LGV - Electronic Vehicle Safety Systems

Introduction

The European Union has recognised the importance of road safety and through the ‘General Safety Regulations’ has sought to reduce the number of road collisions involving LGV’s across the union.

European Community Directive 66/2009 – General Safety Regulations has mandated the fitment of vehicle safety systems to newly registered LGV’s.

Since the 1st of November 2014 newly registered LGV’s are required to be fitted at the point of manufacture with:

* Electronic Stability Control (ESC)

From the 1st of November 2015 newly registered LGV’s are required to be fitted at the point of manufacture with:

* Automatic Emergency Brake Assist (AEBA)
* Autonomous Emergency Braking (AEB)
* Lane Departure Warning System (LDW)

These are generic terms for these systems and different manufacturers use different acronyms but the systems fulfil a broadly similar function to satisfy EU requirements.

Because most large fire appliances and ‘special’ vehicles are based on an LGV chassis these modern safety systems are now appearing as standard on emergency service vehicles.

Rationale for Fitment

The EC has conducted much research into road traffic collisions involving LGV’s.

In summary they have determined that 90% of all accidents involving LGV’s are the result of human error usually when one or more drivers are distracted or have misjudged their speed.

Up to 20% of all fatal collisions involve one LGV driving into the back of another vehicle.

In 2012 the United Kingdom Department for Transport undertook research into the cost of a fatal collision involving an LGV.

They have determined that the average cost of such an incident is £1.9 million pounds not including legal costs, compensation claims, or the cost of a replacement vehicle.

Reputational cost was not mentioned or quantified.

The cost of fitment of modern electronic LGV safety systems at the point of manufacture does carry a cost but in relation to the cost of a fatal collision there are obvious savings to be made.

Safety Systems and Their Functions

1. Electronic Stability Control

Electronic Stability Control (ESC) is an integrated safety system that monitors a number of key parameters and automatically intervenes to ensure the vehicle remains upright and assists the driver to maintain directional control when there is a risk of understeer or oversteer developing into a skid.

It is particularly effective on wet or slippery roads when under or over steering can easily occur. On dry roads it can prevent ‘roll over’ resulting from excessive speed (for the situation) on roundabouts, bends, adverse cambers or sudden steering movements.

The ESC system automatically applies the brakes to individual wheels and reduces engine power output in such a way as to keep the vehicle upright and on the intended path.

The system automatically returns full control to the driver once it recognises that the vehicle has returned to a stable condition.

2. Automatic Emergency Brake Assist

Automatic Emergency Brake Assist (AEB) is a generic term for an active safety system that increases brake pressure in an emergency.

The system monitors the speed and force that the brake pedal is applied and with reference to pre-set parameters may decide that the driver is attempting an ‘emergency stop’.

In this situation the system will take over the braking applied by the driver and will apply the maximum braking effort possible without locking the wheels.

This allows the driver to maintain steering control and take evasive action.

3. Autonomous Emergency Braking

Autonomous Emergency Braking (AEB) uses forward facing camera’s radar or lasers to scan the area in front of the vehicle and warn the driver of a potential collision.

If an obstacle is detected and it is perceived that the driver is not reacting an audible and visual warning is given.

The AEB system is also electronically ‘prompted’.

If following the driver alerts no action is taken by the driver the system enters the next phase and applies the brakes.

Only part braking capacity is utilised and this is intended as another driver warning.

If there is still no reaction from the driver, the AEB system with reference to speed and distance applies emergency braking in an effort to prevent the collision or reduce the severity.

4. Lane Departure Warning

Lane Departure Warning (LDW) is designed to help the driver maintain the intended path and remain within road markings.

The system uses sensors to remain within road markings and also monitors speed, steering wheel movement and the vehicle indicators.

By monitoring vehicle controls and sensing the lane it is able to differentiate between unintended lane drift and an intended lane change.

The system usually activates in stages firstly warning the driver by a buzzer or by shaking the steering wheel.

If the driver takes no action the system combines with other safety systems and dependent on manufacturer can maintain the vehicle in the lane and /or brake the vehicle to a safe halt.

Electronic Vehicle Safety Systems in the Fire Service

The electronic vehicle safety systems are just as valid in large emergency response fire service vehicles as in the road haulage industry.

The goals of the EC, fleet operators and fire services are the same:

* Reduce collisions
* Reduce vehicle running costs
* Reduce vehicle insurance costs

Collisions involving emergency service vehicles often attract adverse publicity.

By reducing vehicle collisions and avoiding a potentially large collision, the reputation of the organisation is preserved.

Disabling Electronic Vehicle Safety Systems

Should these safety systems be de-activated when the emergency warning equipment is switched on?

* There is no potential benefit for this. The systems are designed to intervene only when pre-defined safety parameters have been exceeded.
* Like Anti-Lock Braking Systems (a well-established safety system), these systems are not intended to be relied upon by the driver.
* They are intended to automatically activate only once a safety threshold has been exceeded.
* Emergency response drivers should be driving well inside the pre-set thresholds in the knowledge that these safety systems are working in the background.
* The systems are not designed to be ‘leaned on’ by drivers. That is to say the driver should not push a vehicle into a bend at speed relying on the electronic safety systems to stay in control.
* Response drivers have great responsibility to the public, the service and their crew members.
* They must drive in accordance with ‘Roadcraft’ legislation and organisational requirements.
* However because of the dynamic nature of response driving, things can go wrong requiring a rapid change of speed or direction.
* It is in these unplanned situations that the electronic safety systems can play an important role and help a driver maintain control and avoid a collision.
* In considering whether or not these systems should be fitted when ordering a new chassis or if they should be disabled when the emergency warning equipment is activated, services should consider the legal and ethical ramifications.
* In the event of a fatal collision the circumstances will be scrutinised by the Health and Safety Executive as well as a criminal or coroners court.
* Services may have to justify why the vehicle was not fitted with electronic safety systems when they are readily available to be fitted by the manufacturer or why, when the vehicle is fulfilling its emergency response role, were these safety systems disabled?
* If the safety systems were not fitted at the point of manufacture (when usually a standard fitment) or disabled during response driving, the rationale may be hard to justify under the microscope of a legal arena.

Summary / Opinion

Modern electronic vehicle safety systems are designed to save lives and money.

NFCC Transport Officers Group & NFCC Emergency Response Driving Group recommends that these systems should be fitted to new fire service vehicles in the same way as new commercial haulage vehicles.

NFCC Transport Officers Group & NFCC Emergency Response Driving Group also recommends that safety systems should remain active at all times so that they can fulfil their intended function.

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