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DatapointLabs Releases CAETestBench™ for Validation of Simulation

Physically accurate simulation is a requirement for initiatives such as late-stage prototyping, additive manufacturing, and digital twinning. Simulations use mathematical models to replicate physical reality. Verification and validation (V&V) is an important step for high fidelity simulation. While verification is a way to check the accuracy of these models, factors such as simulation settings, element type, mesh size, choice of material model, material parameter conversion process, quality and suitability of material property data used can have a large impact on simulation quality. Validation presents a means to check simulation accuracy against a physical experiment. CAETestBench validations do not utilize real-life parts, but instead use carefully designed, standardized geometries in a controlled physical test that probes the accuracy of the simulation. These validations are a valuable tool to measure solver accuracy prior to use in product development. Confidence is gained that the simulation replicates real-life physical behavior.

Validate before you create

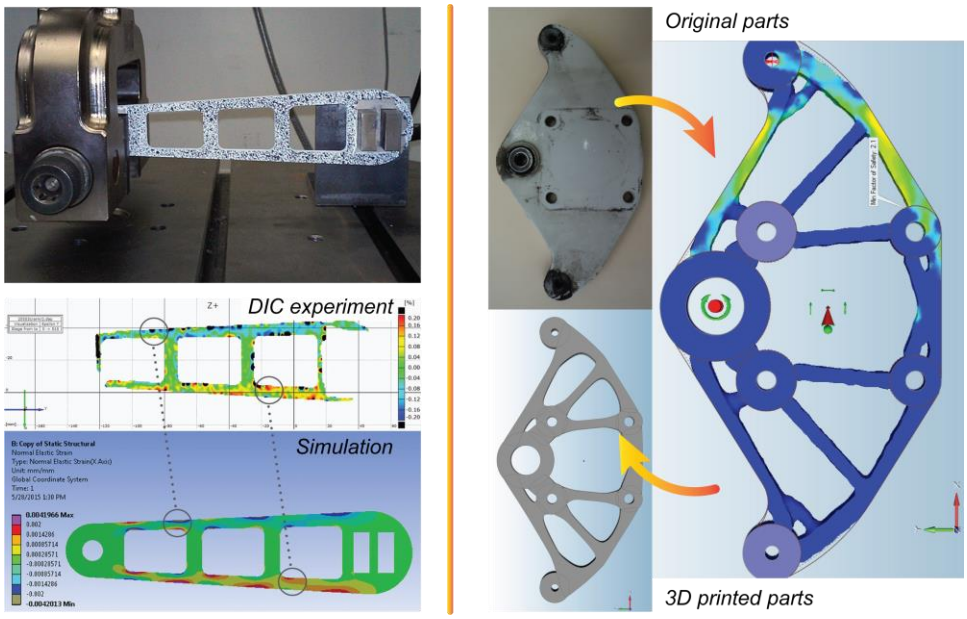

Figure 1. Validation is performed prior to using simulation for design of new products

CAETestBench utilizes Matereality's patented PICSCI™ electronic lab notebooks (ELN) infrastructure as a platform for set-up, storage, analysis, and tuning of validations. A real part is created and tested in the laboratory. The same test is replicated in the target CAE solver. Output data, parameters, and variables from simulation and test are dropped into PICSCI. PICSCI provides software modules to compare simulations to test. Simulations may be iterated to gauge the impact of various variables. The outcome of each simulation is added to PICSCI. The effect of changes to element type, mesh size, or material model can be compared using the automated cross-plotting features in the software, allowing for quick assessment of improvements compared to the physical test.

While CAETestBench validation provides a measure of simulation accuracy for the chosen element type and size, material models, and simulation parameters, it is not uncommon for these to change as simulation is performed on real-life products and applications. The question arises as to what impact these might have on accuracy. This is where the PICSCI platform provides value. CAE analysts can access all the details of the validation simulation,

including the simulation files and material card. Simulation inputs can now be modified as needed. The analysts can drop the new simulation results back into PICSCI for comparison to the original simulations or the physical test, as needed. These steps can greatly streamline the validation process, ensuring a continuous and living check of simulation quality throughout the design process.

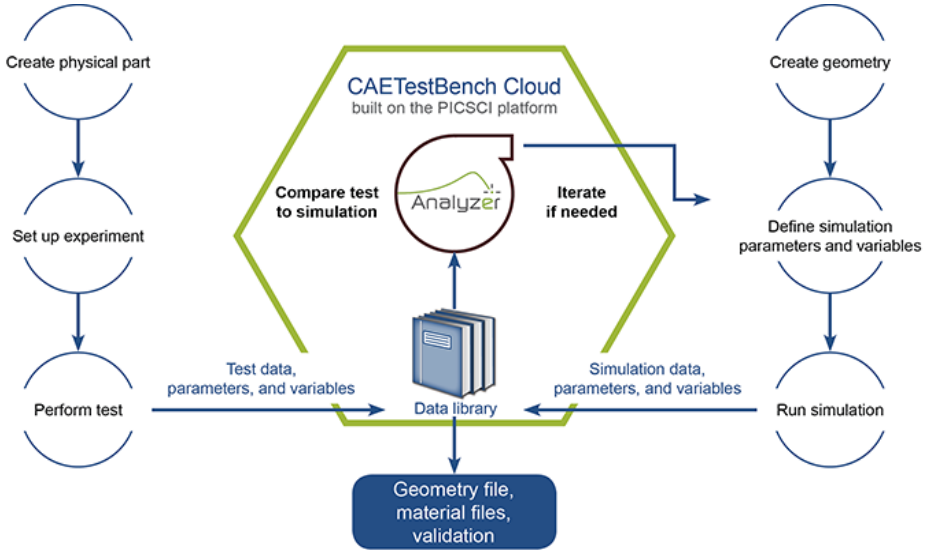

Fig 2. Flowchart of the CAETestBench validation process

CAETestBench is available as a service, often as an accompaniment to DatapointLabs' *TestPaks*®,which provide material testing and parameter conversion for most simulations. Validation parts are created at the same time as producing the test samples needed for material testing. Currently available part geometries can be used for rubber, plastics, conventional and additively manufactured metals, quasi-static and dynamic crash applications. Currently supported solvers include Abaqus, ANSYS, LS-DYNA and RADIOSS. Support for other solvers and parts is being added.

About DatapointLabs

Founded in 1995, DatapointLabs Technical Center for Materials provides accurate material testing, material parameter conversion and validation services for CAE, allowing companies to populate their databases with high-quality, application-ready data for design and new product development. Matereality® Software for Materials gives manufacturing enterprises the means to build a centralized, secure materials knowledge core to store properties, CAE material files, specifications, and material information on any material. The PICSCI Electronic Lab Notebooks cloud-based software from Matereality provides infrastructure for storage, visualization, analysis, and collaboration for any experimental data.

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