

Scooter platform

New 2021 test protocols due to be introduced by C-NCAP will take into account scooter occupant safety on China's bustling roads

According to statistics, in China, scooter accidents account for the highest proportion of the total number of two-wheeled vehicle accidents. But there is currently no corresponding scooter model available for ADAS testing.

In 2019, China Automotive Technology and Research Center (CATARC) began a joint project to develop the C-NCAP 2021 protocols to better represent real-life traffic conditions in China. More specifically, it will look at the introduction of new vehicle scenarios involving scooters. 4activeSystems supported the project through development of test tools for the new test procedures. The company called upon more than 10 years of experience in the development of test dummy and propulsion systems for real-world system testing.

An extensive investigation of different scooter models, taking into account internal and external measurement resources, resulted in the design of the 4activeMC Model E Scooter CN. The dummy represents a real scooter in terms of how it is perceived by vehicle sensors – in terms of the car's radar response, its IR reflectivity (lidar systems) and its visual appearance (camera systems), but it has a very lightweight structure so that the dummy and vehicle do not succumb to any damage in a crash.

In a crash test, a dummy must move on a predefined trajectory. Consumer testing

scenarios mainly focus on straight line paths. In the 2021 C-NCAP protocols, notably more complex scenarios must be covered. In addition to its belt-driven systems, such as the 4activeSB/XB, used for straight line situation testing, 4activeSystems also offers free-moving platforms such as the Freeboard large (which is a carrier for large objects such as car dummies) and the Freeboard small (designed for VRU testing). The 4activeFB-small carrier is a GNSS/IMU-controlled, battery-powered, free-moving platform, which provides a very high position accuracy of ±2cm ensuring test repeatability.

For VRU testing it is essential that the underlying propulsion system does not affect the sensor response, so only the dummy object should be detected. Therefore the platform beneath the dummy is extremely low profile, taking



The 4activeFB-small carrier platform is free-moving and ensures low radar response

into account the right distance estimations for camera-based systems. Thanks to the special shape and damping plastic materials used, the radar response is very low from all directions (orders of magnitude below dummy objects).

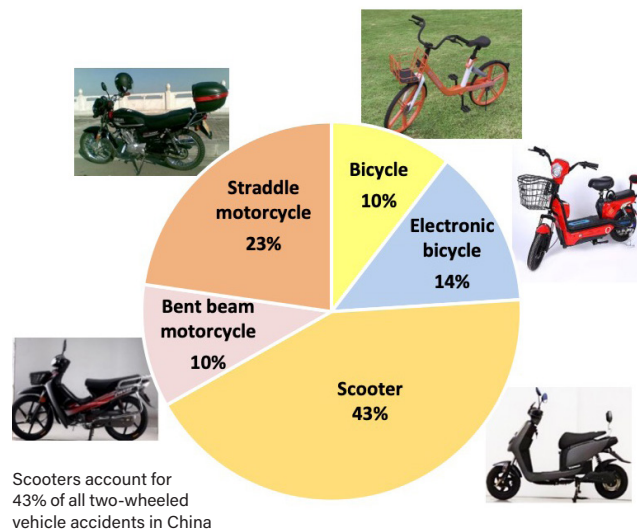
Based on accident analysis, the main scenarios involving pedestrians and bicyclists that cause severe injuries and deaths happen at speeds up

to 20km/h (12.5mph). New scooter testing protocols in the 2021 C-NCAP go higher (up to 50km/h [30mph]). The 4activeFB-small exceeds this standard requirement and can reach speeds up to 80km/h (50mph) to cope with future testing demands.

User-defined trajectories can also be set up within an easy-to-use software interface and displayed online on a satellite map. The intelligent system can communicate to any major ADMA supplier, so absolute and relative position data between platforms and test vehicles is available for movement triggering, speed control and monitoring.

Designed for development of ADAS in the truck segment, the 4activeFB-small carrier platform can be driven over by heavy, fully loaded trucks in stock configuration.

At this point in time, the 4activeFB-small is the only free-driving platform that conforms to all official Euro NCAP and ISO AEB VRU testing specifications. <



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