

**Automatic
mesh generation**

Create perfect models



Employ the leading solution for top notch meshing quality

ANSA, combining the automatic geometry healing with the automated middle skin extraction and the Batch Meshing, offers the most efficient creation of meshed models. The resulting shell and volume elements models easily meet the meshing requirements and quality criteria in less than 75% of the time needed by other software.

Geometry handling and area idealization

Geometric entities are easily handled and manipulated by numerous integrated tools. Geometrical errors are automatically identified, isolated and fixed, while depending on the mesh requirements, the geometry can automatically be simplified.

Advanced fully automated middle surface extraction

ANSA offers a variety of functions for a fully automated extraction of middle surfaces for stamped, cast parts, and sheet welded structures. Starting from the solid description, high quality mesh is created at the neutral fiber, while nodal thickness is assigned.

Meshing algorithms

Following the mesh area idealization, geometry can be meshed according to modeling requirements by cutting edge fully integrated surface mesh algorithms. These

algorithms are uniquely created for:

- Sheet metal components for all analysis types (crash, NVH, durability, etc).
- CFD applications, with resolution adapted to local surface curvature and flexible size boxes for the automatic refinement of specific regions.
- Surface Wrapping of solid description, capturing sharp edges, with curvature dependent mesh density.
- Shell and Solid meshing for structural analysis.
- Tetra meshing of high quality.
- Boundary layers element deployment.
- Hexahedral dominant mesh.
- Pure hexahedral meshing.
- Polyhedral mesh.
- Acoustic cavity mesh.

Mesh Quality control

The quality of the mesh is easily evaluated using the numerous available quality criteria. Violating elements are isolated and colored according to criteria type or value and automatically corrected.

The ANSA Batch Meshing Manager is a powerful tool for versatile, controllable and predictable high quality meshing with shell (surface, CFD, wrapping of 3D parts), or volume (solid components, CFD, HEXA interior) elements.

The concept of the batch meshing scenario

The principal concept of the ANSA Batch Meshing Manager is based on the fact that usually, each area of the model has to be meshed with different meshing parameters, depending on the discipline and the simulation scenario. In this manner, a Batch Meshing Scenario is partitioned into Batch Meshing Sessions, which are collections of model parts that are corresponding to the areas to be treated with different settings. These areas can be identified according to the parts' location, weight, external dimensions. The settings of each session can be tuned right from the early stage, to control:

- the shell & volume mesh properties,

- the features treatment rules,
- the quality improvement settings and
- the mesh quality criteria.

The ANSA Batch Meshing Manager allows the detailed definition of the Meshing Scenarios. All required operations can be achieved through this interface, including the monitoring of the process execution status and the reviewing of the results report. Additionally, the set up and the execution of meshing sessions can be a straight forward GUI driven procedure, or a no-GUI one, powered by scripting.

Features

- Controllable meshing
- Quality improvement
- Repeatability / Reporting
- Local refinement / coarsening
- Automated mesh area de- featuring
- Controlled washers
- Element rows on fillets and flanges
- Hexa Interior / CFD Mesh
- Fillets Split or Sharp
- Solid structural mesh
- Mapped mesh on fillets and tubes
- Cooperation with ANSA Connection Manager

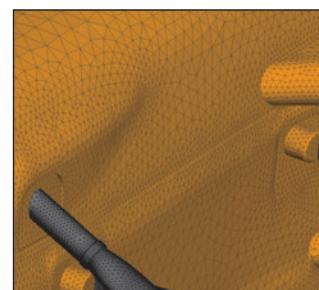
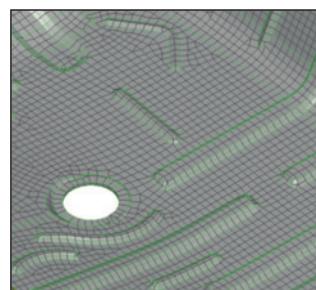
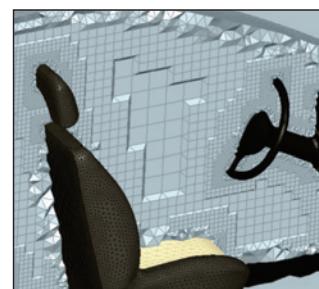
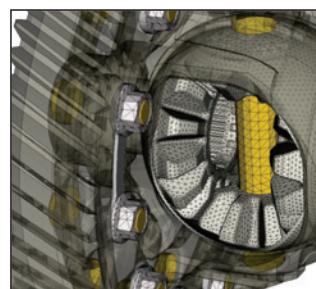
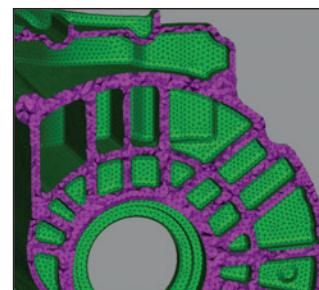
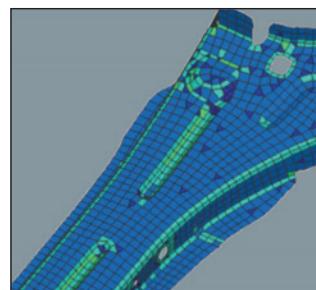
Benefits

- Significant modeling time reduction
- High mesh quality, regardless of user's experience
- Decrease of human error factor
- Repeatability of meshing operations
- Process efficiency enhancement through the integration of the batch meshing process with the rest of the pre-processing functionality
- Adaptability to alternative technological cultures of different processes, followed by different CAE environments and disciplines

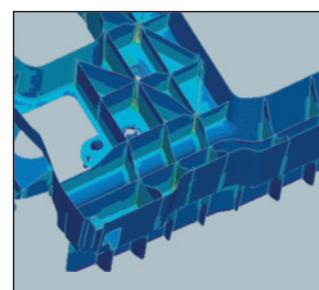
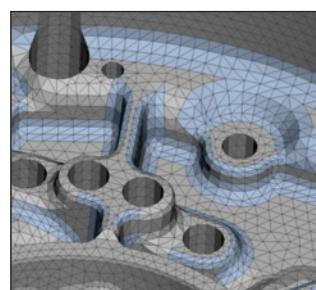
Automatic feature and mesh handling

A number of automatic functions are available for mesh manipulation and improvement. ANSA's responsive graphical user interface guides the user in creating a mesh meeting all requirements for each analysis type. In addition to the numerous proprietary mesh generation and reconstruction algorithms, ANSA provides:

- Automatic feature recognition and defeaturizing (selection of defeaturizing level, logos and emboss removal, identify and respect rib edges in solids).
- Hole / tube treatment (identify bolt holes, fill holes, assign nodes, create zones, etc.).
- Fillet treatment (sharpen, split, assign element rows depending on size and curvature, length control along fillet according to aspect or given value).
- Chamfer treatment.
- Flange treatment (identify flanges and apply treatment in both shell and solid meshed parts).
- Local refinement or coarsening of mesh.



It is notable that ANSA Batch Meshing Manager not only generates mesh according to specifications, but simultaneously improves the quality of the mesh under process, so that the result meets the quality criteria that are declared in the template. Consequently, the resulting mesh is of higher quality compared to interactively generated mesh and less time is required for any further inspection and correction. The optional further interactive improvement of the batch meshing result may be achieved through the core ANSA functionality. This allows for the selective modification of mesh in critical areas achieving improvement in a controllable manner.





physics on screen