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Technical Bulletin

Damped Accelerometers in Pedestrian Protection Testing

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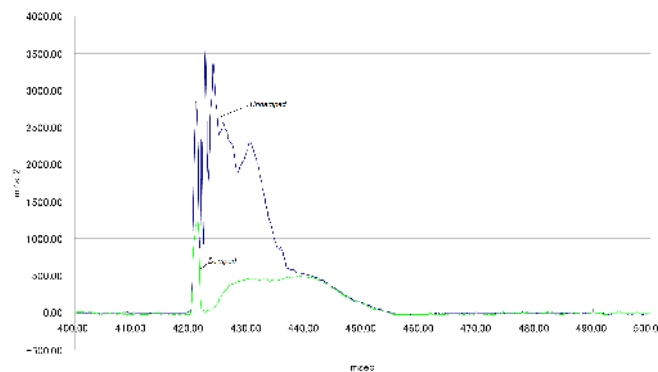
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Damped Accelerometers in Pedestrian Protection Testing

Background

Undamped accelerometers can give spurious readings when used in pedestrian headform impactors, particularly against some parts of a car's surface. High frequency resonance leads to peaks in deceleration and unrepresentative values for HIC₁₅. The phenomenon occurs most frequently in tests on the windscreen but may also happen when testing the bonnet surface and front wings.

The issue was first investigated by JARI in 2002¹ who proposed the use of damped accelerometers for headform tests.



J-NCAP started using damped accelerometers for pedestrian testing in 2003. The issue was widely discussed during the development of the ECE global technical regulation (GTR) for pedestrian protection². The GTR, published in 2007, requires the use of damped accelerometers for all child and adult headform tests.

Results presented to the Euro NCAP TWG by BAST in January 2007 confirmed that undamped accelerometers may not be suitable when testing windscreen areas and could sometimes give misleading results on the bonnet surface. Since then, the group has considered further information regarding the design, suitability and availability of damped accelerometers.

Decision

Damped accelerometers will be used for all headform and child headform tests (including tests to areas other than the windscreen) for cars to be released in August 2008 and later.

¹ INF GR/PS/96,

² ECE/TRANS/WP.29/2007/94, July 2007

Following TWG-09-09-03 it is recommended that accelerometers should have a damping ratio between 0.2 and 0.71 and that the Data Acquisition minimum measurement range should be set at three times the maximum expected amplitude.

It is also recommended to take countermeasures against noise during pedestrian testing as follows (TWG-10-06-xx):

- Apply the maximum allowable excitation voltage
- Apply ground wire to the back plate and make sure to remove anodising layer locally and test ground wire electric conductivity.
 - Do not attach the ground wire close to the accelerometer!
- Avoid secondary impact from cables on the bonnet either by
 - Elastically suspended cable away from the bonnet
 - Cushioning of the bonnet in the cable contact area.

The following damped accelerometers are in use in Euro NCAP laboratories:

Endevco 7264G-2K

Kyowa ASE-A-500 SA7

Measurement Specialties 64C-2000-360

Entran EGAS 3