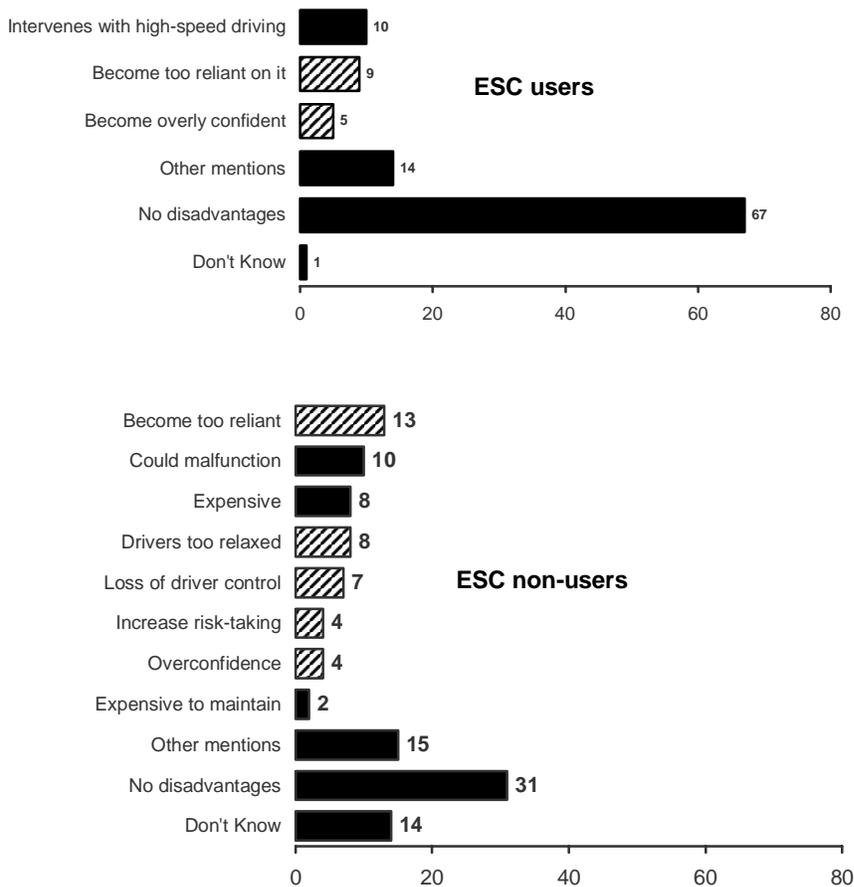


Figure 2. ESC users' (N=54; top) and non-users' (N=1014; bottom) perceived disadvantages of ESC.

The most frequent type of disadvantage (indicated by hatched bars in Figure 2), reported by both users and non-users of ESC, was that of drivers over-relying on ESC, or being over-confident when driving an ESC-equipped vehicle. Interestingly, women ESC users were more likely than men (27% vs. 0%) to cite reliance/dependence as the greatest disadvantage.

When asked how they thought the installation of ESC on vehicles would impact people's driving behaviour and overall driving experience, drivers of non-ESC-equipped vehicles were over twice as likely to describe negative consequences than positive ones (Figure 3). Negative anticipated

consequences of ESC identified by participants included: drivers becoming too dependent/reliant on ESC, people not driving as carefully/responsibly/attentively, drivers placing too much faith/confidence in ESC, and ESC not making much of a difference to people's driving behaviour. Positive consequences of ESC included: ESC being good/positive/helpful/beneficial, ESC improving safety, and drivers becoming better and more confident with ESC.

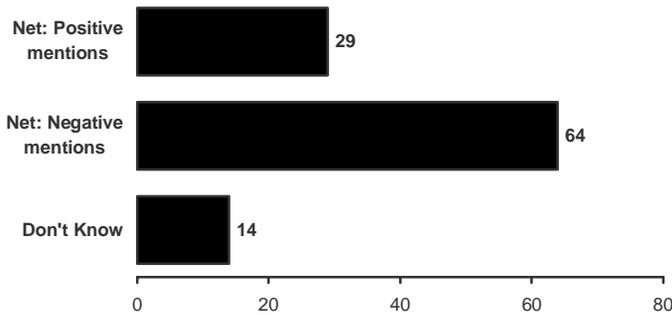
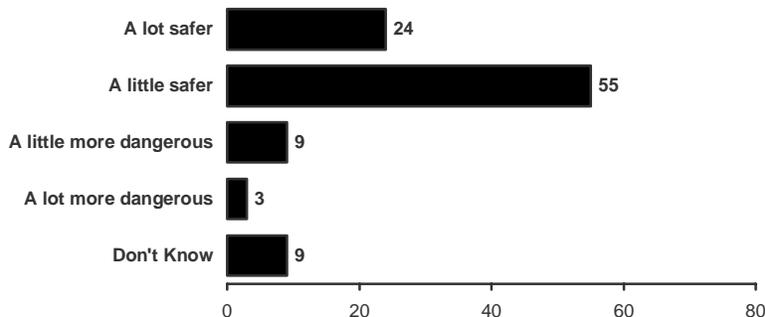


Figure 3. Perceived impact of ESC on driving behaviour and experience (non-ESC-users only; N=1014).

Despite the apparent ambivalence of people's attitudes and perceptions of ESC, most respondents recognized that the widespread installation of ESC in vehicles would make driving safer (Figure 4). Seventy-nine per cent of respondents, when asked, said they thought that the installation of ESC technology on all vehicles would make them a little or a lot safer to drive, compared to only 12% who believed it would make them a little or a lot more dangerous. Of interest, less-educated respondents were almost twice as likely to feel 'a lot' safer than were respondents with post-graduate education (29% vs. 17%), as were Ontarians compared to drivers from the Atlantic region (30% vs. 18%).

Figure 4. Overall perceived impact of ESC on road safety (all respondents). (Q: "Overall, would



you say that if ESC technology was installed on all vehicles it would make them...").

Drivers who thought that the widespread installation of ESC would make vehicles more dangerous were asked to elaborate on the reasons underlying this opinion. Of greatest concern to these respondents was the belief that ESC would cause drivers to become too dependent and reliant, and that it might give drivers a false sense of security. Other concerns included: loss of control while driving, an increase in dangerous driving and collisions, and not paying attention to the road.

Opinions regarding ESC

Drivers were asked for their opinions on a number of issues relating to ESC. Sixty-five per cent of respondents thought that it is important (24% very important) to have ESC installed as standard equipment on all new vehicles available in Canada. This belief is related both to age and education, with those aged 55 and over supporting ESC the most (71%) compared to those aged 35-44 (60%) and those with a high school education or less being the most adamant in this belief (71%) compared to those with a post-graduate degree (58%).

Respondents who had previously indicated they would be likely to purchase a new vehicle in the next 12 months were asked how much they would be willing to pay to have ESC installed on their new vehicle. A demand curve procedure was used to determine the percentage of people who would be willing to pay various amounts. This procedure works by randomly assigning each respondent to one of five starting price points ranging from \$500 to \$2500. For example, a respondent might be started at the \$1000 price point. If s/he indicated they were willing to pay \$1000, s/he would then be presented with an amount two price points higher (\$2000). While a 'yes' to that price point would lead to a final question assessing willingness to pay \$2500, a 'no' would lead to a question whether they would pay \$1500 (i.e., the respondent said yes to \$1000 but no to \$2000). The demand curve is represented graphically as a cumulative distribution of the willingness to pay for the safety technology at different price levels (Figure 5). It is noteworthy that men are more willing than women to pay for ESC at all price points. The majority of Canadian drivers are willing to spend between \$500 and \$1000 to have ESC installed on their new vehicles.

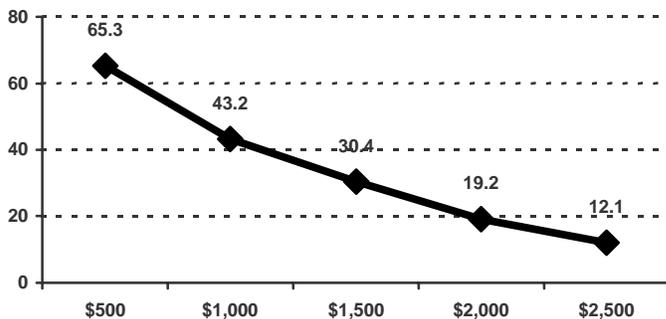


Figure 5. Dollar amount that respondents who were planning on buying a new vehicle (N=259) were willing to pay for ESC.

When asked which group(s) of drivers they thought would benefit more from ESC, most (73%) respondents agreed that drivers who carry children as passengers, drivers of vehicles that are more likely to roll over in a crash (66%), inexperienced drivers (64%), drivers who drive long distances regularly (64%) and drivers under the age of 21 (56%) would benefit more.

Finally, when asked which source(s) of information they would most likely use to learn about vehicle safety, most respondents indicated public awareness campaigns on television (63%), followed by those in print form (54%). Information from third party organizations such as the Canadian Automobile Association (CAA) (46%), friends and family (45%), consumer magazines (45%), and internet web sites (44%) was also mentioned. Interestingly, only 34% of

respondents indicated that they would use government pamphlets as a source for vehicle safety information.

Possible strategies to increase awareness of ESC

The results of this survey indicate that the majority of Canadians are unaware of ESC and its potential effects on road safety. As well, perception and understanding of ESC is ambivalent. On the one hand, 85% of people who claim to drive an ESC-equipped vehicle thought that it had made driving safer and many people could not list any potential disadvantages to using the system. On the other hand, a significant number of people could not list any benefits of ESC and, when asked an open-ended question regarding its impact on driving behaviour, made mostly negative predictions regarding road safety.

Collectively, these results suggest that national and provincial government bodies who are responsible for road safety, and automotive technology manufacturers have not done an adequate job of educating the driving public regarding this technology's significant safety benefits. In terms of road safety, this is unfortunate. ESC is one technology that has many benefits and limited disadvantages. It has been hailed by some as "the greatest life saving technology since the safety belt" [7]. Its overall effect on reducing the number of deaths, injuries, and property damage incidents on Canadian roads would be staggering if it was properly introduced and promoted to the driving public. In the following section, potential methods to more effectively promote ESC are presented and discussed.

It is clear that people's opinions and understanding of ESC do not entirely reflect results of empirical research demonstrating the benefits of this technology. Yet over twice as many ESC users than non-users report no disadvantages to having ESC installed on their vehicle, an encouraging finding that suggests education and experience with a technology generate more accurate opinions regarding its effects on safety. It is important for vehicle manufacturers, governments, and safety associations, therefore, to educate the driving public about the benefits of ESC, and to encourage people to consider it as a part of their next vehicle purchase.

The 'push-pull strategy' of marketing is a concept that originated in the business world, and that relates to the promotion of ESC. In general, it refers to the relationship between a product or piece of information and the entity that is providing it [8], but it can also act as a basis for social marketing and/or health promotion strategies. 'Pull marketing' occurs when advertising and promotional strategies are developed to entice prospective customers to buy a product or service. 'Push marketing' is geared to producers and distributors, and is designed to entice them into promoting a product. In other words, a customer "pulls" things towards themselves, while a producer "pushes" things toward customers. It may be helpful to think in terms of this strategy when discussing ESC. In order to most quickly reap the potential safety benefits offered by ESC, it is important for government, the automotive industry, user groups, and the insurance industry to cooperate with each other and share in the marketing task.

There are already mechanisms in place for road safety stakeholders to work together in 'pushing' or promoting ESC. First, road safety is a shared national-provincial/territorial responsibility in Canada, and there are committees in place that facilitate cooperation. The Canadian Council of Motor Transport Administrators (CCMTA), through a collective consultative process, makes decisions on administration and operational matters dealing with licensing, registration and control of Canadian motor vehicle transportation and highway safety. As well, there is ample opportunity for Transport Canada to partner with vehicle manufacturer

associations, such as the Canadian Vehicle Manufacturers Association (CVMA) and the Association of International Automobile Manufacturers of Canada (AIAMC), road user groups such as the CAA, and insurance corporations such as the Insurance Bureau of Canada.

Although survey respondents indicated that safety was the second most important vehicle feature (after fuel consumption) they considered when purchasing a new vehicle, many (60%) were unable to list even one safety feature that is available on vehicles other than their own. Only 2% mentioned ESC in this regard. This suggests that people are generally not aware or cognizant of safety technologies that may be available on vehicles unless these features are already available on one's own personal vehicle. It may also reflect the widespread tendency to view safety efforts primarily in terms of features that increase a vehicle's crashworthiness (and that are available on most cars, such as seat belts and air bags), as opposed to features designed to improve crash avoidance. For example, safety ratings are typically given for how well a vehicle is able to absorb energy and protect its occupants in the event of a collision; however, ratings do not typically assess the technological systems, such as ESC, that can significantly reduce the chances of these collisions occurring in the first place. It is possible that new car buyers educate themselves, or are at least more receptive to information on vehicle safety features, when they are in the process of, or approaching the time when they will be, making a new vehicle purchase. When deciding when and in which media to promote ESC and related safety education, it may be advantageous for 'push stakeholders' to primarily target the new vehicle buyer.

One proposed method to let drivers in on the 'secret of ESC' is for Transport Canada to display and distribute pamphlets about its safety benefits in vehicle dealerships. This kind of method is challenging, however, due to a variety of reasons, including Transport Canada's limited financial resources and access to the public. The automotive industry, with its significant advertising budget, is much better placed to attract public attention to ESC. In fact, it is puzzling as to why ESC technology is such a secret when automobile manufacturers are in a position to attract customers by citing the benefits of ESC; for example, by advertising that its presence on a vehicle will save lives. To date, there have been only a few vehicle advertisements that have focused on, or mentioned, ESC (e.g., Hyundai Tucson); however, manufacturers should be encouraged to do more. They should also be encouraged to make ESC more available. Although ESC is currently offered as optional equipment on certain vehicle models, dealers (who may also not understand the benefits of ESC) may not keep these trim lines in stock and will therefore encourage customers to buy non-ESC-equipped vehicles that are available on the lot. Another industry that could help promote ESC is the automotive press. It would be extremely helpful in terms of safety if automotive magazines would include the availability of ESC in their vehicle reviews. At present, magazines such as *Protégez-Vous* note whether a vehicle model comes equipped with ABS as standard or optional equipment. Magazines should also be encouraged to indicate whether a vehicle model is equipped with ESC.

Instead of a pamphlet or public awareness campaign that originates from a single government department, an enhanced technique used by other governments to increase the likelihood of successfully increasing public awareness and 'consumer pull' on an automotive safety issue is to partner with industry and user organizations (such as the CAA). An example from the European Union is eSafetyAware! This program seeks to "accelerate the market introduction of life-saving technologies by organising information campaigns and dedicated events aimed at creating awareness of eSafety benefits among policy-makers and end-users" (www.esafetyaware.eu). It is worth mentioning that the first campaign promoted by the eSafetyAware! partners is "Choose ESC!", which begins in May 2007. Transport Canada and other Canadian government agencies may want to consider the possibility of establishing such a partnership in North America.

Despite the intentions of joint industry-user-government groups such as eSafetyAware!, and while the new vehicle purchase appears to be a good occasion to introduce safety-relevant information on ESC, based on the results of this survey, it appears that the majority of people tend not to rely on government pamphlets when educating themselves about vehicle safety. Interestingly, Transport Canada has, since January 2007, provided safety information regarding ESC on their public web site (<http://www.tc.gc.ca/roadsafety/tp/tp14651/vs200701/menu.htm>). The document, while informative and well written, has not received much attention, as evidenced by the limited number of 'hits' to the site (approximately 2500 between January and April 2007). Thus, 'push stakeholders' may want to consider other forms of communication through which they can reach drivers.

One of the most popular sources of vehicle safety information reported by a majority of survey respondents is the public awareness campaign. In particular, a campaign that is delivered via television appears to be the preferred method for most Canadians. An especially effective method of communicating information that is difficult to convey verbally or in writing is to provide a demonstration. This is something that could quite easily be accomplished, as vehicles that are equipped with ESC also have an on/off button, meaning that videotaped demonstrations could easily be set up that show the same vehicles performing emergency driving manoeuvres both with, and without, ESC activated.

Another strategy to increase the public's awareness and understanding of ESC, and consequently, 'consumer pull', is to encourage the insurance industry to provide incentives and/or reductions in premiums to owners of ESC-equipped vehicles. To date, there have been no such incentives offered anywhere in the world; however, it is something that the insurance industry may want to consider. New car rating programs such as the star-rating program conducted by the U.S. Insurance Institute for Highway Safety and the National Highway Traffic Safety Administration's 'Stars on Cars' program would also provide drivers with much more complete information relating to a vehicle's safety features if they were to include presence/absence of ESC in their ratings.

Lastly, another approach to 'push' or promote ESC is to mandate its installation in all vehicles by means of a Canadian Motor Vehicle Safety Standard (CMVSS). At the time of writing, the U.S. National Highway Traffic Safety Administration was proposing to require the installation of ESC as standard equipment in all new light vehicles in the U.S. by the 2012 model year, with a phase-in approach covering the interim. As part of the proposed U.S. regulation, ESC systems would be required to meet certain technical specifications and vehicles equipped with ESC would have to pass minimum performance test criteria. Because of differences between the U.S. and Canada in terms of environmental conditions and the vehicle fleet, and because enacting a regulation requires a clear demonstration of cost-benefit, Transport Canada is currently investigating whether the effectiveness of ESC in Canada will mirror that seen in the U.S. If the Canadian data show that ESC is, or would be, significantly beneficial in Canada, Transport Canada will consider requiring it. Transport Canada may also want to consider whether a joint government-industry Memorandum of Understanding (MOU), based on the U.S. requirement, would be sufficient to bring the benefits of ESC to Canada. The main objective of such an MOU would be to accelerate the fitment of ESC to vehicles sold in Canada. It would ensure that, during the U.S. regulation's phase-in period, ESC would be provided as either standard or optional equipment on the same vehicle models in Canada as in the U.S.

Collectively, results from this telephone survey reveal that Canadians are largely unaware of ESC and, despite recognizing that its widespread installation in all vehicles would benefit road

safety overall, hold ambivalent and possibly flawed opinions regarding its potential negative effects on road safety. It is important that the Canadian government, with the automotive industry, and road user and insurance associations, increase awareness and understanding of ESC, and consequently, its demand, in the general public. Failing to do this will keep it a secret, limiting and/or delaying ESC's significant potential road safety benefits from reaching Canadian road users.

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