Overview of the current research of EEVC WG13 – Side Impact

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EEVC member IHRA SIWG

35th meeting GRSP

Background to EEVC work in side impact

- Initial research to an MDB test procedure was led by WG 9
- Regulation 95 became Europe's first full-scale side impact test procedure
  - Foundations started to take shape in the mid 1980's
  - Key elements -
    - EuroSID-1 *(finalised 1989)*
    - MDB face and test procedure
- A simple highly repeatable perpendicular test
- Protection for front seat occupant *(Front & rear recommended by EEVC)*
- MDB based on vehicle characteristics of the 1970's *– French LCW*

Regulation 95

- Regulation 95 recently updated
  - EuroSID-1 þ ES-2 (WG12)
  - Revised MDB specification (WG13)
    General shape and performance now supplemented by design and build requirements
- Recognition that further procedures are necessary to assess all appropriate areas for increased head protection
- EEVC WG13 tasked by the EEVC Steering Committee with the development of an appropriate 'Interior Surface Test Procedure'

IHRA

International Harmonised Research Activities

- IHRA was created 1996 to co-ordinate research that could lead to harmonised (worldwide) test procedures
- Two members of WG13 lead the EEVC contributions within the IHRA Side Impact Working Group

IHRA SIWG current status

IHRA Side Impact Working Group (SIWG) is developing a suite of four advanced test procedures

1. Barrier based
   - Two versions, since global markets are different
     - North American – reflecting large SUV & Trucks
     - European *(Japan)* – reflecting European cars & the small SUV
2. Interior Surface
3. Pole test
4. Out of Position, airbag

Europe – EEVC WG13

European MDB - AE-MDB

- First stage research - Investigation into what is appropriate for the European accident situation and current vehicle fleet
- Base line tests performed - moving car to moving car impacts
- Protection of both front and rear seat occupants *(IHRA target)*
  - Bullet vehicles – Typical European Cars and European SUV
  - Assessment of impact severity based on vehicle damage and dummy measurements - Initially using EuroSID-1 but now using ES-2. *In the future WorldSID (5th%ile)?*
- Barrier stiffness - derived through load cell wall and geometrical studies

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Initial baseline tests – *further vehicles now added*

Target vehicles - Renault Megane - Toyota Camry


Bullet vehicles - Ford Mondeo - Freelander


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Baseline tests

Renault Megane - Mondeo


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Baseline tests

Renault Megane - Mondeo


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Further baseline tests

Toyota Camry - Freelander


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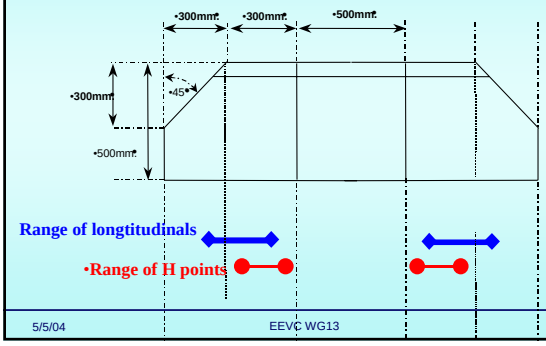
AE-MDB detail



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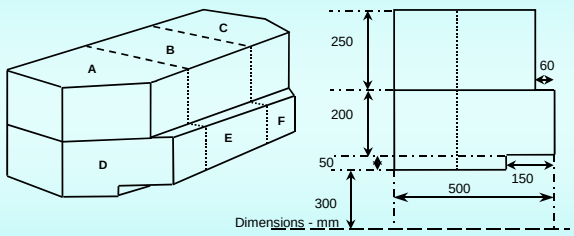
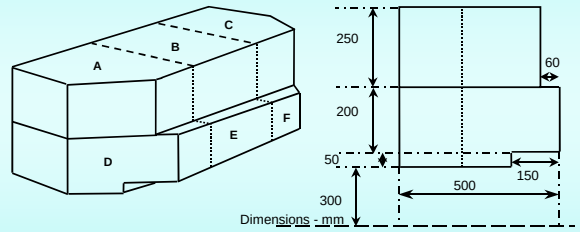
Barrier shape & Test Conditions



Velocity 50 km/hr **Impact 250 mm rear of the Front Seat 'R point'**

Trolley mass 1500 kg **Perpendicular impact**

Barrier shape & Test Conditions



Perpendicular impact

Sliding impact

Oblique impact

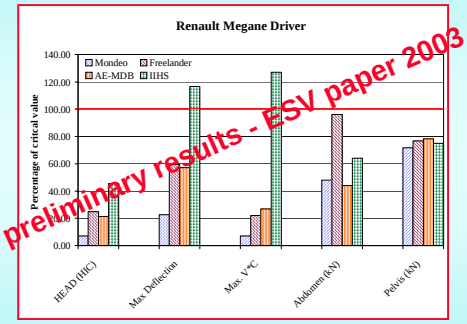
AE-MDB Visual damage - Megane

Mondeo

AE-MDB

Freelander

IIHS



Full preliminary results - ESV paper 2003

Current AE-MDB research

- Refining the AE-MDB design & build specification
- Performing broader range of vehicle tests.
- WG13 hopes to complete current study by August
- European validation EC 6th Framework APROSYS
- Interaction with WorldSID
- Interaction with the other IHRA SIWG test procedures.

Head impact assessment

Free Motion Headform

- Initial EEVC studies directed towards European application
- WG13 studied European injury situation – contact zones
- Selection of an appropriate headform impactor
- Choice of headform guidance/launch methods
- Development of a test procedure
- WG13 aware of FMVSS 201 but was directed by the EEVC SC to consider 'What would be appropriate for Europe'.
- Focussed on front seat occupant protection
- IHRA extension – now incorporates rear seat positions

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Free Motion Headform

1. Impactor selection
   - Evaluated early EEVC Pedestrian (WG17), FMH (201) & AAAM headform impactors
   - A range of tests performed into various structures and paddings
   - No clear winner from this comparison
   - FMH selected based on harmonisation considerations

Results published ESV paper 1996

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2. Guidance methods
   - Linear vs. free flight – Are both acceptable?
   - Testing strongly suggested that linear guidance raised a number of complex issues
   - WG13 decided that launch and guidance should be restricted to 'free flight

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Free Motion Headform

3. Injury criteria *(equivalence to the EuroSID as used in Regulation 95)*
   - A programme of sled tests were performed into a range of structures using the EuroSID generating 'injurious' head impacts
   - Equivalent severity tests with the FMH undertaken
   - Correlation found to be very similar to the FMVSS 201 regression
   - Considering harmonisation WG13 chose to adopt the FMVSS 210 HIC_{dummy} equivalence function

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4. Desire to encourage 'overall protection' and 'worse case' evaluation

5. Worst case impacts thought to be perpendicular to the surface

Status paper - ESV 2003

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- A range of issues have and are still being investigated by WG13
- Active Head Protection Systems (HPS) are being evaluated using a perpendicular pole test, using ES-2 – *based on EuroNCAP procedure.*
- Studies continue within EEVC WG13:
  - Examining the practicality of the procedure
  - Reducing interpretation problems and possible ambiguity
  - A broader based evaluation of active systems
    - Give benefit if active systems are fitted and work

Free Motion Headform

- The European version of the procedure only covers front seat occupant protection
- The IHRA version covers both front and rear occupants
  - Rear seat impact zone definition under investigation
- Both versions include the assessment of active systems through a pole test.
  - Current WG13 procedure is based on a perpendicular pole test
  - The IHRA pole test is likely to be an oblique pole
    - *Information on the equivalence between configurations is needed*
- It is hoped that the procedure(s) will be sufficiently robust for broader based evaluation from August, after next WG13 meeting

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Thank you for your attention

Countries represented in WG13

France, Germany, Netherlands, Italy, Spain, Sweden, UK