Informal document **GRSP-49-31**
(49th GRSP, 16-20 May 2011,
agenda items 4(c))

Pedestrian Safety

Request For Clarification Of Test Procedures

49th Session of UNECE GRSP,
Geneva, 16 – 20 May 2011

Request For Clarification Of Test Procedures

CONTENT

1. Clarification Of Headform Test Procedure
2. Clarification Of Headform Test Area
3. Clarification Of Legform Test Procedure

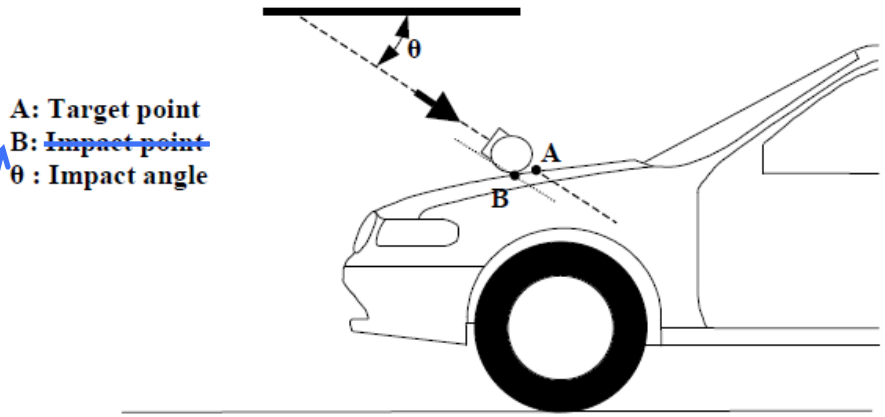
Clarification Of Headform Test Procedure

- As pointed out in informal document GRSP-48-27, the headform test procedure as described in gtr No 9 is not fully clear
- The headform test procedure is an interaction of three different points but just two points are clearly defined
- During the discussion on gtr No 9, it was accepted that describing only 2 points may be sufficient
- However, corrigendum 2 to gtr No 9 made inconsistencies more obvious despite the intention of this corrigendum is fully supported by OICA
- OICA therefore suggests the following clarification of the headform test procedure

Clarification Of Headform Test Procedure – Suggestion

- A second drawing should be added to describe the three-dimensional interaction of the points
- The three different points need to be clearly described

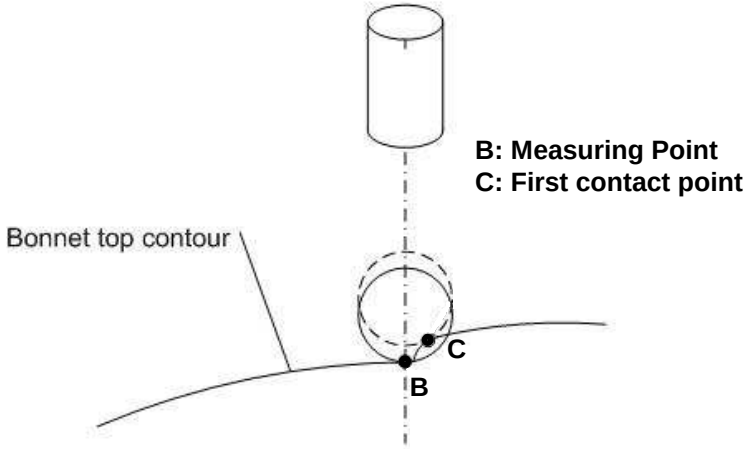
Existing drawing: Schematic side view



Drawing: gtr No. 9, part B, figure 6

Point B should read „measuring point“

New, additional drawing: Schematic front view



Point C should be added as „first contact point“

Clarification Of Headform Test Procedure – Suggestion (2)

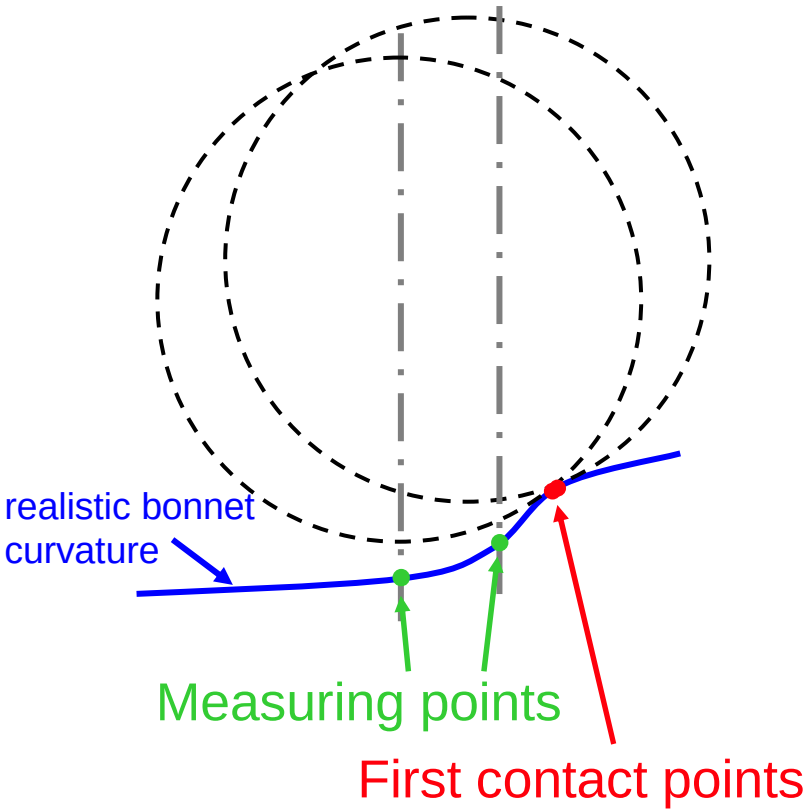
- In several cases, different terms are used to describe identical points
- Therefore, it is proposed to add the following references, e.g. to the definitions:
  - “Target point” A is also referred to as “aiming point”
  - “Measuring point” B is also referred to as “selected impact point” or “test point”
  - “First contact point” C is also referred to as “impact point”
- However, clear and easy understandable definitions are wished for by OICA to avoid misunderstandings

Clarification Of Headform Test Procedure – Suggestion (3)

- Finally, a test result achieved during a test should be allocated to the respective “measuring point” and not to the “first contact point”
- If accepted, the changes mentioned above should also be incorporated into the draft ECE Regulation

Advantages Of The Suggested Clarifications

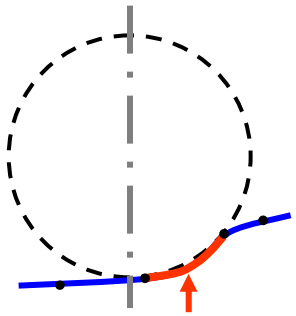
- During the gtr No 9 discussion, it was accepted that a “first contact point” always exists but:



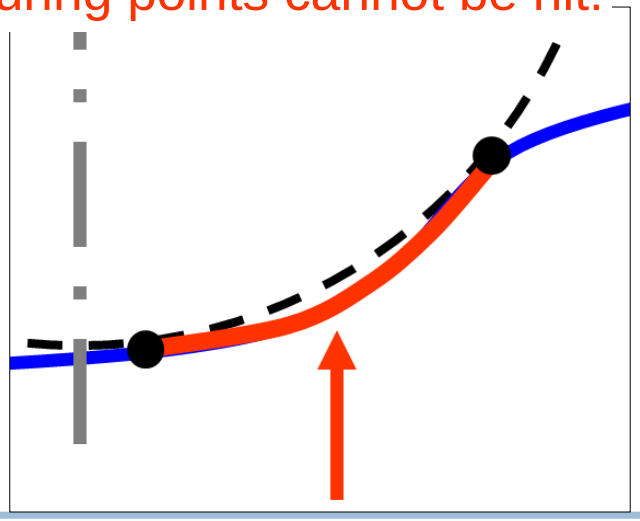
  - It is unclear how to position the headform in relation to this point
  - For very different impactor positions (as e.g. shown in the sketch) the first contact point could be nearly identical!
  - However, headform center of gravity clearly influences the behavior of the headform during and after the impact
  - Different HIC results can be possible
  - Using the measuring points, a clear allocation of the test result is possible

Advantages Of The Suggested Clarifications (2)

- There can be areas where a “measuring point” cannot be directly contacted, but:



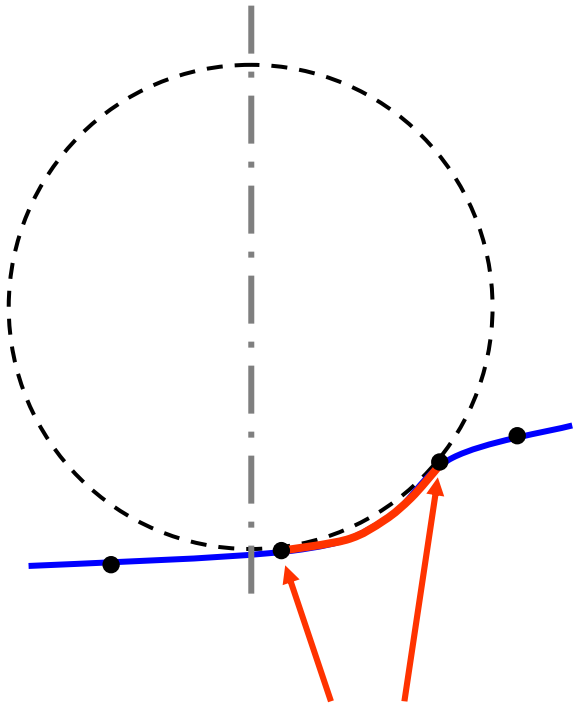
Measuring points cannot be hit!



  - Clear positioning of the headform nevertheless possible
  - Due to the headform’s center of gravity the headform will travel mainly in the intended direction
  - Even if the same “first contact point” will be hit the resulting HIC can differ
  - Areas that cannot be contacted may be misused as “black holes” preventing critical points from being tested
  - Using the proposed procedure, each point on the bonnet that can be finger-pointed to will have an allocated test result!

Advantages Of The Suggested Clarifications (3)

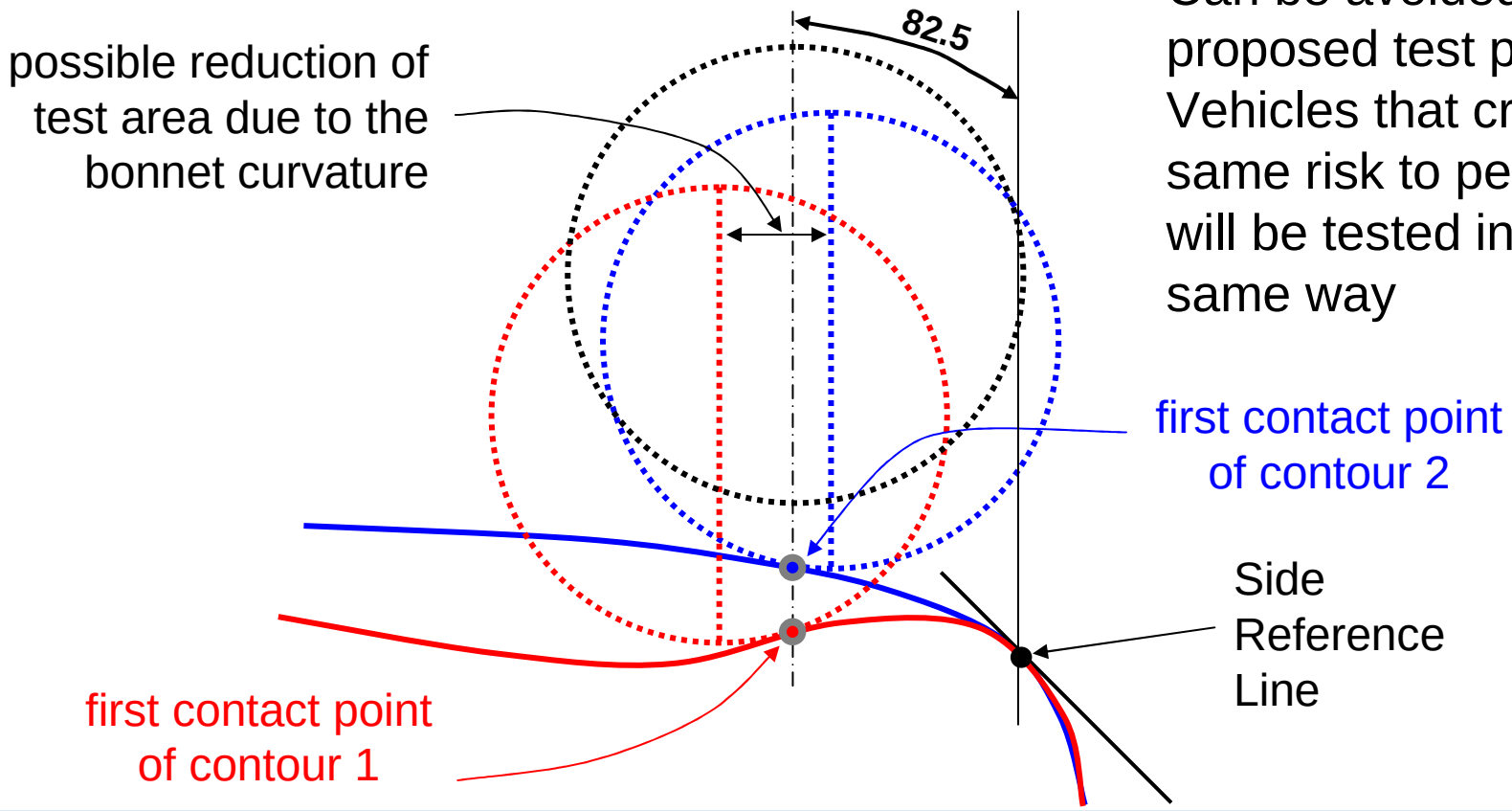
- There can be multiple contacts with 2 or even more “first contact points” hit during the same impact, but:
  - Usually, kinetic energy is transferred in the plane of the headform’s center of gravity
  - Independent of the number of first contact points: There will be just one calculated HIC result achieved
  - Using the proposed procedure, the test result will be allocated to the point that was assigned as measuring point!



Two first contact points

Advantages Of The Suggested Clarifications (4)

- Vehicles with an identical overall width but with different bonnet designs will be tested differently:
  - Can be avoided with the proposed test procedure: Vehicles that create the same risk to pedestrians will be tested in the same way



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Clarification Of Headform Test Area

- Further difficulties are seen for the area subjected to headform tests that is defined different when comparing existing legislation in Japan and the EU to gtr No 9 and Draft ECE Regulation:
  - Japan/EU: exclude the ½ headform diameter (82.5 mm) offset area from HIC zones calculation
  - Gtr9/draft ECE: include offset area in HIC zones calculation
  - Position of measuring points / selected impact points always in the test area excluding the offsets
  - Leads to different sizes of HIC zones
  - Gtr9/draft ECE procedure is unclear since the HIC1000 criterion may be assigned to the offset areas that cannot be tested

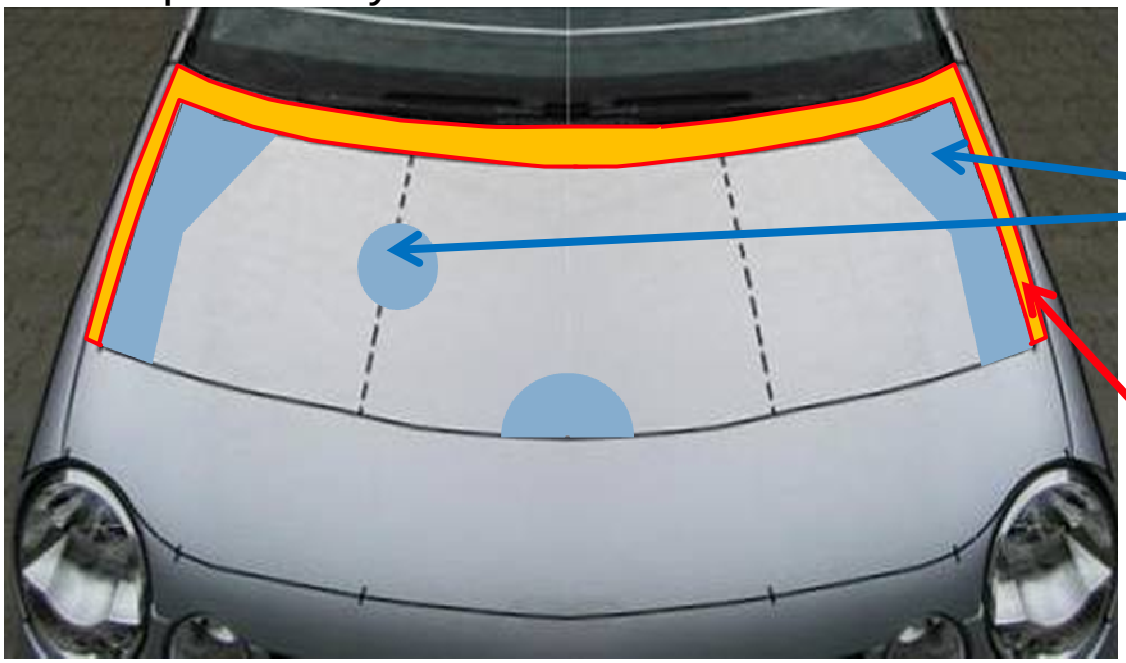
Clarification Of Headform Test Area – Suggestions

- The ½ headform diameter (82.5 mm) offset area should be excluded from the area used for HIC zones calculation
- Tests should be conducted to the same area

Advantages Of The Suggested Clarifications

- A much larger HIC1700 zone will result (that may be spread in the testable area) from considering the offset area during the calculation of the HIC zones
  - Using the proposed procedure, this will not be possible

Schematic example, exact position of HIC zones to be specified by the vehicle manufacturer!



Photograph + original sketch (blue areas): BGS Boehme & Gehring

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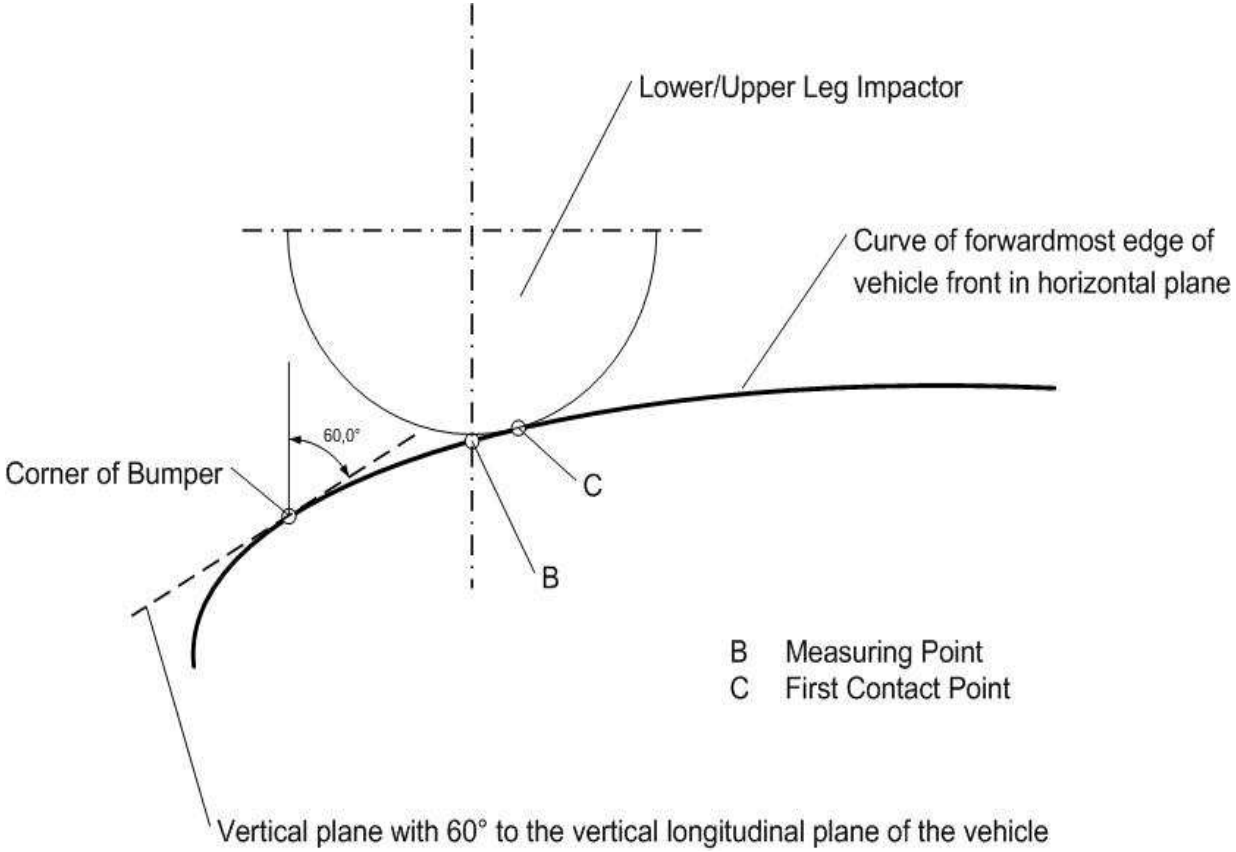
Clarification Of Legform Test Area

- For the legform test area, the principle test procedure should follow the one used for the headform tests



Suggestion

The measuring point should be aligned with the impactor's center line, the test result should always be allocated to the measuring point

Thank you!