

CATIA V6 Surface FE Modeling (SFE)

Advanced surface and wireframe meshing capabilities for complex geometries

Make CAD-Integrated Advanced Meshing Work for You

Global competition requires the creation of better products faster and at lower costs without sacrificing quality. CAD-integrated advanced meshing has benefits for analysts in terms of efficiency, reliability, and lifecycle management. Meshes generated in a CAD-integrated environment are fully associative with the geometry, saving time, ensuring synchronization between mesh and geometry, and providing consistent management of valuable meshing IP.

Performing simulation earlier in the design phase with industry-proved design-integrated analysis technology can provide significant time and cost savings.

About CATIA V6 Surface FE Modeling

CATIA Surface FE Modeling provides meshing capabilities for specialists who require high-quality meshes of complex surface parts and wireframe geometries. Complex parts can be meshed automatically or using a number of manual meshing tools that provide a high degree of control over the meshing process. The solution supports creating finite element models with assembly joints and other fasteners, including spot seam and surface welds. It also provides tools to analyze mesh quality according to pre-defined and customizable criteria.

Features & Benefits

- Advanced meshing of surfaces based on geometry simplification ensures that small geometric features do not adversely affect element size and quality.
- Mesh associative with the design ensures that any changes to the geometry automatically cause the mesh to be updated so that the mesh and the geometry always remain in sync.
- Local mesh constraints can be applied quickly and easily facilitates user control over meshes on complex surface parts and to impose mesh constraints required when modeling connections, such as spot welds and flexible joints.
- Customizable mesh quality analysis provides a thorough understanding of overall mesh quality and individual element quality with respect to user-defined quality criteria.
- Integration with Knowledgeware technology enables mesh specifications to be defined with knowledge-based parameters, ensuring compliance with corporate standard and the experience of expert analysts.
- Creation and simultaneous solving of multiple analysis cases for static, frequency and buckling analysis promotes efficient modeling and solution for large-scale structures under a variety of different loading situations.
- Variable bearing loads, thermal loads and the import of generalized variable loads from external applications enable analysts to accurately analyze the effects of complex loading conditions using both built-in and external tools.
- Composite properties specification and postprocessing enables analysis of models built with complex layered composite materials, designed either in the CATIA Composites Design (CPD) workbench or elsewhere.

Product Highlights

Mesh associativity

- Any changes to the geometry automatically cause the mesh to be updated.
- Reference geometry is never modified during the meshing process. Geometry simplifications necessary for meshing are handled without impacting the reference model.

Compatible and incompatible meshing

- Meshes on different parts can be generated independently or with influence on each other to create compatible meshes.
- Welds and other connections that occur in large quantities can be handled readily in SFE.

Knowledge-based technology

- Mesh specifications—such as meshing domain, node distribution, mesh capture tolerance, element sizes, etc.—are available as Knowledgeware parameters.
- Highly customized and robust meshing methods can be applied to models to ensure meshing standards are met.

Quality analysis and mesh editing

- Mesh quality can be visualized directly on the mesh, with non-conforming elements conveniently grouped and viewable.
- Mesh editing tools can be used interactively while checking element quality.

Mesh as a PLM entity

- Mesh lifecycle can be managed separately from the design model.
- Several FE models can be created to correspond to different analyses on the same product.

Tools for analysts in a CAD-integrated environment

- Extends the capabilities of CATIA Structural Analysis (STA) to include frequency and buckling analysis.
- Specialists and design engineers benefit from using a common user interface with a scalable set of analysis capabilities.

Integrated composites analysis

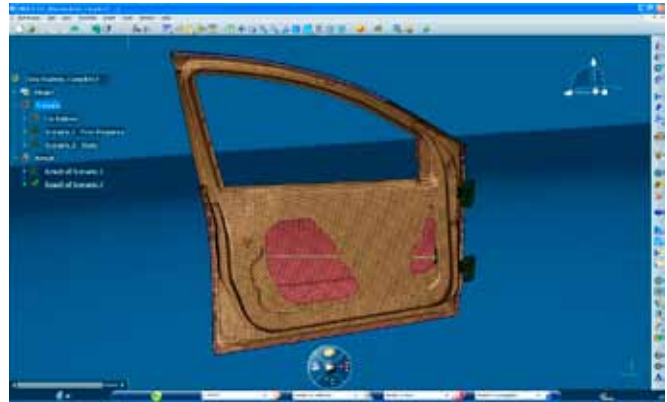
- Specification of the composite layup from the CATIA Composites Design (CPD) workbench or from an imported XML file.
- Results postprocessing enables predictions of failure based on standard composite failure criteria and envelopes of worst-case throughout all layers.

Management of multiple load cases

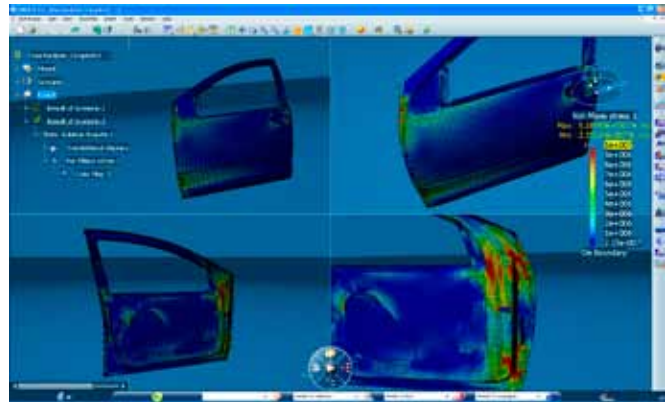
- Hundreds or thousands of linear load cases can be defined and solved efficiently.
- Load cases can be combined to enable study of additional loading scenarios.

Advanced and flexible loading options

- Loading data from external applications can be used. Loads and spatial locations are specified in a spreadsheet and mapped to the CATIA model.
- Loads with complex distributions, such as bearing loads, can be defined.



Unique topology simplification enables high quality surface meshing on model such as a door assembly.



Door sag analysis is performed to determine if the stress in the structure comply with the quality standards.

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