Injury Risk Curves for WorldSID 50$^{th}$ Male

GRSP Informal Meeting
February 4, 2010
ISO TC22/SC12/WG6 Task Group

- Performed detailed data quality check of existing PMHS side impact test data
- Scaled the test severity from PMHS size to mid-size male
- Scaled WorldSID test data to the same test severity as the PMHS
- Adjusted WorldSID test data from PMHS age to 45
- Paired WorldSID measures with PMHS injuries
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- Developed injury risk curves using the following methods:
  - Certainty
  - Mertz-Weber (Modified Median Rank)
  - Survival
  - Logistic
  - CTE

WorldSID 50th Injury Risk Curves Were Developed for:

• AIS ≥ 2 Shoulder Injury as Functions of:
  – Shoulder Rib Deflection
  – Shoulder Force $F_y$

• AIS ≥ 3 Thoracic Skeletal Injury as Functions of:
  – Thorax Rib or Abdomen Rib Deflection
  – Thorax Rib or Abdomen Rib $V^*C$

• AIS ≥ 4 Thoracic Skeletal Injury as Functions of:
  – Thorax Rib or Abdomen Rib Deflection
  – Thorax Rib or Abdomen Rib $V^*C$
WorldSID 50th Injury Risk Curves Were Developed for:

• AIS ≥ 2 Abdomen Injury as Functions of:
  – Abdomen Rib Deflection
  – Abdomen Rib V*C
  – Lower Spine Acceleration (3 ms clip)

• AIS ≥ 3 Abdomen Injury as Functions of:
  – Abdomen Rib Deflection
  – Abdomen Rib V*C
  – Lower Spine Acceleration (3 ms clip)
WorldSID 50\textsuperscript{th} Injury Risk Curves Were Developed for:

- AIS $\geq 2$ Pelvis Injury as Functions of:
  - Pubic Force
  - Pelvis Acceleration (3 ms clip)

- AIS $\geq 3$ Pelvis Injury as Functions of:
  - Pubic Force
  - Pelvis Acceleration (3 ms clip)
Continuing Work of ISO TC22/SC12/WG6

• Technical Report on Injury Risk Curves for WorldSID 50\textsuperscript{th} is being balloted at SC level

• Task Group is being formed to reach consensus on appropriate statistical methods to be used
Additional Efforts to Consider

• Form a group of Technical Experts from GRSP Informal Group to:
  – Review work of ISO WG6 task group
  – Propose and review other methods
  – Reach agreement among technical experts
  – Develop a plan to conduct tests and generate risk curves for head and neck injuries
Additional Work to Consider

- Review the PMHS test conditions that had sufficient data quality to be considered, but no WorldSID 50th tests were conducted
  - Conduct new WorldSID 50th tests that, when paired with PMHS injuries, would achieve a better balance between injured and un-injured for risk curve development
Additional Work to Consider

• Review the velocity of WorldSID 50\textsuperscript{th} tests and the velocity scaled from PMHS tests
  – Conduct new WorldSID 50\textsuperscript{th} tests at velocities that correspond to
    • Lowest velocity scaled from non-injured PMHS
    • Highest velocity scaled from non-injured PMHS
    • Lowest velocity scaled from injured PMHS
    • Highest velocity scaled from injured PMHS
  – Is WorldSID linear across velocity range?
Example Where Data May Have Been Extrapolated Beyond Linear Range of WorldSID

× WorldSID pelvis tests conducted at 6 & 10 m/s
○ 40% of “non-injured” data was paired with WorldSID data extrapolated beyond 10 m/s
• 33% of “injured” data was paired with WorldSID data extrapolated beyond 10 m/s
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Task Group on Statistical Methods

• First web meeting of WG6 Task Group will occur February 11, 2010 at 1PM (Paris time)
• All experts are invited to participate
• Please e-mail Audrey.Petitjean@ceesar.asso.fr