

# Anti-rollover device for tractors

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An Agricultural Mechanisation team from the Department of Rural Projects and Engineering at the Public University of Navarre have designed a new anti-rollover structure for pre-1980 registered tractors. It involves a double arch protection system located at both the front and behind the driver's seat and anchored to the chassis of a Massey Ferguson 178 Ebro tractor, the model for which the basic safety structure was designed and that can also be fitted, with adaptations, to the other makes and models in use.

The research team started work on this in 2002, the year that 1215/97 Royal Decree came into force, obliging all tractors being handled by agricultural workers to have a system protecting against roll-over tengan in order to avoid work accidents: This regulation made the up-dating of safety compulsory for those tractors registered before 1980.

This is why the Navarre Institute of Health at Work (INSL) commissioned the Agricultural Mechanisation group to carry out a study on the 1500 tractors of this type in function in Navarre. A solution had to be found and a structure that could be coupled to these machines and would reduce the high accident rate amongst them began to take shape.

Accidents due to tractor rollover are the main cause of deaths in agriculture. Each year, in the Spanish State, some 60 deaths arise as a result of tractor rollover. Moreover, it is not only the deaths that have to be taken into account, but also serious and less serious injuries.

Programme available on the INSL website

After analysing the data, the team of researchers designed the protective structure according to the OECD Code 4 norms for the Massey Ferguson 178 Ebro, being the most abundant model in Navarre, although the new structure could be coupled to the majority of models. Then a computer programme was designed which would enable a calculation to be made of the protective structure needed by the various types of tractor in use, according to their characteristics. This programme, known as Estrema, can be freely at the INSL website, [www.cfnavarra.es/insl](http://www.cfnavarra.es/insl).

In order to validate the programme, the new structure was subjected to a series of trials and tests as carried out in the homologation tests on structures just out of the factory workshop, and the new structure passed all of them. Using these test data, a second, improved version of the Estrema programme was drawn up and, with this, a new, enhanced structure was built at Víctor Bergés' company at Leida in Catalonia.

The enhanced model was approved at the II Workplace Risk Prevention Projects Competition in the agricultural sector, where a simulation test was carried out. The results were very good and, although the structure suffered the blow produced by the rollover, it had not invaded the security zone that the tractor-driver would have occupied and, therefore, they would have been protected.

Currently a line is being followed for the safety of another group of tractors – those weighing less than 1500 kilos, given that the “Estrema” programme only calculates structures for tractors weighing more than 1500 kg.

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