

## ACCC Consultation response

*AD ROPS +: “Automatic and expandable safety frame: design and execution of rollover tests on ATV vehicles”*

In response to the consultation of the ACCC investigation into quad bike safety, and considering the merits of implementing a safety standard for quad bikes, we consider to inform the ACCC about this project that could potentially lead to useful information and inputs for the implementation of a quad bike safety standard.

### **Background**

Rollovers are by far, the first cause of death in the agricultural industry because of the lack of rollover protective structure and because of the inoperance of foldable ROPS. For the past years, the Public University of Navarra has been focused in the research of AD-ROPS (Automatically Deployed ROPS) and its application to agricultural machinery.

AD-ROPS present clear advantages over fixed and foldable ROPS for different reasons. They increase the rollover protection availability by eliminating the risks of entanglement of fixed ROPS during low clearance operations, they suppress the non-ergonomic operations and inoperance of foldable ROPS and finally they enable the use of ROPS on small machines in which standard ROPS can pose ergonomic and stability issues.

Several papers have been published by the Public University of Navarra in the field of AD-ROPS.

### **“Automatic and expandable safety frame: design and execution of rollover tests on ATV vehicles”**

In the framework of the research project *“Automatic and expandable safety frame: design and execution of rollover tests on ATV vehicles”* in collaboration with air-ROPS, the Public University of Navarra is participating, as the investigation organism, in the design and execution of rollover tests with ATV-Quad vehicles. This project consists of 4 phases.

In the first phase of the research project, the technical design specifications required for ATV-Quad vehicle rollover platforms have been analyzed. The milestones of this phase comprise:

- The design in CAD of the platform
- The manufacturing and assembly of the platform components
- The design and implementation of the sensing hardware and software: sensors to monitor the incline angle of the platform and load cells to track the force under the ATV wheels. This implementation is expected to determine the tipping rollover condition of the ATV

The second phase of the project aims to develop the rollover test protocol. The initial assumptions of the test are taken from the “Tilt test procedure” of the ACCC Exposure draft recommendations. Static and dynamic rollover tests are performed in different configurations dependant of external parameters such as the mass of the dummies (80 Kg and 100 Kg), the use of different models of ATV-Quads, the use of a restraint system, the fitment of an AD-ROPS, and the orientation of the rollover (forward, rearward and lateral).

The third phase of the project consists of the detailed procedure to execute the rollover tests considered in the testing protocol and the methodology to record the data generated during the tests. The test parameters recorded during the test are the incline angle and the time of the rollover. Related to the AD-ROPS system the parameters registered during the test are the triggering angle and time as well as the achievement of the full deployment condition of the safety system.

In the 4<sup>th</sup> and final phase of the project, after the execution of the tests, the influence of the external parameters is evaluated:

- The influence on of the center of gravity of the ATV and dummy
- The influence in the critical angle where the static rollover occurs,
- The time to trigger the safety system and the total deployment of the AD-ROPS system.

During this phase, the performance of the safety system against dynamic rollovers is also evaluated. The pathologies suffered by the dummy after the rollover test are analyzed in this phase of the project.

### **Conclusions**

**AD-ROPS present several advantages over fixed and foldable ROPS. The project under development aims to evaluate quad bike performance during different rollover conditions and the potential behavior of an AD-ROPS to reduce risks during these events. Workproducts from this project can provide additional inputs to a standard related to quad bike CPD's and rollover protection.**