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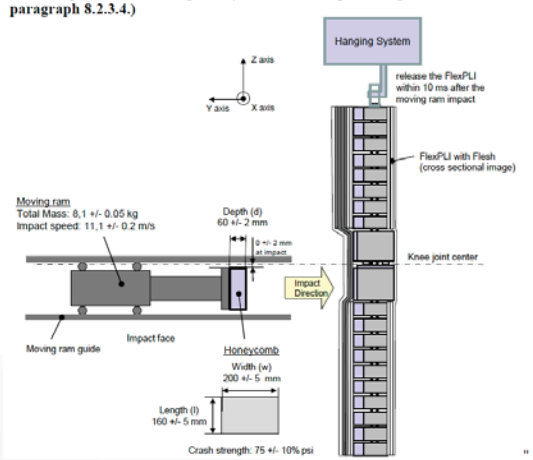
Concept Tech GmbH:

Investigation of the Influences of Friction within the Inverse Certification Test Setup of the FlexPLI - Lower Legform Impactor

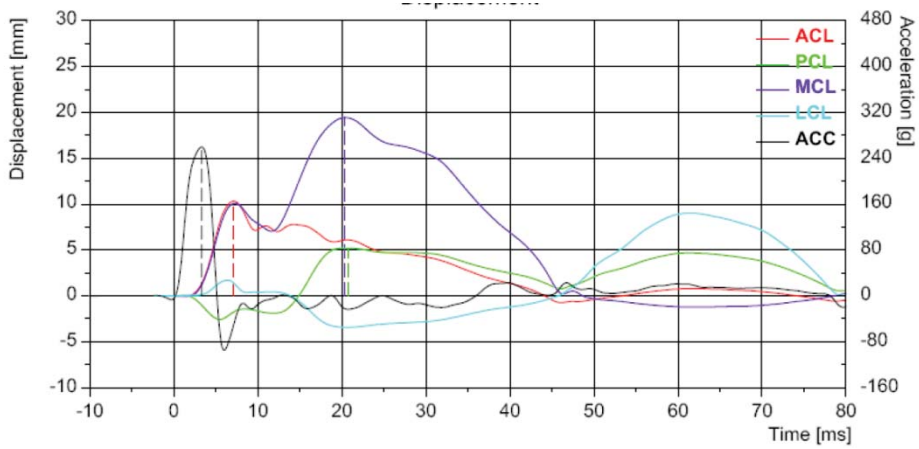
Frictional Effects – FlexPLI Inverse Certification

- **Initial Information – Boundary Conditions of the Inverse Certification Test Procedure:**
  from ECE/TRAN/WP.29/GRSP/2011/13

Figure 37
Lower legform II test set-up for dynamic lower legform impactor certification test, inverse type (see paragraph 8.2.3.4.)



- **Initial Information – Acceleration and Displacement values at Inverse Certification:**
  from D.-U. Gehring, *Current News About Pedestrian Protection Testing*, presentation at 7.Praxiskonferenz FGS, 2012



- **Estimation of acting frictional forces in „moving ram“:**

→ based on Concept experiences with development and construction of test-equipment for automotive safety tests (e.g. several guided impactors, such as in an ejection mitigation EMI test system)

⇒ F, fric. ~ 100[N]

Frictional Effects – FlexPLI Inverse Certification

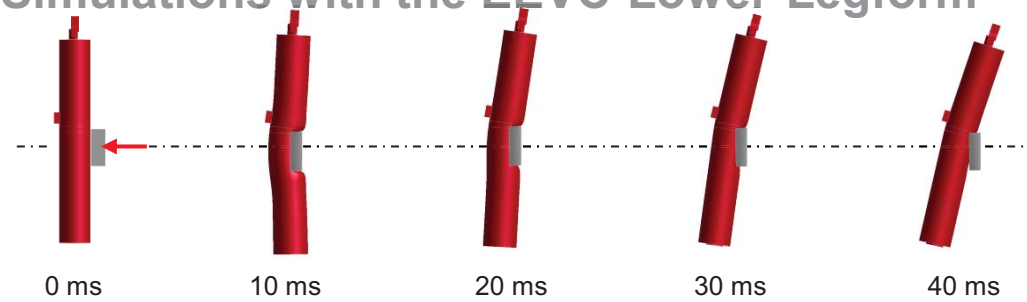
- **Simulation-setup to approximate the FlexPLI inverse certification:**

→ the EEVC legform has been used as approximation of the FlexPLI!

- **Simulations:**
  (A) Impact with guided honeycomb impactor without friction
  (B) with constant friction force on guided „ram“: F,fric = 100 [N] in opposite direction of v_0

Frictional Effects – FlexPLI Inverse Certification

Results of Simulations with the EEVC-Lower-Legform

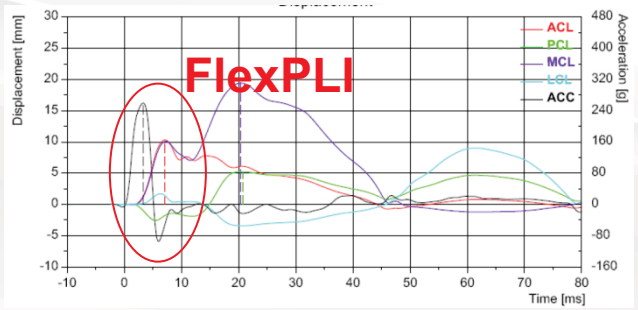


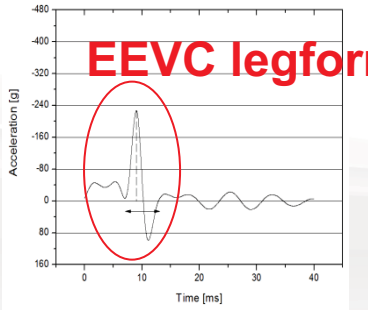
Test video – FlexPLI Inverse Certification

from D.-U. Gehring, *Current News About Pedestrian Protection Testing*, presentation at 7.Praxiskonferenz FGS, 2012

comparable kinematics !

Comparison of legform acceleration





comparable legform acceleration!

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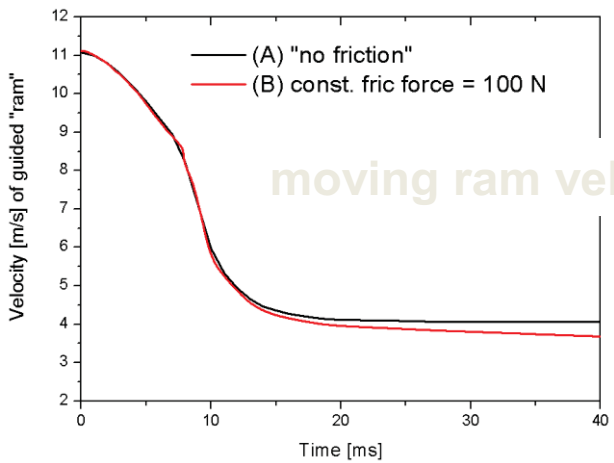
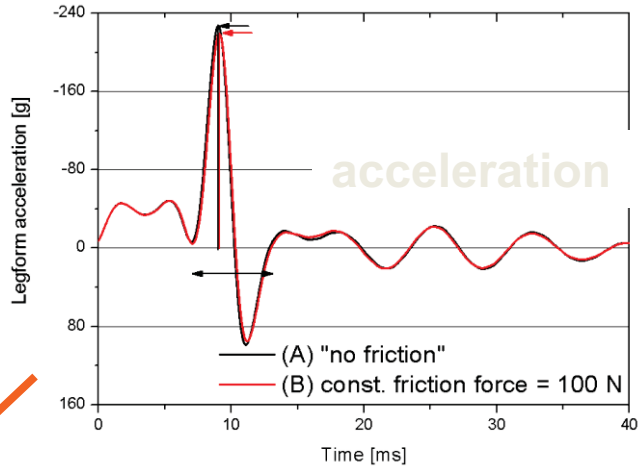
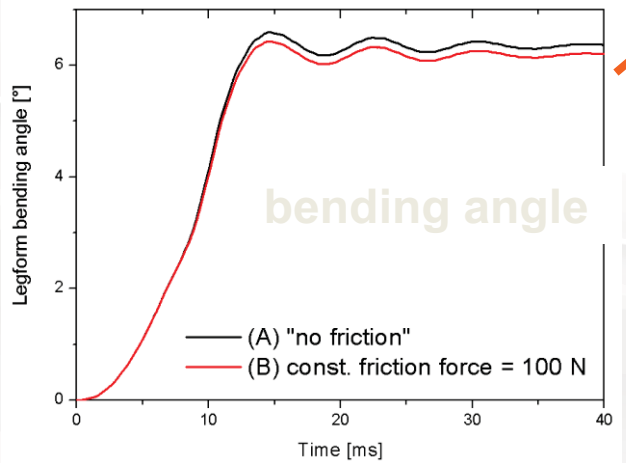
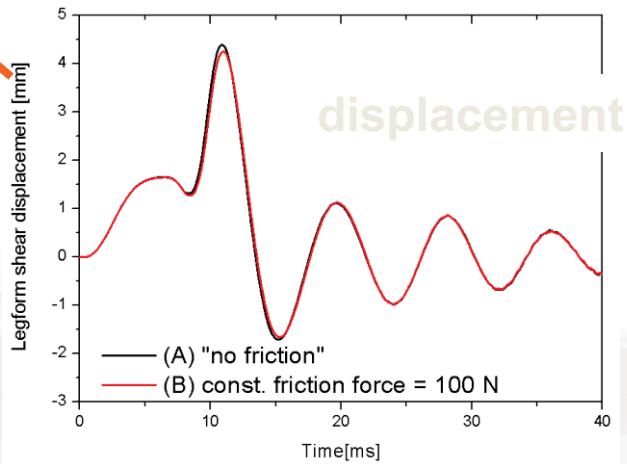
Results of Simulations:





Influence of friction force on signal max. values < 5 % !





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- **Summary:**

The **frictional forces** in the inverse certification test setup will most probably **influence the measured displacements and bending moments** in the legform and **should therefore be specified within the description of the test procedure**.

As first suggestion:

If the **frictional forces** could be limited to values **< 100 to 120 N**, any influences on the signals would most probably be below 5 %.

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