

Collision Test apparatus

Description

The present invention relates to a dynamic testing apparatus for investigating impact on human body parts when in collision with vehicle structural components. The proposed method uses modified Hopkinson bar principles. It extends the utilisation of classical Hopkinson bars, which has been limited to the testing of steel, concrete or medium density composites, to low-density, soft materials.

The innovative technique presented here provides a collision testing apparatus in which a modified Hopkinson bar system can be used to measure the dynamic mechanical behaviour and impact response of soft tissues or other soft materials. The sample to be tested is inserted between two liquid columns, the input and output bars, and is loaded by a pressure wave, generated by appropriately pretensioning and suddenly releasing an elastic plunger. Stress levels and associated injuring effects of a collision can be directly assessed by placing a section of an automotive structural part (bumper, pillar ...) in contact with the tissue-sample between the two liquid columns. The system also allows the measurement of the compression pulse generated by an inflating air-bag and the study of the injury mitigation obtained through the use of energy absorption materials.

Innovative aspects and main advantages

- Impact properties of soft tissue or soft materials can be measured
- No impedance mismatch problems

Areas of application

- Automotive industry
- Airbag industry
- Material testing
- Protective industry
- Mechanical modelling of human body

Stages of development

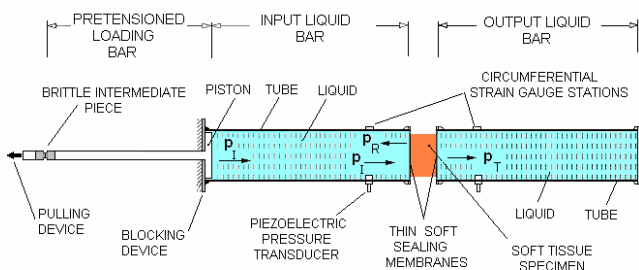
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Sketch of the Hopkinson liquid bar for the dynamic testing of soft materials/tissues

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