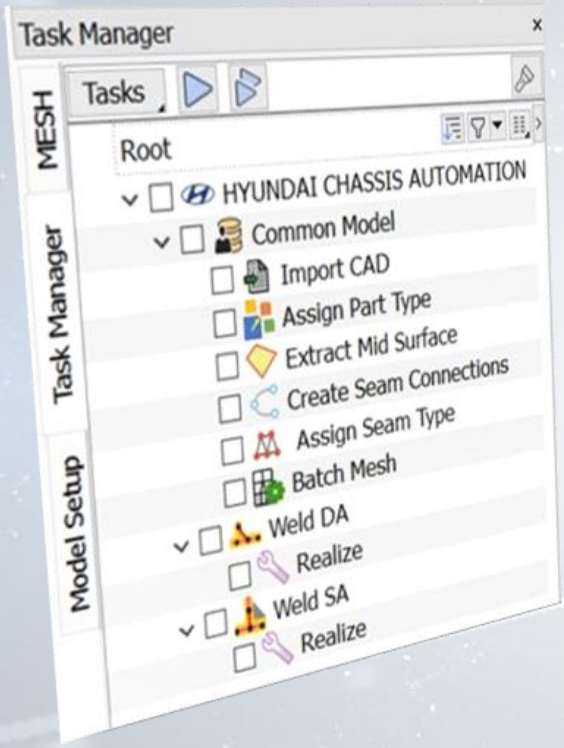
BETA
SIMULATION SOLUTIONS




Hyundai Motor India Engineering

# The HMIE chassis automation tool

A complete automation process for chassis shell modeling, assembly, deck setup, solving and report generation.

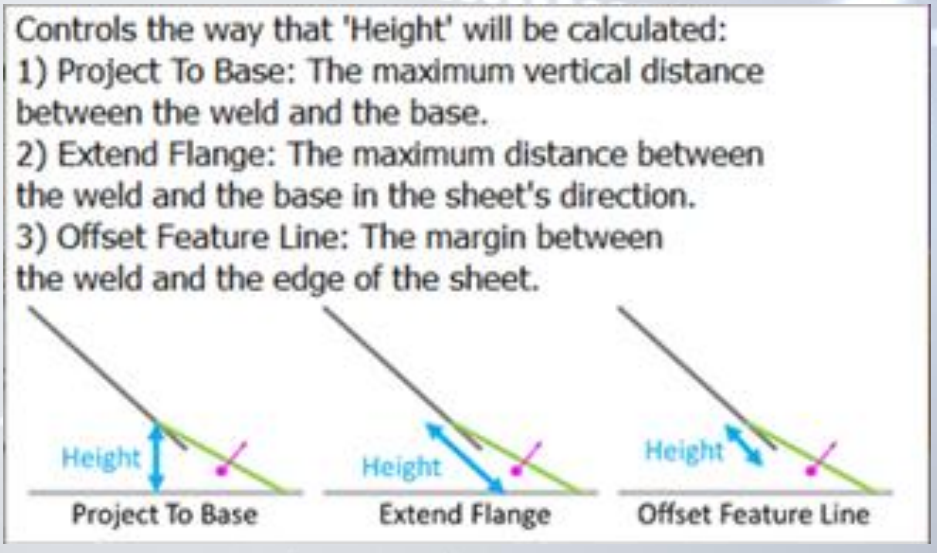
Modelling of chassis components involves tedious manual tasks such as, grouping parts, extracting middle surfaces, meshing, and realizing welds as per required standards.

Weld realization however, can be a complex process with more than one base sheets, with improper orientation or distance from feature lines, and requiring different calculation methods for root generation, height, and width.

All these issues are successfully addressed and handled through the chassis automation tool involving custom robust algorithms developed by BETA CAE Systems in close co-operation with HMIE.

”This process automation involves the preparation of FE models with complex seam weld connections handled very efficiently. BETA CAE Systems offers a powerful, highly flexible software and an outstanding support team .Their development team is also very responsive to our requirements.”

Karthik P.V.E.V


## Challenge

The aim was to reach the maximum possible automation level and minimize the modelling and deck setup time.

In this effort, rough patches were:

- The identification of fastener
- The accurate differentiation of part type
- The geometric clean up
- The middle surface extraction for complex and unusual geometry
- The classification of special seam weld types based on their connectivity and flange angle
- The realization and customization of FE representation type of seam welds as per the required standards

## Approach

Common fasteners are identified and stored in a centralized database. With reference to this database, fasteners are detected and treated as per the requirement.

With the aid of available APIs, different algorithms have been built. With these series of algorithms, part types are differentiated accurately. The geometry clean-up is performed based on connectivity, size and proximity. The middle surface extraction of intricate sheet metal parts are addressed using a custom designed algorithm, which identifies the correct face and performs its offset.

Special and different types of seam welds are identified using an algorithm developed based on connectivity, flange angle, and weld characteristics.

Regarding flanges, their angle is calculated, and the appropriate FE representation type is assigned. These flanges, along with the middle surface parts and the segregated solid parts are treated as per the defined meshing scenario. A purpose-built, specialized post-realization script function of ANSA, performs the treatment of the generated weld shells according to the requirements.

## Results

Modelling and assembly are performed automatically for all valid inputs (meshing scenario, weld templates, post-realization functions) in a single click. This tool has the capability to run either in GUI or No-GUI mode, enabling the user to run on a HPC server.

Hyundai Motor India Engineering has achieved an overall time reduction of 75%, by using the HMIE Chassis Automation Tool.

For more about BETA CAE Systems, visit www.beta-cae.com