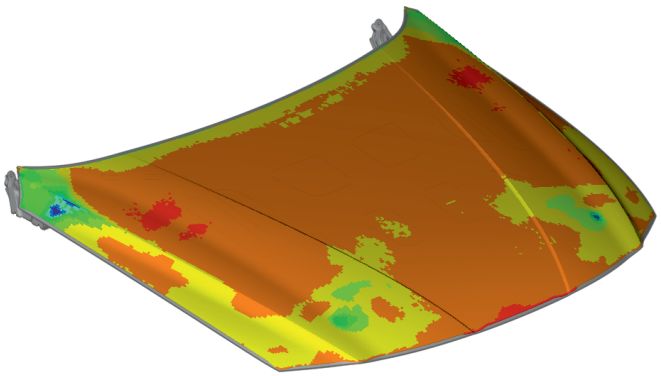
Hyundai Motor Company: Paint dipping pressure fields mapping for structural simulation on a hood component

Challenge

- Mapping of the initial conditions of pressure loads for a large number of analysis steps from CFD simulation result files to a ready-to-run dynamic analysis structural model.
- Handling of large datasets: 100 to 300 steps, source data with pressures at ~100k discrete locations, target mesh with ~100k shell elements.
- Handling of rotating gravity vector.
- Reducing the needed manual work and CPU time for the mapping process.



Approach

- Utilization of the Results Mapper with script additions.
- Additional automation scripts to aid the preparation of the model for mapping and direct output with INCLUDES structure.
- Validation of mapping process by comparing pressure fringe plots, mapped pressure values at specific elements, as well as simulation results.

Results - Benefits

The new approach that utilizes the Results Mapper and the scripting API functionality in ANSA resulted in a manual work time reduction of -37% and an overall time reduction of -70%.

"ANSA is a tool that enables the adaptation of CAE information among diverse file formats. Sametime it works great with really big datasets. The combination of the Results Mapper and the Python script API provided us an effective process that greatly reduces both manual work and computational time."

Yumin Heo, Manager / Advanced Manufacturing CAE Team, HYUNDAI Motor Group
Hyundai Motor Group, South Korea