

# Workshop on R22 Regulation

Paris, February 6<sup>th</sup> 2019

## Synthesis

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# Workshop on R22 Motorcycle Helmet Standard

February 6th, 2019

Paris, Grande Arche de la Défense

**Objectives of the Workshop** : To bring experts together in order to harmonize motorcycle helmet test methods in terms of :

- Headform,
- Impact conditions,
- Neck boundary conditions
- Injury criteria.

10:15 : Reception, coffee

10:30 : Rémy Willinger : Introduction & Objectives (Strasbourg University, France)

10:40 : Luca Cenedese : Current stage of R2206 proposal (Newton Lab, Italy)

11:00 : Mazdak Ghajari : Suggestions for R22 test method (Imp. College London, UK)

11:20 : Daniel Huster : UNECE R22 View of BAST. (BAST, Germany)

11:40 : Nicolas Bourdet : UNISTRA Helmet Test Method. (University Strasbourg, France)

12:00 : Peter Halldin : CEN oblique helmet test method. (KTH & MIPS, Sweden)

12:20 : Erica Manfredi : The FIM helmet homologation (FIM, Switzerland)

12:30 : Mario Maza : Lessons learned & key suggestions R22 (Univ. Saragossa, Spain)

12: 40 : Mike Ashmead : Advanced headform for helmet testing (Cellbond)

13:00 : Lunch Break

14:00 : Caroline Deck : Injury criteria for complex loading.(University Strasbourg, France)

14:20 : Halldin, Huster, Willinger : Overview of recent EU projects

15:00 : Rémy Willinger, with all : Synthesis & Recommendations

17:00 : End of Workshop

After discussions a survey was initiated.

A total of 13 experts provided feedback :  
(7 from Research , 2 from Test Labs and 4 from Industry).

Organization of questionnaire :

- 6 questions related to the headform
- 11 questions related to the linear impact
- 8 questions related to the oblique impact.

The synthesis presents the recommendations derived from this survey in terms of Yes, No or NP (No Position).

Comments are from some of the experts, not from the author.

# Synthesis \_ Headform

- Question H1 : New headform for Linear and Oblique
- Responses : 13 Yes, 0 No, 0 NP
- Comments :
  - New headform will be available by May 2019
  - Injury criteria in line with headform
  - Sizing aspects will be available by the end of 2019
  - Must be same for Linear and Oblique
- Recommendation: New headform for Linear and Oblique

- Question H2 : Free headform drop (no neck) ?
- Responses : 13 Yes, 0 No, 0 NP
- Comments :
  - No biofidelic omnidirectional neck exists
  - Critical for point P
- Recommendation: Free headform drop test for linear and oblique impact tests.

- Question H3 : Friction coefficient of 0,3 ?
- Responses : 10 Yes, 0 No, 3 NP
- Comments :
  - Eventually even higher Friction Coefficient ?
- Recommendation: Friction coefficient of 0,3



- Question H4 : Need of friction calibration test ?
- Responses : 11 Yes, 1 No, 1 NP
- Comments :
- Recommendation: Need of friction calibration test

- Question H5 : First Nat Frequency over 2000 ?
- Responses : 11 Yes, 0 No, 2 NP
- Comments :
- Recommendation: First Nat Frequency over 2000 Hz

- Question H6 : Wireless 6D signal vs time ?
- Responses : 12 Yes, 0 No, 1 NP
- Comments :
- Recommendation: Wireless 6D signal vs time

# Synthesis \_ Linear Impact

- Question L1 : Remove kerbstone test ?
- Responses : 7 Yes, 5 No, 1 NP
- Comments :
- Recommendation: No clear recommendation

- Question L2 : Recording of rotation ?
- Responses : 13 Yes, 0 No, 0 NP
- Comments :
  - a threshold is needed
  - Eventually based on BRIC ?
- Recommendation: Recording of rotation

- Question L3 : Impacts B, P, R, X and in between
- Responses : 10 Yes, 0 No, 3 NP
- Comments :
- Recommendation: Impacts B, P, R, X and in between

- Question L4 : High speed at 7,5 m/s ?
- Responses : 13 Yes, 0 No, 0 NP
- Comments :
- Recommendation: High speed at 7,5 m/s



- Question L5 : Low speed at 5,5 m/s ?
- Responses : 10 Yes, 2 No, 1 NP
- Comments :
- Recommendation: Low speed at 5,5 m/s

- Question L6 : Cold condition is  $-10^{\circ}\text{C}$ ?
- Responses : 12 Yes, 1 No, 0 NP
- Comments :
  - Or eventually  $0^{\circ}\text{C}$  ?
- Recommendation: Cold condition is  $-10^{\circ}\text{C}$

- Question L7 : PLA of 275 G for high speed?
- Responses : 9 Yes, 3 No, 1 NP
- Comments :
  - Eventually 250 G ?
- Recommendation: PLA of 275 G for high speed

- Question L8 : HIC 2400 at high speed?
- Responses : 8 Yes, 4 No, 1 NP
- Comments :
  - Seems very high
- Recommendation: HIC 2400 at high speed

- Question L9 : PLA of 250 G for low speed ?
- Responses : 9 Yes, 1 No, 3 NP
- Comments :
  - Eventually 220 G
- Recommendation: PLA of 250 G for low speed

- Question L10 : HIC 1200 at low speed?
- Responses : 10 Yes, 1 No, 2 NP
- Comments :
- Recommendation: HIC 1200 at low speed

- Question L11 : Monitored Model based AIS2 brain injury risk ?
- Responses : 8 Yes, 4 No, 1 NP
- Comments :
  - Duration and actions based on results of the monitoring have to be defined
  - Need of transition period
  - Availability of model
  - First model based tools are available
- Recommendation: Monitored Model based AIS2 brain injury risk

## Synthesis \_ Oblique Impact



- Question R 1 : 45° inclined anvil ?
- Responses : 13 Yes, 0 No, 0 NP
- Comments :
- Recommendation: 45° inclined anvil

- Question R2 : Anvil diameter of 150 mm ?
- Responses : 12 Yes, 1 No, 0 NP
- Comments :
  - Or eventually more
- Recommendation : Anvil diameter of 150 mm

- Question R3 : Abrasive anvil surface ?
- Responses : 13 Yes, 0 No, 0 NP
- Comments :
  - Paper P80
- Recommendation: Abrasive anvil surface

- Question R4 : Three impacts : RotX, RotY, RotZ ?
- Responses : 11 Yes, 1 No, 1 NP
- Comments :
  - Eventually other impact locations
  - Eventually -RoY
- Recommendation: Three impacts RotX, RotY, RotZ

- Question R5 : Impact speed of 8.0 m/s ?
- Responses : 13 Yes, 0 No, 0 NP
- Comments :
- Recommendation: Impact speed of 8.0 m/s

- Question R6 : HIC 1200 (AIS3+) ?
- Responses : 12 Yes, 1 No, 0 NP
- Comments :
- Recommendation: HIC 1200 (AIS3+)

- Question R7 : BRIC 0,6 (AIS3+) ?
- Responses : 12 Yes, 1 No, 0 NP
- Comments :
- Recommendation: BRIC 0,6 (AIS3+)

- Question R8 : Monitored Model based AIS2 brain injury risk ?
- Responses : 10 Yes, 2 No, 1 NP
- Comments :
  - Duration and actions based on results of the monitoring have to be defined
  - Need of transition period
  - Availability of model
  - First model based tools are available
- Recommendation: Monitored Model based AIS2 brain injury risk ?



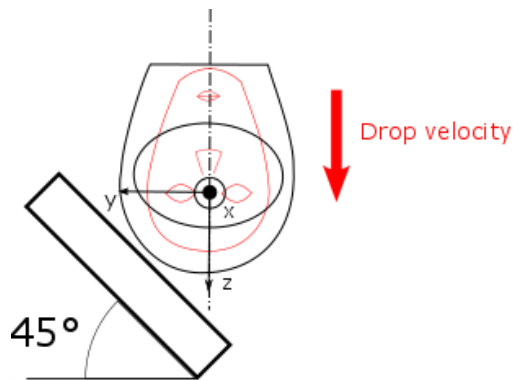
# CONCLUSIONS

- New headform for Linear and Oblique impacts
- Free headform drop test for linear and oblique impacts (no neck).
- Illustration of CEN-WG11 headform for linear and oblique impact as presented at CEN-WG11 meeting, Strasbourg, March 2019

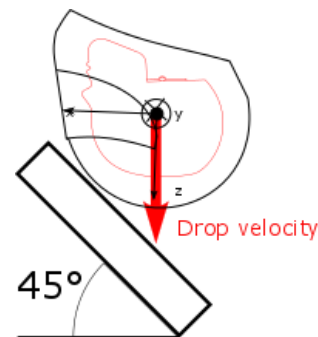


- To record angular kinematic under linear impacts
- Cold temperature is  $-10^{\circ}\text{C}$
- 7,5 m/s ; PLA 275 or 250 ; HIC 2400
- 5,5 m/s ; PLA 250 to 220 ; HIC 1200
- Monitor Model based injury criteria (AIS2+)

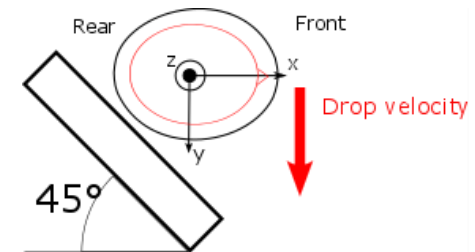
- Inclined anvil ( $45^\circ$ )
- Three impacts : RotX, RotY, RotZ
- 8m/s ; HIC 1200 ; BRIC 0.6
- Monitor Model based injury criteria (AIS2+)



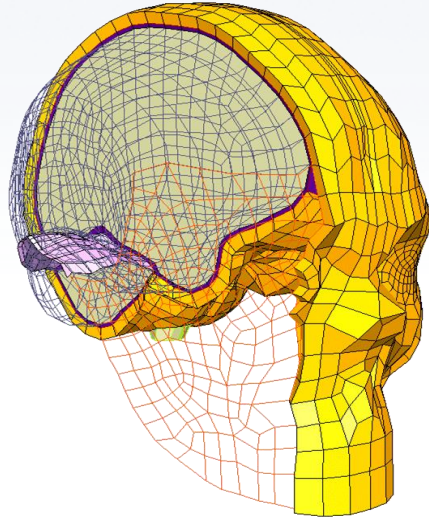
RotX



RotY



RotZ



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