Regulatory Impact Statement

Mandating Electronic Stability Control for Light Vehicles

Agency Disclosure Statement

This Regulatory Impact Statement has been prepared by the Ministry of Transport.

It provides an analysis of options to maximise the benefit to New Zealand from electronic stability control (ESC) in light vehicles entering the vehicle fleet.

This analysis considers the issues affecting the value and optimal timing of mandating ESC for light vehicles. For vehicles sold new in New Zealand, the situation is relatively uncomplicated; however, it is a different story for imported used vehicles.

A key part of the analysis is a model that simulates the benefits and costs of introducing or not introducing a requirement for ESC at different dates. While safety benefits can be estimated with some confidence, based on existing research, the model requires assumptions to be made about the likely effects on the supply of used vehicles from Japan and the costs of any restrictions. These are informed by good information about ESC fitment in Japan, and in vehicles actually imported. We were have also modelled a range of scenarios to test the sensitivity of our conclusions to these assumptions, and consulted with experts and stakeholders.

For New Zealand vehicle importers, the market for used vehicles in Japan is subject to significant variation due to changes in Japan and competition from international buyers. Predictions about the behaviour of this market in several years' time inevitably involve assumptions that may not be borne out.

For light commercial vehicles, we conclude that ESC can be required concurrently with light passenger vehicles without significantly affecting their availability; however, further consultation may be needed to confirm this.

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3 February 2014

Note, two of the numbers quoted in this paper are incorrect. They concern the estimated reduction in minor and serious injuries as a result of the policy considered. The correct numbers are noted on the paper itself.

Executive Summary

1. Electronic Stability Control (ESC) is a low-cost vehicle safety technology that allows drivers to retain control of vehicles that lose traction. It has been proven to be highly effective in reducing the incidence and severity of crashes. For this reason most major international markets have regulated to mandate the fitment of ESC for light vehicles.
2. In New Zealand, most, but not all, new light passenger and commercial vehicles[1] already come fitted with ESC. However, half the vehicles imported, and the majority purchased privately, are used vehicles from Japan – and only 15 percent of these have ESC. Unless ESC is mandated, both new and used vehicles will continue to be imported without ESC, even though ESC-equipped alternatives will be increasingly available. This will result in preventable deaths and serious injuries. In order to maximise the safety benefit ESC can provide to New Zealanders, it should be mandatory for light vehicles entering the fleet.
3. Mandating ESC, particularly for imported used vehicles, carries a risk of reducing the availability of vehicles to New Zealand consumers – by reducing the number or variety able to be imported, or increasing prices. As the number of suitable vehicles available for import is increasing with time, this risk can be minimised or avoided by timing the introduction of any requirement appropriately.
4. Cost-benefit analysis undertaken by the Ministry of Transport shows that the greatest benefit would be obtained by mandating ESC for both new and used light vehicles as soon as possible, assuming that this would not significantly affect the supply of vehicles. The best benefit-cost ratio, of 2.5, is obtained by requiring ESC from 2015 for new vehicles and from 2020 for vehicles imported used. This would result in a saving of around $54 million in social cost, including preventing 22 deaths and 1,307 serious injuries. Assessment of the used vehicle market in Japan suggests that an adequate supply of suitable vehicles could be available from as early as 2018, and that by 2020 the majority of vehicles available will be fitted with ESC.
5. We therefore recommend that ESC be required for new light vehicles in 2015 and for imported used light vehicles in 2020.

The number of **serious injuries prevented** is incorrect. The correct number is 102.

Status quo and problem definition

6. Electronic Stability Control (ESC) is a low-cost vehicle safety technology that allows drivers to retain control of vehicles that lose traction. It has been proven to be highly effective in reducing the incidence and severity of crashes.
7. Loss of vehicle control is a major cause of road casualties. Over three years to the end of 2011, light vehicle crashes involving loss of control resulted in 466 deaths, 3,110 reported serious injuries and 16,625 reported minor injuries.
8. Making ESC mandatory would reduce the harmful effects of loss of control crashes. For example, if ESC was mandated for new light vehicles from 2015, and imported used light vehicles from 2020, it is estimated that 22 deaths and 1,307 serious injuries would be prevented. If ESC is not mandated, there will be preventable deaths and injuries from crashes.

The number of **serious injuries prevented** is incorrect. The correct number is 102.

[1] Light vehicles are vehicles with a gross vehicle mass of 3500kg or less, including both passenger and commercial vehicles. Although vehicles such as motorcycles and trailers also fall under this definition, this Statement only considers proposals that apply to passenger and goods vehicles.

9. The *Safer Journeys Action Plan 2011-2012* committed the Ministry of Transport to investigate mandating ESC for light vehicles. On the basis of a report provided by the Ministry in November 2012, the National Road Safety Management Group agreed that ESC should be mandated. The *Safer Journeys Action Plan 2013-2015* includes the deliverable of commencing the process to mandate ESC by December 2013.

10. ESC works by integrating information from various sensors around the vehicle to determine and correct for any difference between the intended path of the vehicle and its actual path. As it mostly involves information processing, ESC is not intrinsically expensive. It makes use of brake systems that are already standard[2] and requires few extra parts. Though it was once an extra-cost option, it is now an integral part of a vehicle design and is developed for all models that will be sold internationally. Its small cost is not transparent in the price of a vehicle. ESC cannot be retro-fitted.

11. Because of its proven effectiveness, Europe's New Car Assessment Programme (NCAP) and the Australasian New Car Assessment Program (ANCAP) require ESC to be fitted as standard in order for a vehicle model to be eligible for a top, 5-star rating. In recognition of its safety value, ESC has been made a mandatory fitment to most new vehicles in Europe, USA, South Korea, Japan and Australia.

12. ESC has become increasingly available in New Zealand in both new vehicles and vehicles imported used from Japan, no doubt largely due to the international trend towards mandating it. We expect this growth to continue, but unless fitment is at some point mandatory in New Zealand, we will continue to be supplied with vehicles that lack ESC even when safer alternatives are readily available.

13. Around 90 percent of new light passenger vehicles and 80 percent of new light commercial vehicles imported to New Zealand have ESC[3]. We expect that eventually all new vehicles will have ESC, though the Motor Industry Association (MIA), representing new-car distributors, has warned that some of the remaining models without it could be available for some time. Also, new low-cost models without ESC, from new manufacturers, have recently entered the market and more are planned. Without regulation, this may continue.

14. Used vehicles, mostly from Japan[4], make up about half of all vehicles entering the country, and most of the private sales (about 70 percent of brand new vehicles are fleet purchases). Only around 15 percent of used vehicles currently imported from Japan are fitted with ESC. The average age of used vehicles imported to New Zealand is about 8 years.

15. Japan has now mandated fitment of ESC for light passenger vehicles. ESC must be fitted to all new models introduced from October 2012 and all light passenger vehicles produced from October 2014 (for the classes we import). This means that if the age profile of imported used vehicles stays the same, it will be 2022 before most of them can be guaranteed to have ESC. However, without regulation in New Zealand, we do not

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[2] ESC builds on antilock braking systems (ABS), which are now standard, and, where available, traction control, which is a common feature of engine management.

[3] Light vehicles are vehicles with a gross vehicle mass of 3500kg or less, including both passenger and commercial vehicles. Although vehicles such as motorcycles and trailers also fall under this definition, this Statement only considers proposals that apply to passenger and goods vehicles.

[4] Around 3 percent of used imports are not from Japan. Almost all of these are from the UK, Australia or USA, which mandate ESC.

expect importers to demand ESC, and consumers will continue to receive used imports without it even when suitable cars with ESC are readily available. This could be further delayed if older vehicles are imported.

16. Japan is also expected to mandate ESC for light commercial vehicles, but not until 2019 for new models and 2021 for all models. Used vehicles make up a relatively small number of the light commercial vehicles imported into New Zealand.

17. The New Zealand market for imported used vehicles is largely not led by local demand. The variety of types of used vehicles available from Japan depends on Japanese preferences 8 or so years ago, current Japanese demand for used cars, competing demand from other international buyers and the currency exchange rate. New Zealand importers take what vehicles they can get. Furthermore, importers have an interest in maximising their profit margin and have historically preferred to bring in the oldest vehicles that the regulations and market will allow. Previous regulatory requirements, for frontal impact and emissions standards, have reduced the age of vehicles imported when they were introduced, only for it to increase again in following years.

18. There have recently been strong signals from Australia that its new government's reduced support for Australian vehicle manufacturing will be accompanied by greater acceptance of used imports. It can be assumed that Australia will demand ESC (because competitors to local production will not be allowed to meet lower standards), so unless New Zealand importers actively seek ESC, they are likely to get a smaller share of vehicles with it fitted.

19. Mandating the fitment of ESC to light passenger and commercial vehicles entering the fleet will maximise the safety benefit New Zealanders receive from this technology, but may reduce the availability and choice of vehicles, or increase their cost. Careful timing of a requirement for vehicles entering the fleet to have ESC would reduce or avoid any disruption to supply[5].

How effective is ESC?

20. A study of the effectiveness of ESC in Australia and New Zealand was carried out by Scully and Newstead in 2008[6], with a follow-up study in 2010[7]. The results of the follow-up study were similar to the previous results but were based on a broader range of vehicles (because fitment had increased). This study found that ESC resulted in an overall reduction of crashes, in which the driver was injured, by 8 percent. Single vehicle crashes were reduced by 28 percent for all severities and 32 percent for crashes leading

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[5] We also need to consider the international implications of any proposal to increase New Zealand's share of Japanese used vehicles with ESC. If we can ensure that New Zealand takes the safest used vehicles from Japan, the less safe vehicles will be sold in other countries, which will then bear the greater social cost. Furthermore, it is possible that road conditions or emergency services in those other countries are such that the benefits of ESC would be greater than in New Zealand. In that case, the net effect of improving the New Zealand fleet would be more deaths and injuries due to crashes worldwide. We do not have sufficient information to assess this possibility. However, if other countries start to demand ESC, then vehicles without it should reduce in price, which would at least allow an active trade-off of benefits.

[6] Scully, J.E. and S.V. Newstead, *Evaluation of Electronic Stability Control Effectiveness in Australasia*, Acccident Analysis and Prevention 40: 2050-2057 (2008).

[7] Scully, J.E. and Newstead, S.V. *Followup Evaluation of Electronic Stability Control Effectiveness in Australasia*, Monash University Accident Research Centre Report No. 306 (2010).

to driver injury. ESC is particularly effective at preventing rollover crashes, and this study found that 4WD rollovers were reduced by 82 percent.

21. A great deal of international research has also shown that ESC reduces crashes. For our cost benefit analysis, the effectiveness of ESC in reducing loss of control crashes was assumed as shown in Table 1, based on the range of findings from published studies. A summary of published ESC research is presented in an appendix.

1. Table 1: Expected reductions in loss of control crashes

Expected reduction	Light passenger vehicles	Light commercial vehicles
Low	16%	30%
Medium	32%	45%
High	48%	60%

Potential benefits of mandating ESC

22. Given the current high availability of ESC in new vehicles, and the likelihood that this will continue to increase, the benefit of mandating ESC for new vehicles is fairly small. However, the new car industry supports the introduction of mandatory ESC and has lobbied for it through its representative body, the MIA. It is likely that comparable replacements could be found for the remaining models that lack ESC – so the benefit of squeezing these stragglers out of the market more quickly is worth having and probably has little cost.

23. The MIA has stated that although some vehicle distributors are able to order from their manufacturers the specifications they think are suitable for the New Zealand market, other distributors have to take whatever their parent company will give them. These distributors may even benefit from a law that enables them to require more competitive products.

24. The other benefit provided by mandating ESC for new vehicles is that it protects the fleet from market changes that might reduce the availability of ESC. In particular, it is possible that new low-cost models may enter the market without ESC, or ESC may not be provided to markets that do not require it. Because we cannot know the extent of this possible reduction, it cannot be modelled and the benefit from avoiding it cannot be quantified, but precedent suggests the benefit is real. Until recently it was common for ESC to be packaged with luxury features and only fitted to high-specification model variants. In recent years several new entrants to the Australasian market have offered new low-cost models without ESC. And in Australia, a well established brand removed ESC from an entry-level model that had previously had it.

25. The benefit of mandating ESC for vehicles imported used is clearer. Currently there is probably no active selection by importers of vehicles fitted with ESC. The presence of ESC is not noted on Japanese auction sheets and the existing process for importing vehicles makes it difficult to know in advance whether it is fitted. This means that as the presence of ESC in the Japanese used market increases to the point where we could take only vehicles with it fitted, we are likely to instead continue to receive many vehicles without it. Unless importers are required to make the presence of ESC a criterion for

selecting vehicles, we will not benefit from the safety technology as quickly as is possible[8].

Objectives

26. *Safer Journeys – New Zealand's Road Safety Strategy 2010-2020* adopts a safe system approach. Its goal is a safe road system increasingly free of death and serious injury. For vehicles, this entails a forgiving fleet that helps to reduce or avoid error, recover from error and absorb crash forces.

27. Given the proven effectiveness of ESC in enabling drivers to avoid and recover from error, our policy goals are to:

    - maximise the safety benefits of ESC
      while
    - minimising any disruption to the supply and trade of vehicles
    - minimising compliance costs and government administration costs

Regulatory impact analysis

Options

28. The options for maximising the benefit of ESC to New Zealand are as follows.

    1. No action – the status quo – most new vehicles already have ESC and, given that Japan has mandated ESC in its own fleet, most used imports will eventually have ESC.
    2. Mandate the presence of ESC in all vehicles entering the fleet from some point in time.
    3. Encourage the uptake of ESC by increasing promotion of it.

29. The first option – the status quo – is expected to entail a gradual increase in the presence of ESC in the vehicle fleet, and a gradual increase in overall safety. It is probable that the proportion of the fleet fitted with ESC will increase more slowly than it could, and possible that changing market conditions could slow this increase further. The cost of this option is that the safety benefit of ESC in New Zealand will not be maximised and there will be preventable deaths and injuries from crashes.

30. The second option – mandating ESC – will lead to a quicker increase in the presence of ESC in the vehicle fleet. With the right timing, this could maximise the safety benefit of ESC to New Zealand. The cost of this option is a potential reduction in transport options for New Zealanders, and potential lost trading opportunities for importers of used vehicles; however, this cost could be avoided or minimised if the mandate is suitably timed.

31. The cost-benefit modelling undertaken by the Ministry of Transport investigates the value of mandating ESC, from different dates, relative to the status quo.

32. The third option – promoting the uptake of ESC – was not pursued as this would be more expensive and less effective than mandating ESC.

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[8] There is potentially an incidental benefit from mandatory performance requirements for used imported vehicles. If the requirement encourages or forces younger vehicles to be imported, these generally have higher safety standards and may have other improvements. Younger vehicles may also cost more – but where this has happened previously, effects on price were small.

Table 2: Alignment of options with objectives

	Take no action	Mandate ESC	Promote ESC
Maximise the safety benefits of ESC	No – vehicles without ESC will continue to be imported	Yes – if timed so that enough used vehicles are available	No – the market is not strongly demand-led, so vehicles without ESC will continue to be imported (the NZTA has already heavily promoted ESC)
Minimise any disruption to the supply and trade of vehicles	Yes	Yes – if timed appropriately	Probably – depending on response to demand
Minimise compliance & administration costs	Yes	Yes – if timed appropriately	No – increases government costs; subsidises compliance (free promotion of vehicles)

33. A 'rolling age ban', a measure that is sometimes raised in the context of vehicle standards, was not considered because it would not ensure that any particular feature, such as ESC, was present.

Cost-Benefit Analysis

Modelling the effects of the policy

34. The Ministry of Transport commissioned an independent analysis of the costs and benefits of mandating ESC, relative to taking no action. The analysis involved constructing a model to simulate the effects of mandating ESC on import volumes and prices of vehicles, and on the number and social cost of crashes[9].

35. The model includes projections for business as usual, based on historical data, and variables to represent changes in factors that affect economic and safety outcomes. Benefits are assumed as reductions in deaths and injuries as a result of ESC, and these are modelled in terms of the social costs of crashes. Costs of the policy are assumed to be effects on the availability or price of vehicles.

36. Effects on price or availability are considered for used imported vehicles but are assumed to be negligible for new vehicles[10].

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[9] Colegrave, Fraser and Hoskins, Stephen, *Costs and Benefits of Mandating Electronic Stability Control*, prepared for the Ministry of Transport by Covec Ltd, 2013. As discussed, the results cited here are not taken directly from the Covec report but are based on an adapted version of the model.

[10] This assumption may not hold for the availability of the lowest priced new light commercial vehicles; however, in the relevant timeframe, comparable used imports may be available.

37. The figures cited in this document are from an adapted version of the model which assumes that mandating ESC from the dates considered will not affect the number of used vehicles imported. Which dates this is likely to be true of is considered in subsequent sections. The potential cost of the policy is therefore modelled largely by the trade-off cost of accepting either more expensive or less desirable vehicles[11].

38. Trade-off costs are difficult to estimate. The values used in the model are based on an informal survey of vehicle prices for different years of manufacture. The model also includes other variables that are difficult to estimate, but allowed us to test a range of plausible values based on existing data and discussion with experts in the Ministry of Transport, NZ Transport Agency and the vehicle industry.

Results

39. Our analysis suggests that mandating ESC provides benefits relative to taking no action. For both new and used imported vehicles, the benefit is clearly greater the sooner the policy is introduced.

40. For vehicles imported used the benefit of mandating ESC is greater the earlier it is done (see Table 3). However, this assumes that the number of vehicles imported is not reduced, and consumers are able to make acceptable trade-offs. By some date, this is certainly true, but the assumption is weaker for earlier dates. That is, if ESC is required for used imported vehicles too soon, importers may be unable to meet demand and the size of the fleet will decrease relative to business as usual. This would probably mean that some people's expected transport needs would not be met – a cost that the model does not take into account. It is also possible that restricting the supply of imported used vehicles would reduce scrappage of older vehicles, meaning that less safe vehicles were in the fleet for longer.

41. Since mandating ESC for used imported vehicles is not intended to reduce transport options, which would increase the cost and reduce the benefit of the policy, the viable dates for introduction begin when it is unlikely to significantly affect the supply of vehicles. On plausible estimates of availability of ESC in the Japanese used market, this is from around 2018, but we would not be confident until around 2020. However, fitment is higher for some types of vehicles than others.

42. The benefit of mandating ESC for used imported vehicles reduces as the availability of ESC in the Japanese used market increases. By 2022, it can be assumed that all Japanese used passenger vehicles up to 8 years old will have been required to have ESC, so if current importing patterns continue, most vehicles imported to New Zealand will have it. If ESC were to be mandated, it should be earlier than this in order to achieve a worthwhile benefit.

43. Although greater benefits are feasible, the best benefit-cost ratio is predicted from requiring used imported light vehicles to be fitted with ESC from 2020.

44. Note that the estimates in the following tables are based on mid-range assumptions for a number of variables. They are indicative of the scale and trends for the value of different introduction dates.

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[11] Requiring ESC *is* expected to reduce the already small number of used commercial vehicles imported, so the forgone surpluses (benefits of trade) due to this reduction are still represented in the model. The issue of light commercial vehicles is discussed in a later section.

Table 3: Implementation dates for mandating ESC – vehicles imported used

(Note: these estimates assume that the supply of vehicles is not reduced. If fewer vehicles are available, the estimated benefits would not be achieved, and the costs would be higher. The period for estimates is 20 years from 2013.)

Implementation dates	All new light vehicles: **2015** All used light vehicles: **2018**	All new light vehicles: **2015** All used light vehicles: **2019**	All new light vehicles: **2015** All used light vehicles: **2020**	All new light vehicles: **2015** All used light vehicles: **2021**	All new light vehicles: **2015** All used light vehicles: **2022**
Estimated policy benefits (reduced crash costs)	$168 million	$123 million	$90 million	$66 million	$49 million
Estimated policy costs (availability or price)	$90 million	$54 million	$36 million	$27 million	$21 million
Estimated net policy benefit (20 year net present value)	**$78 million**	**$69 million**	**$54 million**	**$39 million**	**$28 million**
Estimated benefit to cost ratio	2.15	2.28	2.50	2.44	2.33
Estimated rate of ESC fitment to light vehicle fleet in 2025 (status quo: 64%)	68 percent	67 percent	66 percent	65 percent	65 percent

45. For vehicles sold new in New Zealand, both the estimated benefit of requiring ESC, and the benefit-cost ratio, are greatest for implementing the policy as soon as possible, and decline for later introduction dates, as shown in Table 4[12]. The earliest the requirement could be in place, allowing importers time to ensure supply, is 2015.

Table 4: Implementation dates for mandating ESC – vehicles sold new in NZ

Implementation dates	All used light vehicles: 2020 All new light vehicles: **2015**	All used light vehicles: 2020 All new light vehicles: **2016**	All used light vehicles: 2020 All new light vehicles: **2017**	All used light vehicles: 2020 All new light vehicles: **2018**
Estimated net policy benefit (20 year net present value)	$54 million	$44 million	$40 million	$39 million
Estimated benefit to cost ratio	2.50	2.25	2.11	2.08

46. Table 5 breaks down the benefit of mandating ESC for new vehicles in 2015 and imported used vehicles in 2020 – the option with the best benefit-cost ratio. Note that the average annual reduction would not be expected in any year; the actual benefit would increase as more vehicles with ESC were on the road for longer.

Table 5: Estimated reduction in death and serious injury from loss of control crashes (over the period from 2015 to 2033)

	Reduction (n)	**Average annual reduction**
Deaths	22	1.2
Serious injuries	1,307	73
Minor injuries	5,352	297

The number of **serious injuries prevented** is incorrect. The correct number is 102.

The number of **minor injuries prevented** is incorrect. The correct number is 400.

Obstacles to mandating ESC

47. The cost-benefit analysis suggests that ESC should be required for new and used imported vehicles as early as is possible without unacceptably reducing the supply of vehicles. This means we must consider the availability of ESC in the Japanese used market and the ability of importers to select vehicles fitted with ESC.

Availability of ESC in the Japanese used market

48. The Japanese used vehicle market is large. The total Japanese light vehicle fleet is about 60 million vehicles. Around 6–7 million used vehicles are sold in Japan each year,

[12] It is noteworthy that these benefit-cost ratios are in line with those found by the two Australian analyses, though they were assessing a much less complicated market, involving only new vehicles.

with 800,000–1,000,000 of these going overseas[13]; about 80,000–100,000 to New Zealand.

49. The details of which models and sub-models in the Japanese domestic market have ESC as standard or as an option are published[14]. We also know how many vehicles were fitted with ESC in each year of production. But we cannot say exactly what this means for the numbers of used vehicles offered for sale that have suitable characteristics and price for the New Zealand market. However, the trends are promising.

50. Although the Japanese market has been slower to adopt ESC than Europe or the USA[15], fitment has increased sharply over the last few years. ESC became mandatory for new models in Japan at the end of 2012, but nearly half the vehicles produced in that year were fitted with it.

51. The proportion of vehicles fitted with ESC in Japan has increased considerably each year, with growth greatest in the medium size sector. If we ignore mini 'kei' class cars[16], nearly a third of the vehicles produced in Japan in 2009 were fitted with ESC; this grew to three quarters in 2012. As Japan has mandated ESC, we can expect that all new models introduced since 2012, and all vehicles produced from 2014 will have it fitted.

52. If the availability of ESC in Japan is reflected in its used market, by 2018 around 37 percent of small to large 8-year-old used vehicles in Japan will have ESC. By 2020 this figure is around 75 percent. New Zealand's total take is less than 10 percent of available vehicles.

The ability of importers to choose vehicles with ESC

53. Vehicles produced for the Japanese domestic market after ESC is mandated in Japan can be assumed by New Zealand importers to be fitted with ESC. However, unlike other mandatory standards, such as frontal impact standards, many vehicles had ESC before it became mandatory. This gives New Zealand importers the opportunity to import older vehicles with ESC, if they can find them.

54. The existing process for purchasing used vehicles in Japan makes it very difficult for importers to identify which vehicles have ESC. The process has developed to efficiently manage a large market and it may not be easy for New Zealand importers to change it.

55. Japanese used vehicles are sold at massive and fast-paced auctions, with bidding both onsite and remote. The importer may bid from a computer terminal in New Zealand. Often the only information available for each vehicle is a photograph and a Japanese-language auction sheet. The amount of detail on the auction sheet varies depending on the auction house but the presence or absence of ESC is not currently noted. The

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[13] Based on information from the Japanese Automobile Manufacturers Association (JAMA).

[14] There is more than one source of this information. Our analysis has relied on data published by the Japan New Car Assessment Programme (JNCAP), which seems to be authoritative with respect to safety information.

[15] In 2010 only 26 percent of new cars registered in Japan were fitted with ESC, compared with 63 percent for Europe and 90 percent for the USA.

[16] These cars, with engines of no more than 660cc, are very popular in Japan but rarely have ESC – it will not be mandatory for all models until 2018. Kei cars bring down the average ESC fitment rate in Japan but are seldom imported into New Zealand. A better indication of the ESC fitment rate for vehicles that might be imported into New Zealand is given by ignoring kei cars.

importer does not usually know the full model details of a vehicle – which would confirm its features – until the vehicle is deregistered and on the boat to New Zealand.

56. On the face of it, there are several opportunities in the import process to confirm the presence of ESC. It is possible for buyers or their agents to inspect the vehicles before the auction, though not all auction houses allow entry to the vehicle. The auction house or exporter presumably can enter the vehicle (since they have to move it), and has the registration papers. Registration papers usually contain the Type Designation Number (TDN) and variant number which can be used to determine ESC fitment. The de-registration papers or export certificate also have this information but these are not available until after purchase.

57. The used vehicle importing industry has emphasised the difficulty of identifying vehicles that have ESC, and the unlikelihood that the process could be changed. A common claim has been that New Zealand is now too small a buyer to be able to influence the process. This claim is difficult to evaluate. Obviously there are challenges in dealing with a foreign market that is not wholly geared to export. But New Zealand actually still purchases nearly 10 percent of the used vehicles exported from Japan, and exporting companies may be even larger customers. Auction sheets currently note features such as the presence of air conditioning or satellite navigation, so it is not inconceivable that ESC could be added, especially given that it would be several years before this is required. Over this time frame, it is also possible that other buyers will seek this information. Even industry sources have suggested that if it were necessary to identify vehicles with ESC, a way would be found, though it may come at some cost.

58. Importers could also guarantee that they are purchasing vehicles with ESC, without explicit information, just by only buying models to which it is fitted as standard. This would restrict the range of models from which importers could choose but it is unclear whether this would be a problem in practice.

59. The Imported Motor Vehicle Industry Association (IMVIA), representing importers of used vehicles, has provided the Ministry of Transport with its own analysis of the impact of choosing only models with standard ESC and identifying vehicles with optional fitment. This research takes into account which vehicle models importers are likely to want or be able to obtain, and looks at which models manufactured in 2012 can be identified as fitted with ESC by using published data[17]. It shows that many models that would otherwise be suitable for New Zealand could not be confidently imported. However, while the range of vehicle *models* may be restricted, the fact that 75 percent of the vehicles made in 2012 (other than kei cars) were fitted with ESC, suggests that plenty of individual vehicles will be available.

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[17] This research has also revealed discrepancies in sources of information about fitment of ESC in Japan. The IMVIA has relied mainly on information provided by the Japan Auto Appraisal Institute (JAAI), whereas our analysis has been based on data from the Japan New Car Assessment Programme (JNCAP). The NZ Transport Agency has checked several discrepancies against information from vehicle manufacturers, and has in every case found it to agree with the JNCAP data. The Agency also contacted the JAAI which confirmed that it could not guarantee the accuracy of information concerning safety equipment. We believe that the JNCAP data could be relied upon by importers, but note that there are also other ways of identifying ESC fitment.

Light commercial vehicles

60. Most of the research into the effectiveness of ESC has not focussed specifically on light commercial vehicles. However, the available data suggest that the benefits are at least as high as for passenger vehicles and probably higher. Vehicles with a high centre of gravity, such as SUVs or loaded goods vehicles, particularly benefit from ESC. An Australian review of the research estimates the benefit of ESC in light commercial vehicles, in crash types for which ESC is relevant, at 32 percent[18].

61. Light commercial vehicles, such as vans and utes, have tended to lag behind passenger vehicles with respect to safety. This is in part due to structural features, such as the cab-forward design of vans, and in part due to the longer model cycles of these types of vehicle.

62. If the slower pace of change in light commercial vehicles means that vehicle distributers would take longer to meet new equipment requirements, this is a reason to consider treating such vehicles differently from passenger vehicles when it comes to mandatory safety equipment. Australia and Japan are mandating ESC for light commercial vehicles a few years later than for passenger vehicles. (Australia has just done so: 2015 for new models and 2017 for all models; Japan is just about to: 2019 for new models and 2021 for all models.) However, the EU and USA did not distinguish between commercial and passenger vehicles when they mandated ESC.

63. The earliest practical date for requiring ESC for new passenger vehicles is 2015. Given that the benefits of ESC are no less for commercial vehicles, we would need to be sure of significant reductions in supply before we could justify delaying a requirement for ESC relative to passenger vehicles. Furthermore, we should note that some commercial vehicles have inferior passive safety compared to passenger vehicles; many commercial vehicles, such as delivery vans, have high exposure to risk; and many commercial vehicles are legally a place of work[19]. Most distributors of new light commercial vehicles have indicated that all their models will have ESC by 2015. However, a few have existing models without ESC that they would prefer to sell until 2017. These models generally have competitors that do have ESC, so it is unlikely that mandating ESC in 2015 would significantly reduce the overall availability of light commercial vehicles. However, some distributors may be disadvantaged.

64. Japan will not begin requiring ESC for light commercial vehicles until 2019 and we do not have good information about the availability of used light commercial vehicles with ESC that could be imported to New Zealand. Probably the rate of fitment is low, so it is likely that mandating ESC will significantly reduce the supply of vehicles from this source.

65. In recent years, used vehicles imported from Japan have made up a relatively small part of the light commercial market: about 2,500–3,000 sales per year compared to new sales of 13,500–21,000. It is clear that most buyers in this market prefer new vehicles. In 2013, although the new to used ratio is similar, sales of light commercial vehicles were considerably higher, with around 4,500 used and around 27,500 new. We don't know what demand for used light commercial vehicles will be in 2020 but we expect it will be

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[18] Study by Fitzharris et al, 2010, prepared for the Australian Department of Infrastructure and Transport, and cited in its *Regulation Impact Statement for the Control of Light Commercial Vehicle Stability*, 2013, but apparently not published separately.

[19] Safety campaigners in both New Zealand and Australia have suggested that employers' existing legal obligations to provide a safe workplace extend to avoiding work vehicles without features such as ESC; however, this has not been tested.

partly met by used vehicles with ESC from Japan or from other overseas sources, partly by used vehicles from New Zealand and partly by new vehicles. By that time, even low-cost new commercial vehicles will have ESC. Nonetheless, there may be some shortfall in supply.

66. We conclude that mandating ESC for all light commercial vehicles will have, at most, a fairly small effect on their availability in New Zealand. Since the benefits of ESC are at least as great as for passenger vehicles, there is therefore no reason to treat them differently in any regulation of ESC.

The unpredictability of the used vehicle import market

67. It is difficult to credibly estimate the future availability in Japan of vehicles suitable for sale in New Zealand, even assuming that current market conditions continue. However, it is likely that current market conditions will not continue. The Japanese used vehicle market is subject to quite significant changes caused both by events in Japan – such as the 2011 earthquake, and changes to vehicle taxes – and, especially, from competition between international buyers. New Zealand buyers' share of the market has fallen from 26 percent in 2001 to a little under 10 percent at present[20]. Some other buyers have been very erratic in their demand. For example, from 2008 to 2009, Russia went from buying half a million cars to only 44,000 (it has increased again since). Myanmar has in some years purchased nearly 100,000 vehicles (comparable to New Zealand), and in other years almost none. That single countries, such as Russia or even Myanmar, could have such a big influence on the market highlights its vulnerability to sudden changes in any part of the world.

68. There has been speculation in the industry that Australia, with the expected collapse of its car manufacturing sector, is likely to enter the market for used vehicles from Japan. Sources in the import industry have suggested that Australia could import as many as 100,000 vehicles per year within three years of beginning large scale importing.

69. The possibility of Australia beginning to seriously import used vehicles from Japan has implications for New Zealand mandating ESC. Australia can be expected to require ESC on imported used vehicles as these compete with new vehicles, including local production, for which it is already required. This would increase pressure on Japanese auction houses to identify ESC fitment (as would demand from any other countries buying in Japan) but it would also increase competition for those vehicles. On the other hand, if Australia (or another country) actively sought ESC and New Zealand did not, we would expect fewer vehicles imported into New Zealand be fitted with it.

70. Changes to consumer tastes, or laws, in Japan and in other countries that import used vehicles inevitably affect what is available to importers of used vehicles to New Zealand – as do model changes from Japanese manufacturers. And consumer preferences change in New Zealand too. So the mix of vehicles coming into New Zealand is always changing. Models popular in one year are not necessarily so popular the next. However, it is likely that many consumers shop for vehicle types rather than particular models.

71. The changeability of the market in imported used vehicles to New Zealand, and its vulnerability to outside influences, makes it very difficult to confidently predict the impact of any policy that affects this industry. However, it is important to recognise that this vulnerability and unpredictability is not a product of such policies but is inherent to the market.

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[20] Since then we have faced greater competition from other countries, notably Russia and Saudi Arabia.

Consultation

72. The key stakeholders in the proposal to mandate ESC in light vehicles are importers and dealers of light vehicles, and road users. The interests of the latter are clear: improved safety and good transport choices (in terms of availability and cost). In order to ensure the interests of all stakeholders have been taken into account, the Ministry of Transport has met with the IMVIA, the MIA, the Motor Trade Association (MTA), Japan Export Vehicle Inspection Center Co. (JEVIC – specialists in pre-shipment vehicle inspections), and the New Zealand Automobile Association (AA).

73. The AA strongly supports mandating ESC for light vehicles as soon as possible.

74. The Ministry of Transport has had substantive ongoing engagement with the MIA and IMVIA.

75. The MIA has lobbied government to mandate ESC. It has proposed that ESC be mandatory for some passenger vehicles (depending on class and whether they are new models) from January 2013, and all passenger vehicles from January 2015. It also supports mandating ESC for new light commercial vehicles, though following Australia's decision to mandate, it is now advocating that this should align with Australia's separate dates for new and existing models (2015 and 2107).

76. The MIA has proposed that used imported passenger vehicles should be required to have ESC from 2018, but has made no recommendation regarding used imported light commercial vehicles.

77. The IMVIA has publically endorsed increasing fitment of ESC and agreed that uptake should be encouraged. However, it has expressed a strong preference that ESC not be mandated for used imported vehicles and that the government advertise to increase demand. The IMVIA's current alternative position is that any introduction of a requirement for ESC should be staggered for different vehicle types over the period 2016 to 2020.

78. The used vehicle importing industry's concerns are that:

    - mandatory ESC will force importers to bring in newer, more expensive vehicles than they would otherwise be able to sell
    - enough suitable vehicles are not available in Japan to maintain supply or meet demand
    - the difficulty in identifying which vehicles have ESC will further restrict supply or make the requirement impossible to meet

79. These concerns have been addressed above. Our analysis has posited the main issue for mandating ESC for used imported vehicles as being when it could be introduced to maximise safety benefits and minimise disruption to the supply and trade of vehicles.

80. The land transport rules process requires public consultation on draft rules, so stakeholders will have a further opportunity to comment on the proposed policy before any rule is finalised.

Conclusions and recommendations

81. Although the estimated benefit of mandating ESC for new light vehicles is low, that is just because the rate of fitment is already high – and because we are not able to quantify the benefit of protecting the market from changes that might reduce the presence of ESC. The cost of mandating is also low. Furthermore, the new car industry favours mandating ESC and it would be difficult to justify requiring ESC on used imported vehicles if it were not required for new vehicles.

82. There is a clear benefit from mandating ESC for used light vehicles entering the fleet, and this benefit is greater the earlier the requirement is imposed. This is because there will otherwise be several years between ESC-equipped used cars becoming readily available in overseas markets and their comprising most used cars imported to New Zealand. Given the proven effectiveness of ESC, this would result in preventable deaths and injuries from crashes in New Zealand.

83. It is difficult to estimate exactly when enough used ESC-equipped vehicles will be available overseas so that a mandatory requirement would not significantly restrict the supply of vehicles to New Zealanders. We know that by 2018 at least one quarter of 8-year-old vehicles in Japan, and a third of 7-year-old vehicles, will have ESC. Based on previous importing patterns, we expect that the proportions will be higher in the market sectors from which we draw our vehicles. Since New Zealand's total take is less than 10 percent of the available vehicles, it is likely that the pool of suitable candidates will be large enough by that date, if not before.

84. We recommend that ESC is mandated for light vehicles entering the New Zealand fleet, including both passenger and light commercial vehicles. For new vehicles, the requirement should be imposed as quickly as practicable, given the time required to consult on and make a rule, and the lead time that new vehicle dealers will need to arrange supply of compliant vehicles. We recommend that ESC be required for new light vehicles in 2015.

85. For used vehicles, the requirement should be imposed as early as possible given consideration of the availability of suitable vehicles. The best benefit-cost ratio is achieved by mandating ESC from 2020; however, greater benefit could be realised by mandating earlier. The risk with setting an earlier date is that if enough compliant vehicles are not available in Japan, the cost of the policy will be higher and the benefits lower than predicted. It is plausible that sufficient vehicles would be available by 2018 and becomes increasingly likely from later dates. By 2020, *three quarters* of the 8-year-old vehicles sold in Japan, in the classes that are imported to New Zealand, would have ESC. We therefore recommend that ESC be required for used vehicles imported in 2020 as this should ensure that the supply of vehicles is sufficient to achieve the predicted benefit.

86. The fact that, in Japan, ESC is more common in some types of vehicle raises the possibility that these types could be required to have ESC in New Zealand before 2020. The IMVIA has proposed that mandatory ESC be introduced progressively: first for SUVs, then vehicles with engine capacities greater than 2 litres and finally all other vehicles. Around a third of imported vehicles fall into the first two categories[21], so requiring them to have ESC earlier could speed up its adoption. However, since these vehicle categories are said to already have a high rate of ESC fitment, the benefit may be small. Any benefit would also depend on how importers respond if business as usual leaves a shortfall in supply. Importers could make up the shortfall with an additional effort to source extra compliant vehicles – which would increase the uptake of ESC -- or they could encourage customers to instead purchase vehicles that did not yet require ESC. For example, some SUV customers might be satisfied with station wagons.

87. The benefit of mandating ESC earlier for some vehicle types could also be diluted if importers stockpile vehicles before the requirement is introduced. Stockpiling has reduced the effect of previous vehicle performance requirements but is practically

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[21] In 2013, nearly 5 percent of imported used vehicles were SUVs, and nearly 28 percent were other vehicles over 2 litres.

constrained by the number of vehicles that can be imported at once, paid for and stored. Spreading the introduction of a requirement over three dates would effectively increase the capacity to stockpile non-compliant vehicles.

88. However, despite the small likely benefit, if importers of used vehicles identify a market sector for which supply is sufficient to allow ESC to be mandated earlier, this should be accepted if practicable.

Implementation

89. Mandatory ESC for light passenger and goods vehicles entering the New Zealand fleet would be effected by amending Land Transport Rule: Light-vehicle Brakes 2002. New and used vehicles will be required to have an ESC system that either meets a specified standard or has the characteristics specified by the Rule.

90. The introduction of mandatory ESC would have to allow vehicle dealers enough time to arrange for compliant vehicles to be ordered and shipped to New Zealand. This will not be a problem for used vehicles, as it will be several years before these need to be sourced, but some dealers of new vehicles may need to plan their order up to a year in advance. A requirement introduced in 2015 could be expected to provide adequate time, but any proposed rule amendment would be contingent on the results of public consultation.

91. The period before used vehicles could be required to have ESC would give importers time to modify their purchasing process to identify vehicles with ESC. As discussed above, there are various approaches importers may choose. A simple approach would be to only buy models known to always have ESC, but access to more models could be achieved by accurately identifying the features of individual vehicles, or persuading (or waiting for) Japanese auction houses to list them.

92. Vehicles would be checked for compliance at entry certification. Identification of ESC is fairly simple with the vehicle present. The fitment of ESC is indicated in the vehicle by a light on the dashboard and, often, by a switch to fully or partially disable it. It is known which models were fitted with ESC as standard, as an option or as a mandatory requirement.

93. Some stakeholders have suggested that sellers or importers might fake the presence of ESC by improperly wiring bogus dashboard lights. This possibility is not particular to this policy – there is always a chance vehicles might be tampered with to cheat the entry certification process – and it is not expected to be a significant problem. Furthermore, it is fairly easy to check the authenticity of the dashboard light, by scanning the onboard diagnostic system or, perhaps, by simulating a sensor fault.

94. We expect that the operation of ESC would be checked when a vehicle is inspected for warrant of fitness or certificate of fitness. This check would be easily added to the inspection and would involve no more than confirming the proper self-diagnostic dashboard light sequence when the vehicle is started – as is done for the ABS and airbag systems. ESC is fairly robust and reliable and we do not expect significant problems with failures in service. ESC is also intrinsically self-diagnosing, because it is continuously comparing the outputs of its various sensors, so the dashboard light is a reliable indicator that it is working.

Monitoring, evaluation and review

95. ESC is considered a proven technology and no specific evaluation is planned to assess its effect after it is mandated. The success of the policy, in the first instance, would be

that almost all light vehicles entering the fleet are fitted with ESC. The quicker uptake of ESC is expected to contribute to the continuing reduction of deaths and injuries due to road crashes, and to bring the estimated savings in social costs. The circumstances of crashes, including whether they result from loss of driver control, and their social cost are routinely monitored but the marginal benefit from *mandating* ESC may not be measurable. It is hoped that considering loss of control crashes by kilometre of travel and by year of vehicle registration could provide some broad indication of the effect.

96. The risk of mandating ESC is that it could adversely affect the supply or price of imported used vehicles. The Ministry of Transport monitors the sales of vehicles and evaluates any effects of regulation.

Appendix

The effectiveness of ESC

The following table summarising research into the effectiveness of ESC is taken from the Australian *Regulation Impact Statement for the Control of Light Commercial Vehicle Stability*[22].

Jurisdiction, Author, Year	Target Crash Type	Estimated Reduction %
Europe, Sferco et al, 2001	All injury crashes	18
	All fatal crashes	34
	Loss of control injury crashes	42
	Loss of control fatal crashes	67
Germany, Langwider et al, 2003	Single vehicle skidding crashes	42-60
	All crashes	20-25
Germany, Kriess et al, 2005	All ESC sensitive crashes	33
	Fatal ESC sensitive crashes	56
Germany, Becker et al, 2003	All crashes	45
Japan, Aga & Okada, 2003	Single car crashes	35
	Severe single car crashes	50
	Head-on crashes	30
	Severe head-on crashes	40
USA, Dang, 2004	Single vehicle car crashes	35
	Single vehicle SUV crashes	67
	Fatal single vehicle – car	30
	Fatal single vehicle – SUV	63
France, Page & Cuny, 2006	All crashes	44 (not significant)
USA, Bahouth, 2005	Multi vehicle frontal crashes	11
	Single vehicle crashes	53
USA, Green & Woodrooffe, 2006	Single car crashes (dry road)	31
	Single SUV crashes (dry road)	50
	Rollover car crashes (dry road)	40
	Rollover SUV crashes (dry road)	73

[22] The table is credited to Fitzharris et al, 2010 and various studies, *Regulation Impact Statement for the Control of Light Commercial Vehicle Stability* Department of Infrastructure and Transport, Canberra, Australia, January 2013.

Jurisdiction, Author, Year	Target Crash Type	Estimated Reduction %
	Run off road car	55
	Run off road SUV	70
Sweden, Lie et al, 2004	All crashes	22
	All crashes – wet road	32
	All crashes – snow and ice on road	38
Sweden, Lie et al, 2006	All injury crashes (not rear end)	17
	All serious and fatal crashes	22
	Fatal + serious loss of control (wet road)	56
	Fatal + serious loss of control (ice/snow)	49
USA, Farmer, 2004	All single vehicle crashes	41
	Single vehicle fatal crashes	56
USA Farmer, 2006	All single vehicle – SUV	49
	All single vehicle – cars	33
	Fatal single vehicles – SUV	59
	Fatal single vehicle – car	53
	Multiple vehicle – SUV	32-37
	Multiple vehicle – car	25
GBR, Frampton & Thomas, 2007	All crashes	7
	Fatality crashes	25
	Single vehicle crashes	27
	Rollover crashes	36
	Crashes involving skidding	23
Australia, Scully & Newstead, 2007	Single vehicle car crashes	24
	Single vehicle car crashes – driver injured	27
	Single vehicle SUV crashes	55
	Single vehicle SUV crashes – driver injured	68
USA, NHTSA, 2004	Single vehicle car crashes	35
	Single vehicle SUV crashes	67
	Single vehicle fatal car crashes	30
	Single vehicle fatal SUV crashes	63

Jurisdiction, Author, Year	Target Crash Type	Estimated Reduction %
USA, NHTSA, 2007	Single vehicle car crashes	34
	Single vehicle SUV crashes	59
	Single vehicle fatal car crashes	35
	Single vehicle fatal SUV crashes	67
	Single vehicle fatal car rollover crashes	69
	Single vehicle fatal SUV rollover crashes	88