ESC STANDARD FITMENT AND FAILURE TO PROTECT YOUNG DRIVERS

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Paper Number 09-0278

ABSTRACT

The objective of the paper is to estimate UK fleet penetration of stability controlled vehicles, and casualty reduction, particularly for younger drivers. Two models (timeline 2003-2030) were developed for predicting UK fleet ESC penetration, one for Availability of ESC, and one for new car Registrations with ESC. Availability of standard ESC fitment increased from 40-53% from 2006-2008, whilst new car registrations increased from 20-56% from 2003-2008. EC regulation requires ESC new car penetration by 2014, and the models were modified to reflect this requirement. The models therefore project complete standard fitment in new cars by 2014, and full car stock penetration by 2021. The projections also reveal that another 3 million more new cars purchased without ESC in the interim from 2009 before ESC becomes mandatory in 2014, and these cannot be retro-fitted with ESC so represent a missed opportunity for casualty reduction. ESC casualty reduction was calculated using recent effectiveness values from UK studies based on a case control method and induced exposure. With full fleet penetration in 2021 ESC is projected to prevent 9,587 casualties annually including 382 fatalities, with £764 million savings (compared to no ESC). ESC effectiveness estimates reveal that ESC could be effective in reducing 14% of injury crashes for young drivers. These young drivers commonly drive small used cars with ESC rarely fitted. Since full fleet penetration could take 12 years, faster ESC introduction into smaller cars is needed for casualty reduction amongst younger drivers who represent 30% serious injuries & fatalities. Providing ESC on smaller cars so that younger drivers are protected equates to savings of £227 million and 2,844 casualties annually.

INTRODUCTION

Electronic Stability Control (ESC) is an important safety technology that is capable of preventing vehicles skidding or spinning out of control. ESC was first developed by Bosch in 1995, and the first manufacturer to fit ESC was Mercedes-Benz. The system compares a driver's steering wheel commands to the actual behaviour of the vehicle (direction of travel).When the sensors (lateral acceleration and yaw) indicate the vehicle is leaving the intended line of travel, ESC applies the brake pressure needed at each individual wheel to bring the vehicle back to the intended course. Some ESC systems also reduce the engine torque. ESC systems may differ in their response, with some programmed to intervene sooner and take away more driver control of speed than others. The driver is not normally aware of the operation of ESC. ESC is intended to be applied mostly in bends where the driver may lose control of the vehicle. Loss of control is likely when the driver is attempting to steer whilst the vehicle is skidding, or the driver enters a bend too quickly without applying the brakes (understeer). The vehicle may leave the road, sometimes rolling over, or it may collide with other vehicles. ESC can also help in oversteer situations, for example if you swerve to avoid an obstacle, oversteer can occur making the vehicle turn more than intended, ultimately spinning. The rear of the car might skid out and turn the car in the same direction as the intended steered direction, but at a faster rate and not under the control of the driver. ESC can prevent this by braking individual wheels to maintain control.

There is much research establishing the benefit of ESC for preventing crashes. Several authors have analysed the crash rates of cars equipped with ESC to compare with non-ESC vehicles [1,2,3,4,5,6,7,8,9,10]. These studies have covered a wide range of countries, road types and surfaces, weather conditions, crash types and severities. All of these studies conclude that ESC has a positive effect on reducing crashes, although there is a large variation in the level of the effectiveness. In a UK based study in 2007 Frampton and Thomas [10] established that ESC effectiveness is 7% in crashes of all severity. Serious crashes are 11% lower compared to non ESC cars and fatalities 25% lower. The potential savings in accident costs for a 100% take up of ESC amounts to some £959

million pounds annually by preventing some 7,800 crashes [10].

Since 2006 Thatcham has been publishing fitment information about the availability of ESC in new cars sold in the UK. This paper uses this fitment data to estimate the penetration of stability controlled vehicles into the UK car fleet over the next two decades. Combining this model of standard ESC penetration with the previous estimates from Frampton and Thomas [10] the paper also provides a new estimate of the effect of actual fleet penetration on casualty number and the severities over the time period. Additionally the paper will estimate the effect of ESC introduction on casualty rate for younger drivers given that they predominantly use older smaller vehicles.

ESC FITMENT RATINGS

Evidence from real world studies shows the effectiveness of ESC, so there is a need to promote fitment of ESC systems. In 2006 Thatcham began to publish ESC fitment ratings [11]. The ESC ratings are a form of public information to help guide new car buyers in their next car choice.

The ESC fitment ratings use a simple system associating colours with availability of ESC. Green indicates standard fitment, Yellow indicates optional fitment where the buyer will have to specify ESC on the order and pay extra when purchasing a new car, and Red indicates that ESC is not available at all. The rating is given as a coloured bar, with proportional areas of red, yellow and green, according to the availability of ESC for a particular car model. Only new passenger cars are rated, and the ratings are updated on an annual basis each summer. Car manufacturers sell their cars with ESC, but under different names such as ESP, DSC, VSA etc. Therefore alongside the ESC ratings bars the name of the ESC system for that particular manufacturer is also given to inform the new car buyer of the name of the system on the particular car they are buying.

The fitment information is gathered from publically available information from car manufacturers, so it directly represents the information on ESC fitment that an average new car buyer might receive in the real world. Data sources include price lists and brochures published by the vehicle manufacturers that include the derivative line up and the detailed specifications of ESC fitment for each vehicle model. The data is downloaded from websites as webpages, or PDF files, or sometimes requested as hardcopy in the post if electronic versions are not available.

The goals of the rating system are to raise awareness of ESC and increase sales of cars fitted with ESC. Also, the ESC ratings will encourage vehicle manufacturers to increase the availability of ESC as standard fit. Optional fitment is a useful step toward increasing ESC fitment in cars on the road, although it is not as effective as standard fitment. Take up of ESC as an option is low since buyers are not aware of the system, nor of its importance. According to manufacturer reports, take up of an ESC option is around 1% or less from new cars sold. Therefore, for increasing fitment of ESC in cars on the road, standard fitment is the most effective option since optional take up is so low. The ideal situation would be for every car sold to have 100% standard fitment – so the ratings would all be solid green bars. Standard fitment of ESC means that all car occupants will be protected by the system without having to select it or pay for it as an option.

Following Thatcham's work on the fitment ratings, Euro NCAP decided to introduce a similar scheme in order to promote ESC fitment throughout the EU. The data covers the 27 EU member states. Euro NCAP first published fitment ratings in 2007 [12], and has also updated the ratings in 2008.

Example ESC Rating: Volkswagen Polo

The Polo is a supermini car sold by Volkswagen. In August 2008 [13] there were 8 trim levels available. In total there were 32 variants (engine/gearbox/trim combinations) of Polo available. There were three trims (Dune, Bluemotion, and Bluemotion 2) where ESC was not available, which is 6 variants in total (19%). ESC was fitted as standard on the GTi trim level, which has 2 variants (6%). On the remaining 4 trim levels ESC was fitted only as an option on new car orders, and this represents 24 variants in total (75%). The cost of ESC as an option was £445 during 2008, and it is sold as Electronic Stability Program (ESP) by Volkswagen. So overall the ESC fitment on the VW Polo has the following proportions, in Table 1:

Table 1.
ESC availability on VW Polo for Summer 2008 - proportions for generation of ESC rating bar

ESC fitment	Variants	Percentage	Rating colour
Not available	6	19%	RED
Optional fit	24	75%	YELLOW
Standard fit	2	6%	GREEN

These percentages of availability for ESC are then used to generate the proportions of the colours in the rating bar for the VW Polo [13], as shown in Figure 1:

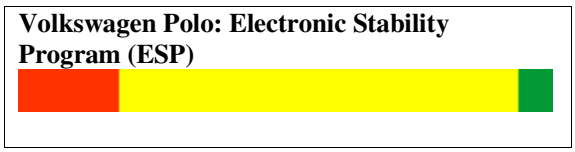

Figure 1. ESC rating for Volkswagen Polo (2008)

ESC Fitment Ratings for 2006 to 2008

ESC ratings have been generated for all new cars on sale in the UK during 2006 [11], 2007 [14], and 2008 [13]. One measure of ESC fitment rates that can be quantified is the number of models on sale with 100% standard fitment (solid green bars) as a proportion of the total models on sale; termed the "percentage of standard fit models". In 2006 the percentage of standard fit models was 40% i.e. 40% of models had 100% standard ESC fitment. In 2007 this rose to 47%, and by summer 2008 percentage of standard fit models had reached 53%. The progression over the years 2006 to 2008 for percentage of standard fit models is summarised below in Figure 2:

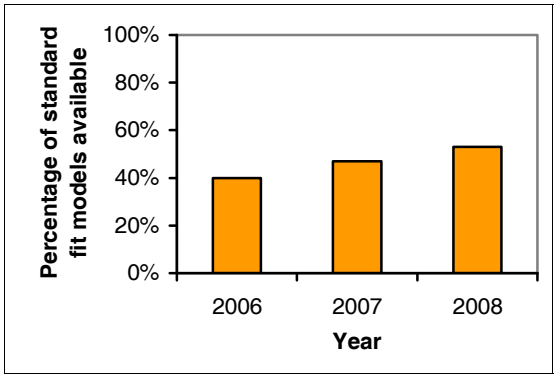

Figure 2. Percentage of standard fit models available for sale in the UK for 2006 to 2008.

MODEL OF ESC STANDARD FITMENT PENETRATION ON NEW CARS

Using the fitment information available it is possible to develop models of how ESC is penetrating the market within the UK. Two different models are developed based on two data sources. The first model uses the fitment ratings from Thatcham describing the availability of ESC on new cars. The second model uses new vehicle registration data from Bosch.

ESC Availability Model

The Thatcham ratings describe the availability of ESC in new cars as standard fitment. Using the data from Figure 2 the average increase in the percentage of standard fit models is 6.5%. This rate of increase is projected forward based on the assumption that the increase will remain at 6.5%, and this is modelled in Figure 3 up to the year 2030.

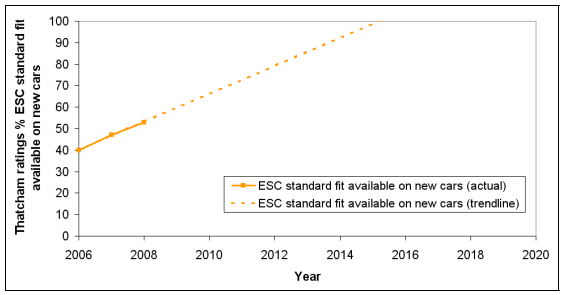

Figure 3. Model of ESC standard fitment availability 2006-2030 (data source: Thatcham ESC fitment ratings)

This model of ESC standard fitment availability reveals that it will take until 2016 before all new cars sold in the UK have ESC fitted as standard.

ESC Registrations Model

An alternative model uses data from Robert Bosch for the percentage fitment of ESC in new car registrations [15], which is data gathered by the agency R.L.Polk & Co for nine European countries including the UK. This data has been published from 2003 to date, and is shown in Figure 4.

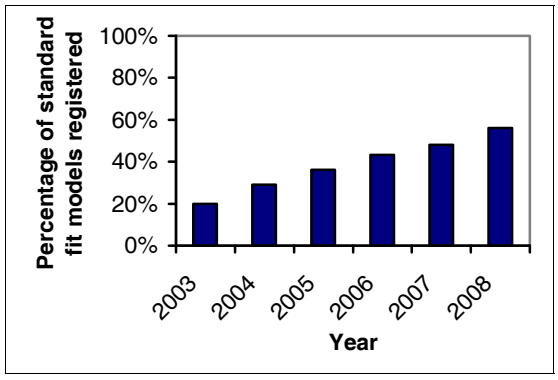

Figure 4. Percentage of standard fit models registered in the UK for 2003 to 2008.

Using the data from Bosch in Figure 4 the average increase in percentage of standard fit models is 6.97%. Based on the assumption that the increase will remain at 6.97% this rate of increase is projected forward to 2030, and this is modelled in Figure 5.

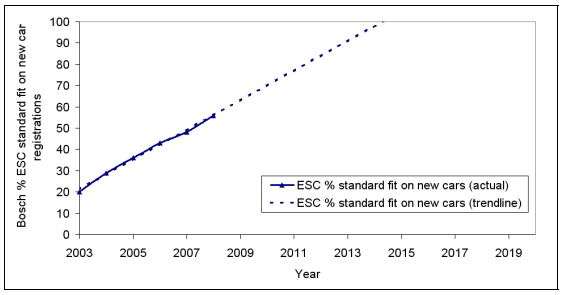

Figure 5. Model of ESC standard fitment registrations 2003-2030 (data source: Bosch new car registrations).

This model of ESC fitment registrations reveals that it will take until 2015 before all new cars sold in the UK have ESC fitted as standard.

Comparison of Availability and Registrations Models

The Availability and Registrations models are based on two different data sources, and are consequently slightly different. The Availability model uses Thatcham fitment ratings data [11,13,14], and the Registrations model uses new car registrations data from Bosch [15]. However both models make similar predictions for when 100% penetration of ESC standard fitment on new cars will be reached. The Availability model predicts 100% penetration by 2016, and the Registrations model by 2015. Since there is only one year difference as shown in Figure 6 it can be concluded that these models are in close agreement.

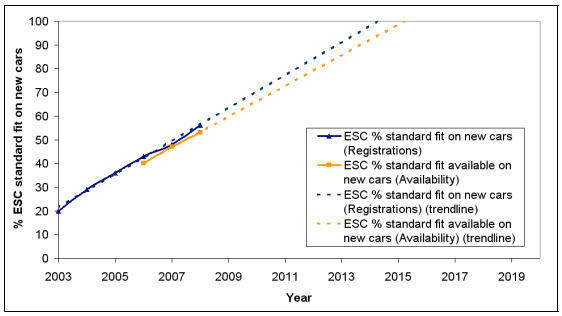

Figure 6. Comparison between Availability and Registrations models for new car penetration of ESC standard fitment.

Model of ESC standard fitment penetration on vehicle stock

Annually there are around 2,500,000 new cars sold in the UK [16]. Using this data on new car sales the proportion of new cars sold fitted with ESC can be calculated using the percentages from both the Availability and Registrations models. This is then used to find the proportion of cars fitted with ESC within the entire vehicle stock. Based on vehicle licensing data from the UK Department for Transport [17] the vehicle stock data is shown in Figure 7. The vehicle stock is currently approximately 28,000,000 cars, and this is also projected forward until the year 2030.

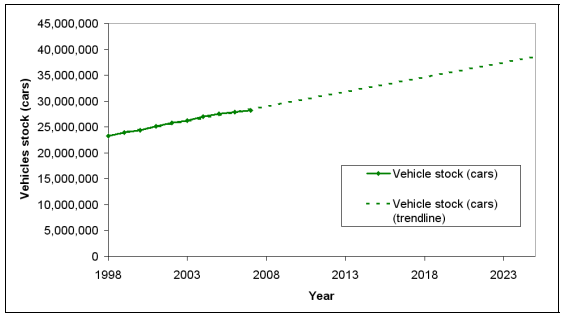

Figure 7. Vehicle stock on UK roads (1998-2030).

The proportion of ESC equipped cars in the vehicle stock is then calculated as the proportion of new ESC equipped cars entering the fleet each year cumulatively. This is modelled from 2005 to 2030. This model reveals that 100% penetration of ESC into the vehicle stock will be achieved in 2021 according to both the Availability and Registrations models. There is a close agreement between these two models, as shown in Figure 8.

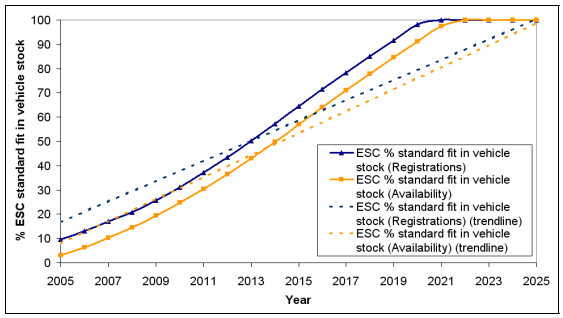

Figure 8. ESC penetration into UK vehicle stock: Availability model compared to Registrations model.

The Availability and Registrations models of ESC standard fitment into new cars and into the vehicle stock are based on two different data sources. However there is a close agreement between the two models with only one year difference between them for full fleet penetration. Since there is a close agreement it can be concluded that the estimate for 2016 for new car fleet penetration and 2021 for vehicle stock penetration is a reasonable estimate. Vehicle licensing statistics show that in the period 1998-2007 the average age of cars on the road was 6.6 years, which corresponds to the last cars registered in 2014 without ESC being taken off the road by 2021.

ESC Regulation and Vehicle Stock Penetration

On 10 March 2009, Members of the European Parliament voted for a compulsory introduction of ESC in all new types of vehicles from 1 November 2011, and for all new vehicles from 1 November 2014. This will have some impact upon the fitment of ESC in the vehicle stock. The Availability and Registrations models have been re-generated, but with fitment projections following the pattern required in order to meet the regulatory requirement of full penetration of new car sales by 2014. These models are shown in Figure 9.

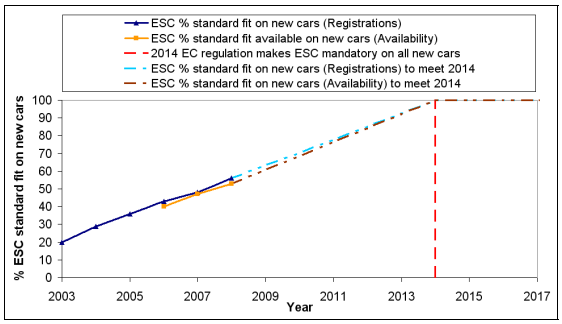

Figure 9. Availability and Registrations models for new car penetration of ESC standard fitment in order to meet EC regulatory requirement of standard fit by 2014.

This model indicates that there is a gap between the current market rate of ESC penetration (Figure 6) into the new car market, and the fitment rate required in order to meet the regulatory requirement in 2014 (Figure 9). Current market penetration rates will achieve new car fleet penetration by 2016, but it is required by the EC regulation by 2014. For some vehicle manufacturers this will simply mean providing ESC as standard, instead of as an option or being unavailable on some trim levels. For example the VW Polo in Figure 1 indicates that ESC is available on most trims, so the system need only be produced and sold as standard in order to meet the regulation. However for other manufacturers such as Proton this regulation for ESC will mean a substantial task since no Proton models in the UK are currently sold with ESC systems available at all [13].

The revised vehicle stock penetration, based on the models in Figure 9 to meet the requirement for standard fitment by 2014, therefore reveals that full stock penetration of ESC equipped cars will be achieved by 2021, as shown in Figure 10.

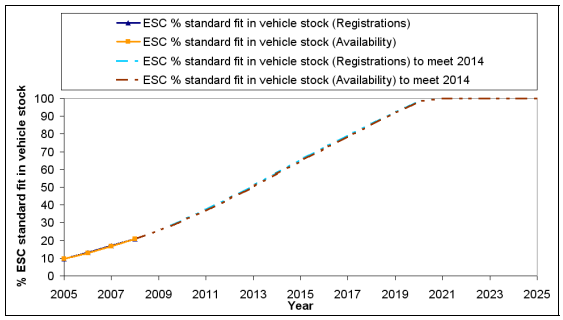

Figure 10. Availability and Registrations models of ESC penetration into the UK vehicle stock, with regulatory requirement for standard fitment of ESC by 2014 met.

In the period from 2009 before full stock penetration of ESC is reached another 3 million cars will be purchased as new without ESC fitted. ESC cannot be retro-fitted so all of these cars remain on the roads without this important safety technology.

This model (Figure 10) is used to generate estimates of casualty and cost savings offered by the standard fitment of ESC in accordance with the EC regulation by 2014.

CASUALTY AND COST SAVINGS FOR ESC

Using the ESC fitment and penetration models, it is possible to estimate the casualty and financial savings that can be projected when these models are combined with the true casualty numbers of occupants in cars. Like many other countries the UK has declining numbers of traffic casualties. Table 2 shows the average annual reduction since the current baseline values of the 1994-8 average. The reduction for all casualty severities is 1.2% annually, and the fatal casualty numbers have reduced by a mean of 0.5% each year.

Table 2.
Mean annual casualty reduction over 1994-8 baseline.

Total car occupants	1994-8 average	2005	Mean annual decline from 1996
Killed	1,762	1,675	0.5%
Serious	21,492	12,942	4.0%
Slight	180,034	163,685	0.9%

The most conservative estimate for fleet penetration is given by the Availability Model with a slightly slower fitment of ESC than in the Registrations model, so this Availability model is used to generate the casualty and cost reduction afforded by ESC. When the existing casualty

reduction rates are combined with the increasing fleet penetration of ESC equipped cars from the Availability model, estimates can be made for the reduction in total casualties due to the increasing ESC numbers in the fleet. These casualty and cost savings are shown in Figure 11, and this also shows the financial savings based on the standard UK model using willingness to pay methods [18].

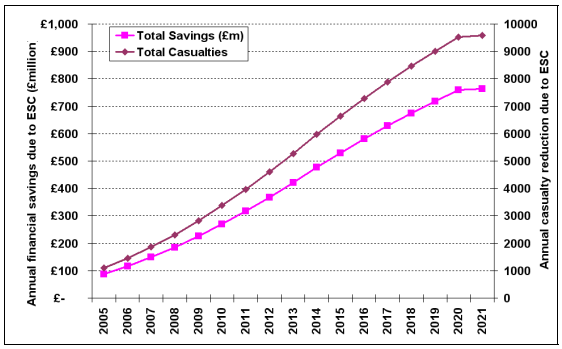

Figure 11. Annual casualty and financial savings with ESC.

By 2021 when full fleet penetration is achieved ESC systems are projected to be reducing total casualties by 9,587 each year, compared to the baseline of no ESC in the fleet. This includes 382 fatalities. Taking account of the different costs for each severity level, the value of these savings, equal £764 million (€1.1 billion) each year (at 2005 prices).

Table 3 shows the projected numbers of each injury category in 2010 and 2021 when all cars in the fleet are expected to be equipped with ESC for the two groups.

Table 3.
Casualty Reduction Projections.

	Total without further ESC		
Year	Slight	Serious	Fatal
2010	156451	10553	1634
2021	141640	6735	1546

	Reduction with ESC		
Year	Slight	Serious	Fatal
2010	2906	343	125
2021	8498	707	382

Comparing the estimates for ESC fleet penetration using these new models and the original model from Frampton and Thomas [10] also reveals similarities. The casualty and cost savings achieve similar levels, although over a slightly longer timescale taking approximately three years longer to reach the same level of savings. Furthermore the costs are based on data from 2005 so are probably underestimated, which might bring the estimates back to a similar time scale to the original.

EFFECTIVENESS OF ESC FOR YOUNGER DRIVERS

Over 3,000 car drivers aged under 25 are killed or seriously injured on Britain's roads each year [19]. A young driver is more than 2.5 times as likely to be involved in a crash as a mature driver [20]. Young drivers are more likely to be involved in single vehicle accidents involving loss of control, excess speed for conditions, and accidents on all-purpose single carriageway rural roads [20]. These are all the types of crashes where ESC is likely to be effective.

The effectiveness of ESC for young drivers (aged 25 and under) compared to mature drivers (aged over 25) has been calculated using the same method as in the previous study by Frampton and Thomas [10]. The analysis used a case-control method based on the induced exposure method [21]. Case vehicles were defined as those known to be equipped with ESC. A comparable group of control vehicles not fitted with ESC were also defined, and these were generally the previous version of a case vehicle. There were 10,475 case vehicles and 41,656 control vehicles in the dataset. The case control method also required vehicle manoeuvres to be separated into those where ESC may have an effect and those where no ESC effect is assumed. Table 4 shows the numbers of matched cases used to calculate effectiveness estimates.

Table 4.
Numbers of Cases used to Calculate Overall Effectiveness

Crash Severity	ESC Cars N	Non ESC Cars N
All Injuries	10,475	41,656
Fatal	110	491
Serious	846	3,564
Slight	9,519	37,601

ESC Effectiveness Estimates: Comparison of Young and Mature Drivers

Effectiveness estimates are calculated for drivers aged 25 years and younger, compared to drivers aged over 25 years. Driver age was known in 93% of cases. Figure 12 shows the distribution of young driver crashes compared to mature driver crashes. Crashes involving young drivers are in the minority at 13%.

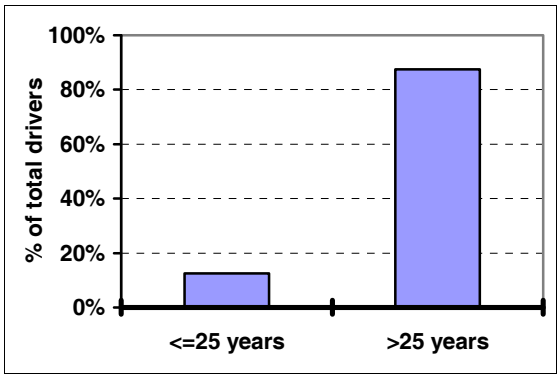

Figure 12. Numbers of Vehicles Involved in Crash.

Figure 13 shows effectiveness rates for cars equipped with ESC in young driver crashes. The best estimates are shown for different injury severity levels together with 95% confidence limits. Overall effectiveness for younger drivers is 14% dropping to 12% for slight crashes. For all fatalities and serious injuries (KSI) the effectiveness for younger drivers is estimated as 16%, which is greater than the effectiveness for all ages (12%) previously published [10]. ESC is shown to be more effective in reducing KSI for younger drivers than all drivers on the road.

Considering all injury levels (KSI and slight injuries), the overall effectiveness for all ages was 7% as previously published by Frampton and Thomas [10]. The overall effectiveness of ESC in reducing all injuries for young drivers is shown to be double (14%).

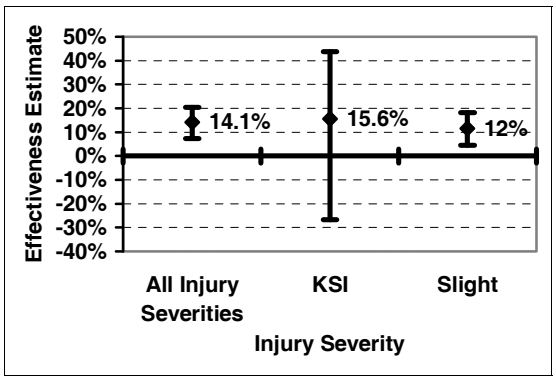

Figure 13. ESC reduction for young drivers.

Cost and Casualty Savings for Young Drivers

Young drivers account for 30% of car drivers killed or seriously injured on roads in the UK [22]. Applying this proportion to the casualty and cost savings reveals that when full fleet penetration is achieved by 2021 ESC systems are projected to be reducing total casualties by 2,844 each year for younger drivers, compared to the baseline of no ESC in the fleet. This includes 114 fatalities. The value of these savings, equal £227 million (€320 million) each year. These savings in casualties and costs are compared to the total annual savings in below in Table 5:

Table 5.
Summary of casualty and cost savings: total compared to young drivers.

	Young drivers	Total
Casualty reduction	2,844	9,587
Fatalities	114	382
Value of savings	£227 million (€320 million)	£764 million (€1.1 billion)

UK ESC Fitments in Young Drivers' Supermini Cars

Examining the ESC fitment ratings for 2008 reveals that only 5 models out of 47 supermini cars (11%) have ESC fitted as standard. Since younger drivers most commonly drive small cars this is a very small choice for the drivers who could benefit most from ESC technology. These models are relatively expensive within the supermini segment, most being priced from £12,000. The Suzuki Splash is cheapest from £9,000, but this is still expensive for a young driver.

Young drivers most commonly drive a second hand, older car. It will take a long time before ESC is available in the small used car market, which makes it extremely difficult for young people to drive cars fitted with this important safety system. The small car market is increasing, with new car sales data from SMMT indicating that the mini and supermini segments combined have increased their market share from 26% to 33% in the last decade [16]. Younger drivers are most likely to buy a second hand small car, but other drivers also buy these small cars – for example as a second car within the household. Given current economic and environmental concerns, households are potentially more likely to purchase a smaller car, and so small car sales are likely to continue to increase. With so few of the small cars fitted with ESC as standard, most of these cars will be entering the market without ESC, which is an opportunity missed in terms of safety provision. Small cars are still being brought to market without ESC fitted as standard. For example the latest Ford Ka launched in January 2009 in the UK only has ESC fitted as an option across the range, not fitted as standard. The small car segment has the largest gap in fitment to fill. In order to ensure that all drivers are protected by ESC it should be fitted as standard on all vehicles regardless of size. Results suggest that it would be most effective to introduce ESC into smaller cars

first in order to address the casualty rates amongst younger drivers.

LIMITATIONS

Both the Availability and Registrations models for standard ESC penetration are based upon the assumption that ESC standard fitment will increase in a linear manner, which may not be accurate. However the data does indicate a linear progression up to 2008.

Neither the ESC availability ratings from Thatcham, nor the ESC new car registrations from Bosch can indicate how many ESC equipped cars have actually been sold in the UK historically in the period before these fitment and registrations data were collected. The model of ESC cars in the vehicle stock therefore has to be assumed to follow the backward projection of the Availability and Registrations models.

A limitation of these models is the assumption that 100% standard fitment ESC throughout the entire vehicle stock can be achieved. In reality, there are likely to always be a small number of cars on the road that do not have ESC, for example classic cars and imported cars. However the models do provide an estimate of ESC penetration for the majority of passengers in the UK.

The model of new cars sales and vehicle stock is based on data up to 2008. Given the economic recession, it is evident that car sales are reducing during 2009. The effect might be to overestimate car sales, and therefore overestimate the benefit to be derived from ESC. However as ESC systems are sold in increasingly greater numbers of car models as the deadline for mandatory fitment in 2014 approaches, the unit costs for ESC systems will reduce. This will likely reduce the price of ESC as an option, and hence improve the take up of ESC as an option, which could mean the calculations of casualty and cost reductions are underestimated.

There are a number of factors to consider when interpreting the results of the effectiveness estimates for young drivers. The Great Britain national casualty data used in this analysis provides one of the largest samples of ESC equipped cars studied to date but further methodological procedures may be required to fully isolate the crash reduction benefits of the system.

The case-control method compares ESC and non-ESC cars in total and hence compares all the differences between these groups. It has been hypothesized that since all ESC cars have ABS systems, the differences in crash involvement could be due to ABS not ESC. However previous studies of ABS systems have shown the effects of ABS to be small [23,24], and most of the non-ESC cars in this study would also have been fitted with ABS.

The part played in injury reduction due to improvements in passive safety of the cars is also important to consider. There may have been further vehicle improvements introduced at the same time as ESC systems. Whilst vehicle safety improvements are unlikely to change driver behaviour, they would change injury outcomes. It was not possible to quantify the effects of passive safety improvements in this study, but the results are considered to be a measure of improvements in handling performance – mostly ESC.

In making the comparisons every effort was made to compare cars that were as similar as possible so that the major difference was ESC fitment. However it is possible that a few were mis-classified, although Kreiss et al [25] stated the effect will be to consistently underestimate the effects of ESC, so these study results can be viewed as conservative. Crashes involving vulnerable road users were excluded from this analysis because the effect on ESC effectiveness rates would have however been marginal [10].

The cost savings are based on the cost per casualty in 2005, where costs would be expected to raise meaning cost calculations are probably an underestimate.

CONCLUSION

Standard ESC fitment will reach 100% by 2014, as per the EC regulatory requirement. However current market rates indicate that fleet penetration of ESC in new cars will not be reached until 2016, revealing a gap in provision that vehicle manufacturers will have to fill. Full vehicle stock penetration will be achieved by 2021 according to the models. Projections also reveal that another 3 million cars will be purchased without ESC in the interim between 2009 and 2014 when it becomes mandatory. This means that the opportunity to reduce casualties is being missed. Earlier standard fitment of ESC could annually save £764 million and 9,587 casualties.

A previous study has shown that ESC effectiveness is 7% in crashes of all severity [10]. ESC appears to offer additional benefit for young drivers. Overall effectiveness was estimated as 14% for young drivers. For KSI the effectiveness for young drivers is 16%, and for slight injuries the effectiveness is 12%. For all these estimates, ESC effectiveness is around double the previously published overall effectiveness of 7% for all ages and all injury severities.

Young drivers commonly drive small used cars with ESC rarely fitted. Since full fleet penetration could take 12 years, faster ESC introduction into smaller cars is needed for casualty reduction amongst younger drivers where it will be most effective. These young drivers represent 30% of serious injuries and fatalities, equating to savings of £227 million and 2,844 casualties annually. With current economic and environmental concerns the small car market is likely to increase, so fitment of ESC as standard in small cars is key to increasing stock penetration of ESC.

There are many factors that can influence the rate of ESC fitment, including the national economy. In these current times of recession new car sales and second-hand cars are dropping. With decreased turnover in the vehicle stock, and people potentially keeping their vehicles for longer, full fleet penetration of ESC equipped cars may be limited. In these circumstances public awareness of ESC must be the focus, so that car buyers make an informed safety choice. Fitment ratings information published by Thatcham is useful tool for raising public awareness of the importance of ESC.

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