

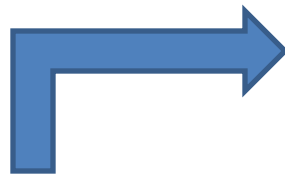
# Overview of NHTSA Pedestrian Activities

Sept. 17-18, 2012

# Overview

- GTR No. 9 – Leg Portion
  - Benefits & Injury Reduction
  - Implementation Cost
  - Feasibility
  - Applicability

**NEED  
APPROPRIATE TEST  
TOOL TO EVALUATE  
THESE ASPECTS!!**



- FlexPLI
  - Biofidelity
  - Durability
  - Repeatability
  - Reproducibility
  - Injury Criteria
  - Certification
  - Specifications

# GTR No. 9 Leg: Injury Reduction (Benefits)

Previous	Current	IWG Question
<ul style="list-style-type: none"><li>• Used PCDS alone to assess target population</li><li>• Used Functional Capacity Index &amp; Equivalent Lives Saved as metrics</li></ul>	<ul style="list-style-type: none"><li>• Combined PCDS &amp; GIDAS assessments to populate dataset</li><li>• Attributable disability high for leg-bumper impacts in both US &amp; Europe</li></ul>	<ul style="list-style-type: none"><li>• Has anyone in other regions done a study to assess cost-benefit margin of GTR No. 9?</li><li>• Consideration of studies by Liers, et al on benefits based on real-world crash data of PEDPRO cars in the E.U.</li></ul>

# GTR No. 9 Leg: Cost

Previous	Current	IWG Question
<ul style="list-style-type: none"><li>• Met individually with many OE's and suppliers</li><li>• Obtained wide range of answers depending on who we asked</li><li>• These costs were based on pre-PEDPRO designs</li></ul>	<ul style="list-style-type: none"><li>• Conducting independent teardown assessment</li><li>• Seeking updated cost information from industry</li><li>• PEDPRO built into many global platforms (constructing vehicle list for testing)</li></ul>	<ul style="list-style-type: none"><li>• How do other countries assess implementation costs to industry to make bumpers meet GTR No. 9?</li><li>• Need cost differential of bumper part swaps for NA vs. global</li></ul>

# GTR No. 9 Leg: Feasibility

Previous	Current	IWG Question
<ul style="list-style-type: none"><li>• Not deemed possible to meet both damageability and GTR No. 9 leg requirements</li><li>• No NA vehicles tested by VRTC fully met GTR No. 9</li></ul>	<ul style="list-style-type: none"><li>• Identified global platform vehicles</li><li>• Cooperative study with Shape (sharing our Flex leg to test pedpro-compliant, 581-compliant, and both pedpro- &amp; 581-compliant bumper systems)</li><li>• Relaxed Canadian damageability standard</li></ul>	<ul style="list-style-type: none"><li>• In round robin series, can participants please provide 581/IIHS(Thatcham) results for Flex-tested vehicles, whichever damageability standard is applicable?</li></ul>

# GTR No. 9 Leg: Applicability

Previous	Current	IWG Question
<ul style="list-style-type: none"><li>• Majority of vehicles in early VRTC testing were passenger cars</li></ul>	<ul style="list-style-type: none"><li>• Tested more aggressive points on large range of vehicle sizes</li><li>• Found that performance with respect to GTR criteria not correlated to bumper height/vehicle size</li></ul>	<ul style="list-style-type: none"><li>• Is it feasible to implement passenger car countermeasures into pickup trucks and LTVs?</li><li>• How are we addressing vehicles &gt; 500 mm? Interested in upper body mass study</li><li>• Upper leg test data available?</li></ul>

# Overview

- GTR No. 9 – Leg Portion
  - Benefits & Injury Reduction
  - Implementation Cost
  - Feasibility
  - Applicability
- **FlexPLI**
  - **Biofidelity**
  - **Durability**
  - **Repeatability**
  - **Reproducibility**
  - **Injury Criteria**
  - **Certification**
  - **Specifications**

# FlexPLI: Biofidelity

Previous	Current	IWG Question
<ul style="list-style-type: none"><li>• Reviewed literature, FlexTEG/IWG Phase 2 studies.</li><li>• We agree that FlexPLI covers more injuries than TRL legform.</li></ul>	<ul style="list-style-type: none"><li>• We are not currently planning any biomechanical studies to directly compare Flex to human response</li></ul>	<ul style="list-style-type: none"><li>• What is status of JASIC/JARI CAE correlation study evaluating upper body mass effects in high bumper impacts? Experimental validation of model results would be beneficial.</li></ul>



# FlexPLI: Durability

Previous	Current	IWG Question
<ul style="list-style-type: none"><li>• Could only test softer bumper locations with early versions of Flex</li></ul>	<ul style="list-style-type: none"><li>• Tested more aggressive points on large range of vehicle sizes</li><li>• Found good durability; only minor issues found (SAE G/I 2012)</li></ul>	<ul style="list-style-type: none"><li>• Would be helpful if labs could test aggressive points on larger vehicles to see how well FlexPLI holds up</li></ul>

# FlexPLI: Repeatability

Previous	Current	IWG Question
<ul style="list-style-type: none"><li>• FlexPLI was demonstrated to provide very repeatable results in limited repeated vehicle testing</li></ul>	<ul style="list-style-type: none"><li>• Conduct multiple tests to same location with our FlexPLI</li></ul>	<ul style="list-style-type: none"><li>• Have any labs examined Flex repeatability in vehicle bumper impacts?</li></ul>

# FlexPLI: Reproducibility

Previous	Current	IWG Question
<ul style="list-style-type: none"><li>• Only have one legform, so assessment not possible</li></ul>	<ul style="list-style-type: none"><li>• Evaluate reproducibility in round robin series vehicle/cert testing using both IWG-provided Flex and our own Flex</li></ul>	<ul style="list-style-type: none"><li>• Have any labs examined Flex reproducibility in vehicle bumper impacts?</li></ul>

# FlexPLI: Injury Criteria

Previous	Current	IWG Question
<ul style="list-style-type: none"><li>• Reviewed literature, FlexTEG/IWG Phase 2 studies.</li><li>• While we feel that supporting information is ample, we must first evaluate IC efficacy for NA fleet.</li></ul>	<ul style="list-style-type: none"><li>• Testing newer, global vehicles to update baseline fleet performance</li><li>• Part of both round robin and Shape cooperative study</li></ul>	<ul style="list-style-type: none"><li>• Interested in FlexPLI vs. EEVC LFI correlation results for same vehicles</li><li>• Concerned about compromise for knee injuries, especially for NA fleet with higher bumpers</li></ul>

# FlexPLI: Certification

Previous	Current	IWG Question
<ul style="list-style-type: none"><li>• Evaluated earlier version of pendulum test with earlier FlexPLI and reported issues at Dec. 2009 FlexTEG meeting</li></ul>	<ul style="list-style-type: none"><li>• Assembled up-to-date pendulum test stand at VRTC</li><li>• Conducted series of FlexPLI certification tests (detailed data provided at this meeting)</li></ul>	<ul style="list-style-type: none"><li>• Is certification testing part of planned round robin? Lab-lab variation should be accounted for corridor development.</li><li>• What are outstanding issues for meeting both certification procedures?</li></ul>

# FlexPLI: Specifications

Previous	Current	IWG Question
<ul style="list-style-type: none"><li>• Obtained user's manual from Humanetics</li></ul>	<ul style="list-style-type: none"><li>• Would like to initiate Part 572-type inspection of legform versus drawings to identify possible areas where more/less detail is required</li><li>• Is Humanetics only supplier?</li></ul>	<ul style="list-style-type: none"><li>• What is status of drawing package and PADI? Can it be made available for non-commercial use?</li><li>• Is there an FTP location for all data and design information on FlexPLI accessible for IWG /technical purposes?</li></ul>

# Summary

- NHTSA actively researching the possibility of introducing leg portion of GTR No. 9
  - Collaborate with IWG P2
    - Contribute certification & vehicle test data through Round Robin effort, as well as our own studies:
      - 1) This overview
      - 2) AAAM paper on LE injury analysis
      - 3) Certification data for TUCC
      - 4) Vehicle test data (goal: meetings 5 & 6)
        - Planned for this fall/winter