Datapoint
Reporting on advancements in material testing and data management

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Applus IDIADA and DatapointLabs Collaborate to Improve Crash Simulations

Engineers at Applus IDIADA and Applus DatapointLabs have co-authored a technical paper for presentation at the European LS-DYNA Conference 2021, taking place onsite in Ulm, Germany, as well as online, October 5-7, 2021.

Non-Isochoric Plasticity Assessment for Accurate Crashworthiness CAE Analysis. Application to SAMP-1 and SAMP-Light.

By Eduardo Martin-Santos[1], Lluis Martorell[1], Pablo Cruz[1], Megan Lobdell[2], Hubert Lobo[2]

Abstract:
A deep understanding of advanced material plasticity and fracture is one of the cornerstones of mechanical engineering to overcome present and future challenges in the automotive industry with respect to lightweight multi-material body solutions. The correct material law selection may imply a design lightweight efficiency improvement of between 10% and 20% depending on the material, component geometry, manufacturing technology and performance requirements. The accurate implementation of the plastic behaviour becomes mandatory when material fracture is a central design parameter. In this paper, the authors propose a clear process to experimentally measure and assess how far uniaxially tested materials are from pure isochoric plastic behaviour. This process will be named Non-isochoric Plasticity Assessment (NPA). In order to illustrate the process, NPA will be applied to actual experimental results of representative automotive metals and thermoplastics. Material plastic dilation behaviour is studied. A general description is provided regarding plasticity theory concepts required for the usage of non-isochoric plasticity material laws. An approach for the validation of the experimental input data consistency for both SAMP-1 and SAMP-Light material laws is also proposed. The overall approach is finally applied and validated on an extruded aluminium and a thermoplastic showing a proper level of correlation between CAE and experimental results for shell-based FE-models.

Presented by Pablo Cruz at the 13th European LS-DYNA Conference; October 5-7, 2021; Ulm, Germany.

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Applus DatapointLabs is a Silver Sponsor of the European LS-DYNA Conference 2021. If you are participating in the conference, we welcome you to stop by our booth, either onsite or online, or contact us to arrange an appointment.

Upcoming Events

- Meet us at the 13th European LS-DYNA Conference 2021 (online and onsite), October 5-7, 2021; Ulm, Germany. DatapointLabs is a Silver Sponsor.
- Find us at Design & Engineering 2021 (online), October 12-14, 2021. Find
- us at the CARHS Automotive CAE Grand Challenge (online), October 19-20, 2021; Hanau, Germany.
- Meet us at the Club Utilisateurs Moldflow 2021 | Aplicit, October 21; Paris, France.
- Find us at the NAFEMS World Congress (online), October 25-29, 2021.

DatapointLabs Growing in New Facility

Only three months after accomplishing the move to our new headquarters, Applus DatapointLabs is adding laboratory staff as testing business continues to increase. We have welcomed a new Laboratory Technician, working primarily in the Mechanical labs. Further, our affiliate company, Applus Software, also is adding a software developer to work on code for new and enhanced technologies for our Matereality and eLim products.

Electromechanical and servomechanical testing labs

Expect further growth in both testing services and software development as we continue to take advantage of our new facility. DatapointLabs collaborates closely with our clients and CAE Partners to develop TestPaks to meet evolving needs. For example, our LS-DYNA High Speed Tensile Rate Dependent Model and LS-DYNA Validated High Speed Tensile Rate Dependent Model TestPaks now include the MAT_089 model as an option, along with MAT_019 or MAT_024. Do contact us to discuss your materials information needs.

Datapoint news bulletin

strengthening the materials core of manufacturing enterprises

Applus DatapointLabs Technical Center for Materials

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