

Autonomous Emergency Braking (AEB) Frequently Asked Questions

What is Autonomous Emergency Braking? (AEB)

Autonomous Emergency Braking or AEB is a new safety technology increasingly being fitted to vehicles which monitors the traffic conditions ahead and automatically brakes the car if the driver fails to respond to an emergency situation. AEB is seen by experts as important a development as the seatbelt, but rather than protecting the occupant in the event of a crash, it aims to prevent the crash happening in the first place.

How can AEB benefit the UK driver?

AEB has a significant role to play in preventing a wide range of collisions. It can address both minor and major collisions and consequently associated injuries, costs and inconvenience. It will also contribute to the addressing of the whiplash epidemic that the UK insurance industry is experiencing and ultimately costing the motoring public in increased premiums. If the crash is prevented then so is any ensuing whiplash claim.

Is AEB called anything else?

Unfortunately yes. Different vehicle manufacturers use a myriad of different terms and marque specific trade names to describe what are all effectively AEB systems. Some alternative system names include;

City Safety – Volvo

SCBS – Smart City Brake Support – Mazda

Active City Stop – Ford

City Emergency Braking – Volkswagen

How does AEB work?

AEB systems use camera, lidar or radar sensors to monitor their environment and detect potential threats. Complex algorithms analyse sensor data to identify collision partners and in conjunction with vehicle motion data determine their relative position, speed and hence collision threat. If a critical situation is identified and the driver fails to react appropriately the AEB system can automatically apply the brakes to avoid the crash altogether or lessen the impact.

At what speeds does AEB work?

The speed range over which an AEB system operates is dependent on the type and complexity of sensor used. Improved performance can be achieved by combining multiple sensor types together in 'fusion' to complement one another for instance camera and radar together. Three-quarters of all collisions occur at speeds less than 20mph in so called 'City' driving environments. This is where AEB systems using the cost efficient lidar sensor are very effective, typically avoiding crashes at speeds up to 12-15mph and mitigating those up to 25mph. Relevant crashes include those that occur at junctions roundabouts and in stop start low speed traffic typically with one car running into the back of another.

More complex, but expensive radar sensors build on the low speed capability with the potential to avoid collisions with stationary and moving vehicles across at higher speeds. Teaming radar and camera sensors in “fusion” offers the potential to also address pedestrian and other vulnerable road user crashes. The camera complements the radar’s ranging ability by enabling object detection and classification and so adds to the overall performance capabilities of these systems. AEB sensing technologies are developing rapidly enabling an ever increasing ability to avoid crashes.

Is Forward Collision Warning (FCW) the same as AEB

No, FCW systems detect potential obstacles in the path of the vehicle and alert the driver with a warning. They can also support the driver by boosting the braking input as necessary to help avoid the crash and offer proven benefits in avoiding some crash types. However FCW systems do not brake the vehicle automatically, the driver must take action and apply the brakes in response to the warning. In many situations especially at low speeds there is not enough time for warning systems to be effective hence these are typically beneficial in higher speed traffic.

Is this the car taking over from the driver?

AEB systems are not designed to replace the driver whose responsibility it is to remain in control at all times. However with 90% of all crashes due to driver error there are inevitably times where the driver requires support to prevent a collision.

Will the drivers just rely on AEB and not bother to brake?

No, AEB systems intervene at the very last second and braking is deliberately harsh and uncomfortable to prevent what is known as driver adaptation.

If my car brakes suddenly because of my AEB system, will the car behind run into the back of me?

The AEB system cannot brake the car any more sharply than a human could in the same emergency situation. Automatic braking illuminates the brake lights as normal so alerting the following driver as usual. If the driver is following at a safe distance there will be time enough for him to react as normal.

Can AEB systems also detect pedestrians and cyclists?

Increasingly new systems are able to detect pedestrians, cyclists and large animals. This is particularly important in addressing the 400 pedestrian deaths on UK roads annually.

What evidence is there that these systems work effectively in the real world?

There is a wealth of international data available indicating the effectiveness of AEB and associated reduction in crashes and injuries.

UK insurance claims data from Thatcham member insurers shows an 18% overall reduction in the frequency of third party injury claims.

The US Insurance Institute for Highway Safety compared the Volvo XC60 and S60 (with a standard fit City AEB system) against a control group and showed a 15% reduction in third party damage claims, and a 26% reduction in personal injury claims.

Also in the US an insurance study showed the benefits of the higher speed systems with at least 10% reduction in third party damage, and at least 14% reduction in third party injury.

In the UK, prestige chauffeur fleet 'TriStar worldwide' chose to use cars fitted with AEB and reported a 27% reduction in rear end crashes by its drivers. Overall repair costs, third party costs and associated charges like hire of replacement vehicles dropped 41% compared to the previous 4 years average.

Does AEB work in all weathers and visibilities?

Thatcham has evaluated numerous AEB systems (radar, lidar and camera) and found that the systems operate in wet road conditions. Only heavy snow can affect the performance of some sensors but such conditions are rare.

Radar and lidar sensors function regardless of lighting conditions. Camera based systems however do need adequate lighting, However the majority of systems can work at exceptionally low lighting by boosting the gain applied to the signal – as per your mobile phone.

The ability to recognise pedestrians in the dark is challenging, however the vast majority of pedestrian collisions occur in urban areas where street lighting provides sufficient illumination for camera systems to remain effective.

How much does it cost for AEB?

The price to the consumer is entirely dependent on the vehicle manufacturer and their pricing strategy. Many vehicles have AEB fitted as standard (see Thatcham AEB fitment ratings), however where available as an optional extra it is often bundled in with other Advanced Driver Assistance Systems. The cost for optional AEB is on £1,300 on average, but can be as low as £180 for a simple "City" system.

Can AEB be fitted to my existing car?

No. AEB systems cannot be retro-fitted. When you choose your next car, check Thatcham's website www.thatcham.org/stopthecrash to see if AEB is fitted as standard, or available as an optional extra.

Will AEB systems make my car more expensive to repair if I run into something?

Camera and lidar sensors are generally mounted behind the windscreen therefore they are well protected. Lidar sensors typically clip onto the windscreen and can be easily removed and refitted during windscreen replacement, whilst camera sensor assemblies are often bolted to the vehicle body. Repairs to the screen do not appear to affect the system performance.

There is some risk associated with radar sensors which are usually fitted at the front of the vehicle in more vulnerable positions, but we are already seeing evidence of manufacturers considering the protecting of the radar sensor by moving its location, or clever mounting to reduce the risk.

What are the KSI (Killed or Seriously Injured) savings that could be achieved by AEB?

Based on current fitment rates, Thatcham's forecasts indicate that AEB has the potential to save 1,100 lives and 122,860 casualties over the 10 year period from 2015-2025.

What are Thatcham proposing today?

Given the impressive performance of AEB, Thatcham are proposing a treasury backed incentive of £500 to all customers choosing a new vehicle with AEB (standard or optional fit) to run over the five years from 2015-2019. Whilst the casualty figures above are already impressive with no action, Thatcham believe that a fiscal incentive will accelerate the proliferation of AEB onto UK roads in a

much shorter period of time and will consequently save an additional 12,830 casualties and an additional 120 lives over the same 10 year period (2015-2025).

The sooner we see a large number of AEB systems available to UK car buyers and an incentive to purchase, the sooner these benefits can be realised. It should be noted that each crash has a whole range of associated costs such as loss of earnings and productivity, medical and emergency services costs, insurance costs, congestion and highway maintenance costs. Stop the crash and we stop many of these avoidable costs.

Which cars currently have the system fitted as standard?

Some manufacturers such as Volvo, Mazda and Volkswagen offer systems as standard. However, almost all manufacturers have AEB systems available as optional extras. Thatcham provide a guide to fitment on their website at www.thatcham.org/stopthecrash

What proportion of the car parc currently has an AEB system available?

Thatcham's analysis shows that 23% of new vehicles currently on sale have some kind of AEB system available. Of vehicles currently on the road the figure is currently around 1% but growing daily.

What else do I need to know?

The benefits of AEB have already been recognised by the British insurance industry and therefore cars with standard fit AEB already qualify for a reduction in vehicle insurance grouping of up to 5 groups. This can translate to a potential premium reduction to the policy holder in the region of 10%.

Thatcham as a key member of the European vehicle safety organisation, Euro NCAP has helped to introduce the testing of AEB systems as part of the "Star rating" scheme. In 2014, using similar tests, Euro NCAP will introduce a similar requirement for pedestrian AEB into their rating system from 2016. These initiatives mean that it is becoming increasingly difficult for vehicle manufacturers to achieve the sought after 5 star rating without the availability of AEB.

How can I show my support for AEB?

Thatcham are campaigning for a financial incentive backed by the treasury to be available for customers choosing cars with AEB. You can show your support through social media for this initiative, and for AEB as a life-saving technology, by tweeting using the hashtag #stopthecrash



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