Comet® / LS-Dyna® Application Brief

Automated Plastic Bottle Analysis

Makers of plastic containers now recognize that finite element analysis is a useful tool in the design and manufacture of bottles, jugs and other assorted blow molded plastic containers. Potential for savings include eliminating prototype iterations, eliminating product redesigns (or enabling more of them in the same amount of time), cutting analysis time, and optimizing designs thereby saving material. However, not all organizations have the luxury of a fully staffed FEA department for such analyses.

The Comet Engineering Workspace from Comet Solutions, Inc. helps to fill this void. Comet is a CAE process automation tool that

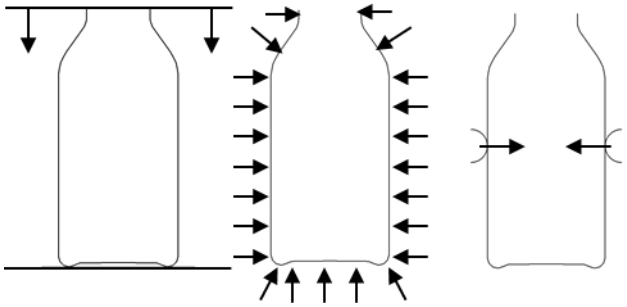

Figure 1

captures analysis best practices in reusable templates. Comet customers gain consistent analyses and results and maintain an audit trail of past simulations. Optionally, Comet templates can be deployed in a controlled manner via a company intranet whereby a wider audience of design engineers can analyze their own designs using the official company sanctioned processes. Designers, engineers and managers alike can review design performance via the Comet Dashboard.

Recent enhancements to Comet in support

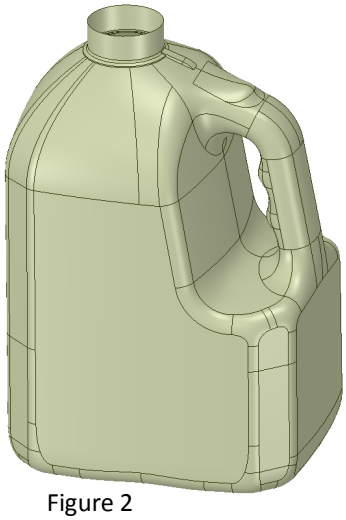

Figure 2

of the LS-Dyna solver allow bottle engineers to automate several key load cases in bottle performance. Examples shown in figure 1 include top load, uniform pressure (i.e. vacuum) and side squeeze.

A Comet template for bottle analysis expects CAD geometry as input. The user simply imports new geometry (as represented by the bottle in fig. 2) and runs the template with no additional input necessary. The template author has already built in rules to automatically guide the creation of the analysis model and ensure that the template is accurate and safe for non-experts to use. Analysis results include deformed shape, stress or strain fringe plots, and force vs deflection plots (see figures 3 and 4.)

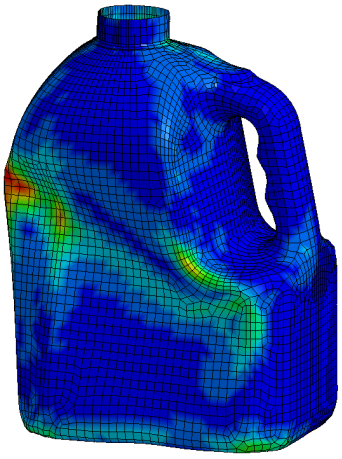

Figure 3

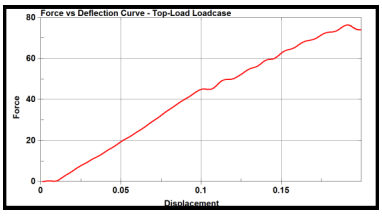

Figure 4

Comet

Figure 5 shows the schematic nature of a Comet template. Each icon represents a task in the analysis process (i.e. geometry import, meshing, load and boundary condition definition, analysis, etc.) The template author can drag and drop the appropriate tasks onto the Comet workspace and connect them with data pipes to create a complete analysis process.

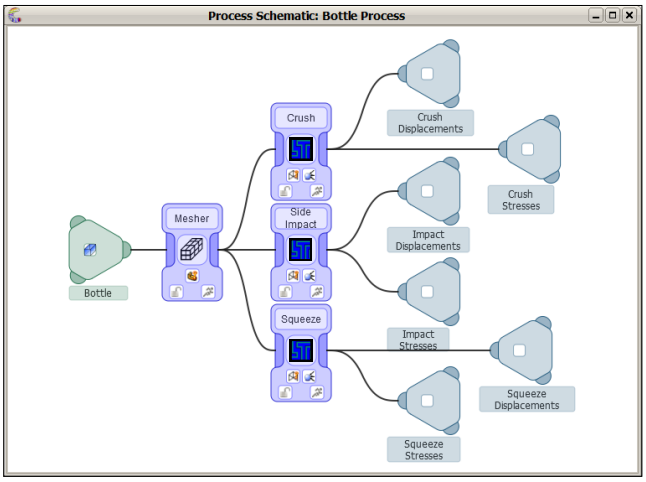

Figure 5

A key advantage of Comet templates is the ability to handle very different geometry as input. For example, a single bottle analysis template can handle all three load cases discussed above and all of the bottle geometries shown on these pages.

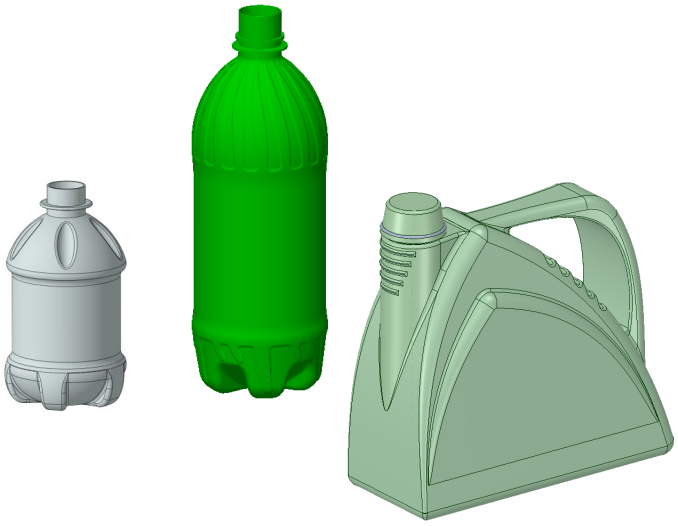

Figure 6

Comet Solutions, Inc. provides software and services for CAE process automation.

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