

WorldSID Durability Requirements and Performance

The durability requirements and measured performance of the WorldSID are described herein.

1. Requirements

Provided the loads on the components remain below 150% of the injury assessment values (IARV, e.g., Mertz^[1]), the components were to remain functional for at least 10 tests. Since injury tolerance levels (e.g., probability of AIS \geq 3) for each body region of WorldSID did not yet exist at the time when WorldSID performance targets were being established, the injury assessment reference values (IARV) developed by Mertz ^[1] were used in the subsequent WorldSID durability evaluation phase.

Further details of the specific body region durability needs were presented in the Design Brief^[2]

2. Performance

The durability performance of the WorldSID is described subsequently, based on the test data available up through early May 2004.

Permanent deformation of the shoulder rib and accompanying IR-TRACC damage was observed as a result of the 8,9 m/s rigid wall sled test and the two-meter body drop test. These test conditions are extremely severe and caused excessive stroking (bottoming out) of several ribs and the IR-TRACCs. While these conditions were considered to be in excess of 150 % of the IARV's, structural reinforcement in the form of a rib doubler was

added to the outer shoulder rib to further improve durability. Subsequent sled tests conducted at 8,9 m/s confirmed that durability had been improved as no deformation or IR-TRACC damage was observed.

Numerous full-scale pole and MDB tests were carried out with WorldSID in the driver and/or rear passenger struck side position. Dummy responses ranged from below the IARV's to three times the IARV's or the maximum measurement range. No damage was observed during visual inspections of the head, neck, thorax, pelvis or legs, indicating excellent durability.

Bibliography

- [1] MERTZ, H., IRVIN, A. and PRASAD, P. Biomechanical and scaling basis for the frontal and side impact injury assessment reference values. In Proceedings of the 47th Stapp car crash conference. Warrendale, PA, US: Society of Automotive Engineers. 2003.
- [2] International Organization for Standardization.
ISO/TC22/SC12/WG5/WSTG N100, Revision 1, WorldSID - α Design Brief. 2000.