



# Discussion of the Rebound Issue

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## ACEA comments for discussion 5. IG-GTR9-PH2

- Current TEG Proposal (TEG-128)
- ACEA Proposal
- Justification / Comments
- Further Steps





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## Current TEG Proposal (TEG-128):

Document TEG-128 (11. TEG Meeting in April 2010)

**Biofidelic response of the FlexPLI is only valid during impact phase (contact to vehicle) until rebound phase starts**

**Biomechanical assessment of FlexPLI measurements in the rebound phase is not recommended**

**Rebound phase was proposed to start around 50ms**

**All max.values should be ignored after rebound start time (to be determined with film analyses)**





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## ACEA proposal:

Distinguish between rebound phases for ligament elongations and bending moments

Rebound for tibia measurements is indicated by the first zero-crossing of T1, T2, T3 or T4 after the first maximum.

Timing of zero-crossing can be easily and automatically derived from time-history-curves and is more precise than film analysis

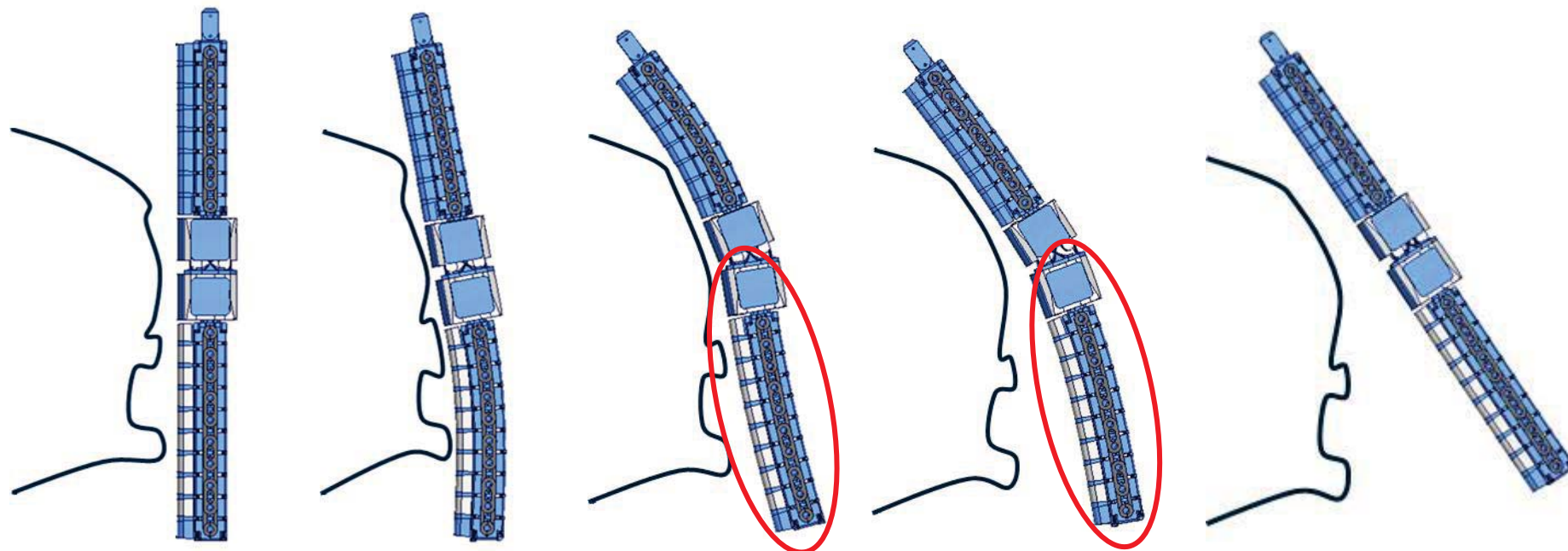
Rebound for ligament measurements remain as proposed by the TEG recommendation (50ms)





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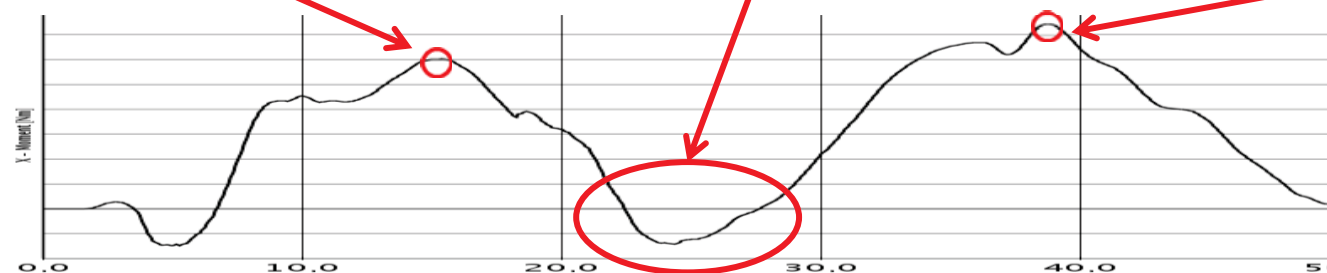
## Justification / Comments:



first tibia bending peak  
**contact to vehicle**  
around 15ms

after zero-crossing  
negative tibia moment  
**no contact of tibia to vehicle**

second peak for tibia bending moment occurs  
without contact **to vehicle** due to **swinging of**  
**impactor**





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## Justification / Comments:

**FlexPLI is designed to assess injury risks for the contact phase**

**Thresholds are addressed to the impact (contact) phase**

- contact durations of tibia and knee are different

**ACEA's goal is an automatic and objective calculation of the rebound**

- based on measured time-history curves
- easy enough for pragmatic reasons
- robust enough to be applied to all vehicle geometries
- acceptable for legislators and industry





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## Further steps:

**Use test results of round robin tests (autumn 2012)**

- tests with the FlexPLI-MasterLegs**
- test results (time-history) on various car fronts**

**Establish a final position in the 5. IG-GTR9-PH2 meeting (Dec.2012)**





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# Thank You

