



www.euroncap.com

EUROPEAN NEW CAR
ASSESSMENT PROGRAMME

Technical Bulletin

Damped Accelerometers in Pedestrian Protection Testing

Version 2.0

9th February 2012
TB 003

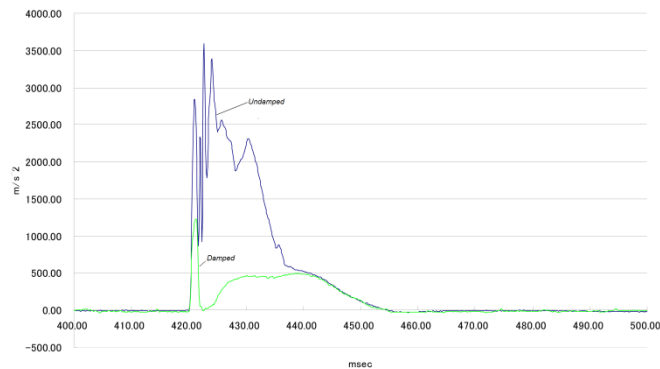
Title	Damped Accelerometers in Pedestrian Protection Testing
Version	2.0
Document Number	TB003
Author	Bernard Been, Richard Schram, James Ellway
Date	9 th February 2012
Related Documents	Euro NCAP Pedestrian Testing Protocol
Status	Information
Application Date	Immediate

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 have been in use in Euro NCAP laboratories since 2008:

Endevco 7264G-2K
Kyowa ASE-A-500 SA7
Measurement Specialties 64C-2000-360
Entran EGAS 3

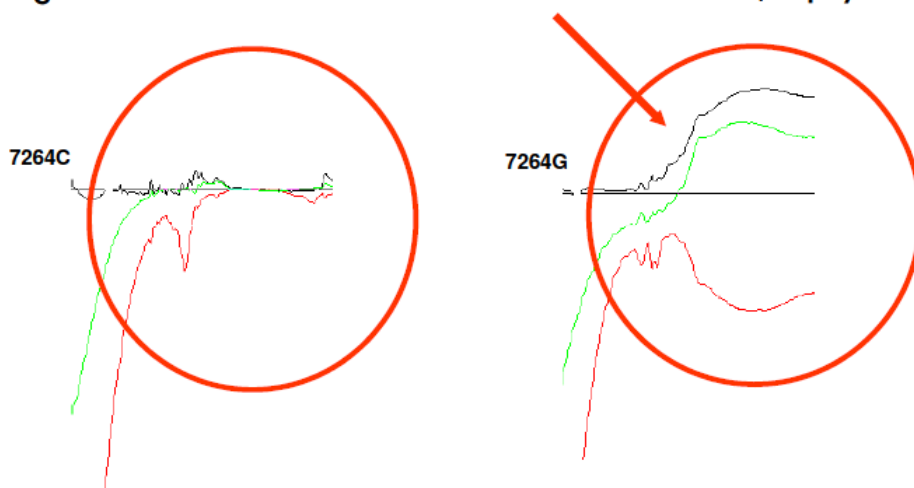
February 2012 Update

In February 2012, concerns have continued to be raised regarding Endevco 7264G accelerometers reported in document TWG12-02-07. Testing to bonnet top areas highlighted differences between damped and undamped Endevco 7264G accelerometers. Signal characteristics and signal offsets after peak G differed considerably.

Signal behaviour during bonnet top test



The signal characteristics of the 7264G shows electrical and/or physical problems



Subsequently, Euro NCAP has decided that Endevco 7264G accelerometers shall **NOT** be used for Euro NCAP testing. This is with immediate effect. Euro NCAP may reconsider this should information be presented to show that modifications to the accelerometers have removed the observed phenomena.