

Analysis solutions



CATIA V5

As one of the software applications that lies at the heart of the PLM solution set, CATIA Version 5 is the cornerstone of true integration between people, tools, methodologies and resources within an enterprise. Its unique product, process, resource model and workplace approach provide a fully collaborative environment that fosters creativity, knowledge sharing and the communication of three-dimensional (3D) product and process-centric definitions.

The ability to capture and reuse knowledge embedded within CATIA facilitates the implementation of corporate design best practices. It also frees end users to concentrate on enhanced creativity and innovation.

In addition, the open CATIA V5 application architecture allows a vast and growing number of third-party vendors to submit specialised applications to meet targeted needs.



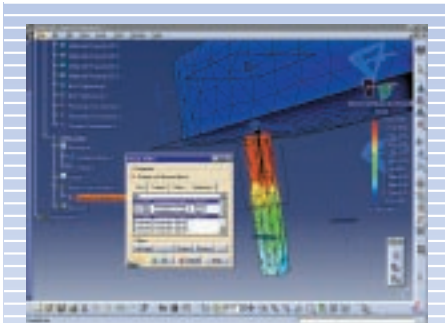
Analysis solutions

The generative capability of CATIA V5 Analysis solutions provides fast design and analysis iterations for any type of part and assembly. Moreover, as a result of the CATIA V5 knowledge-based architecture, it is easy to drive product optimisation based on analysis specifications and results. Unbeatable ease-of-use also makes these powerful tools available to both designers and specialists.

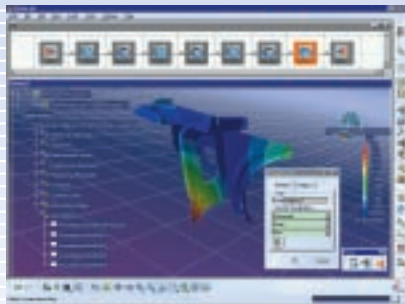
Product highlights include:

- **Fast design-analysis loops –**
The common CAD-FEA environment of the CATIA V5 analysis solution set facilitates a wider number of mechanical behaviour and sizing assessments of parts and assemblies earlier in the product development process. The ability to drive consistent generative and associative specifications throughout the enterprise also enhances the breadth of its capability. As analysis specifications are an extension of part or assembly design specifications, the impact of design changes can be rapidly reassessed with automatic updates. This bridges the design to analysis gap introducing analysis early within the design cycle. This ensures faster time to market with more innovative and higher quality products.
- **Knowledge-based optimisation –**
The analysis suite of products takes advantage of the native CATIA knowledge-based architecture. It is designed to achieve highly sophisticated levels of design optimisation by capturing and studying the knowledge associated with part design and analysis. The reuse of analysis features and application of knowledge-based rules and checks ensure compliance to company best practices.
- **Highly scalable solutions –**
These solutions address the needs of designers, engineering analysts and advanced analysts. They can be used on their own or in conjunction with the extensive range of applications available through CATIA's analysis partner solutions, which are all based on the CATIA V5 architecture. These partnerships extend the process coverage and address more specific needs such as multi-body dynamics, fatigue, acoustics, crash, CFD, non-linear, radiation and more.
- **Industry-proven suite of solutions –**
Characterised by ease-of-use, coupled with a common user interface and fast computation time, these solutions provide a rapid return on investment. Process analysis is supported by robust, built-in finite element solvers and mesh generators, for balancing accuracy and speed. Additionally, users can review the characteristics of designs in a DMU environment to get a realistic idea of the mechanical behaviour. This provides an opportunity to improve and optimise the design early in the development cycle.
- **Products that are easy to understand and to use –**
The integrated and automated approach to solving and pre- and post-processing offers an intuitive interface for the needs of the designer, design engineer and analyst. The core application, CATIA – Generative Part Structural Analysis 2 (GPS), creates this user-friendly environment and acts as the foundation for all other analysis products. In addition, the CATIA V5 tools and environment that are common to all CATIA applications and partner solutions eliminate the problems of lost productivity associated with using multiple applications.

Configurations



CATIA – Structural Analysis 2 (SA2)



CATIA – Tolerance Analysis of Deformable Assembly 3 (TA3)

CATIA – Structural Analysis 2 (SA2)

Provides many of the necessary tools for advanced designers and specialists involved in structural analysis. The processes covered include stress, frequency, thermo-mechanical, buckling and contact analysis with multiple load, restraint and mass complex configurations. Analysis can be performed on single parts as well as on hybrid models mixing solid, shell and beam elements. Analysis can be performed on CATIA V4 models as well as models.

SA2 benefits from the common CAD-FEA environment and its ability to drive consistent generative and associative specifications. This allows for a wider number of mechanical behaviour and sizing assessments of parts and assemblies earlier in the product development process. Users can also take advantage of CATIA's wide partner solution portfolio, based on the CATIA V5 architecture for more industry specific analysis. *(More information is available at: www.caav5.com).*

CATIA – Tolerance Analysis of Deformable Assembly 3 (TA3)

This configuration provides the tools to predict sheet metal assembly tolerances. Predictions are based on each of the single part tolerances, by using both deformation and assembly analysis. It also provides CATIA V4 customers with benefits of such advanced technologies, while preserving their CATIA V4 data investment.

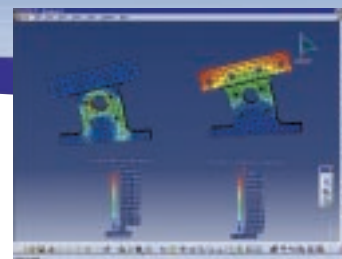
Products

CATIA – Generative Part Structural Analysis 1 (GP1)

Permits designers to perform fast and accurate part stress and displacement analysis. Its transparent and automated approach to part stress analysis is based solely on interactions with the physical definition of the part and its environment (as opposed to interacting with an FEM model). It permits more design/analysis iterations of part behaviour, earlier in the design cycle, to improve product performance. As a result of a common interface and unique integration with the CATIA geometric modeler, CATIA-Generative Part Structural Analysis 1 provides an easy to use and learn scalable environment for the designers and design engineers.

CATIA – Generative Part Structural Analysis 2 (GPS)

Integrates advanced pre-processing, solving and post-processing capabilities. It allows designers to perform associative part stress and vibration analysis including contact analysis for the assessment of part mechanical behaviour. Structural analysis can be performed on volume parts, surface parts and wireframe geometries. Users get a transparent and automated approach to part stress analysis and modal frequencies analysis in a very intuitive environment. CATIA – Generative Part Structural Analysis 2 (GPS) supports local refinement of stress computations with adaptive techniques. This is the core application of the analysis product line and the entry point to a scalable and integrated set of tools including advanced options for specialists.



*CATIA – Generative Part
Structural Analysis 1 (GP1)*



*CATIA – Generative Part
Structural Analysis 2 (GPS)*

Products

CATIA – Generative Assembly Structural Analysis 2 (GAS)

Extends the capability of the CATIA – Generative Part Structural Analysis 2 (GPS) product to perform Finite Element Analysis on assemblies.

Hybrid assemblies including surfaces, solids and wireframe entities as well as assemblies of analysis (i.e. assemblies made-up of parts including analysis specifications) are supported.

CATIA – Generative Assembly Structural Analysis 2 (GAS) provides users with a comprehensive set of tools to connect the different parts of an assembly – from a simple contact, to welding, to a user-defined connection. In addition, the seamless integration between design and analysis applications enables users to retrieve connections properties from any V5 design applications such as CATIA – Assembly Design 2 (ASD) for instance.

The wide range of connections properties supported contributes to the creation of the most realistic and accurate finite element model. This leads to an increased accuracy of the mechanical behaviour simulation of the assembly.

Moreover, the ability to perform assembly of analysis is an important contributor to concurrent engineering practices in PLM. This significantly reduces the time to analyse large assemblies represented by single part analyses by introducing a new innovative process to construct individual analysis into an overall analysis assembly.

CATIA – FEM Surface 2 (FMS)

Is a product that provides an advanced mesher for automatic and associative generation of a finite element model on surface parts and wireframe geometries. Based on a powerful topological engine, it provides advanced control for the generation of the finite element, saving significant time for the user. One can generate finite elements for assembly joints, including spot and seam welding among other fasteners, and analyse the mesh quality according to pre-defined and customisable criteria. The FMS product provides the power that the specialist desires for manual mesh editing.

CATIA – FEM Solid 2 (FMD)

Provides advanced mesh specification controls and a tetrahedron filler to extend the capabilities of CATIA – Generative Part Structural Analysis 2 (GPS) on complex solid parts. Once the mesh is generated CATIA – Generative Part Structural Analysis 2 can be used to complete the analysis process. As an integrated product, CATIA – FEM Solid 2 can be used in conjunction with the CATIA design applications to include mesh specifications associated with design changes, enabling users to generate high-quality designs in a very short time.

CATIA – Elfini Structural Analysis 2 (EST)

Extends the capabilities of the CATIA – Generative Part Structural Analysis 2 (GPS) product to include multiple analysis cases for static, frequency, and buckling analysis. This product is more tailored to the needs of specialists while maintaining a consistent user interface between specialists and design engineers. This common user interface promotes the teamwork between various disciplines to shorten the design analysis turn around time.

CATIA – Dynamic Response Analysis 2 (GDY)

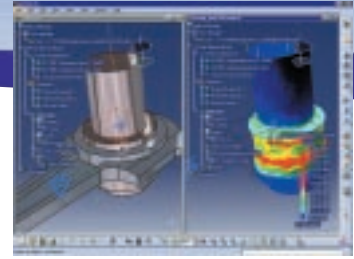
Enables designers to predict the dynamic response of parts, as well as assemblies, in conjunction with CATIA – Generative Part Structural Analysis 2 (GPS) and CATIA – Generative Assembly Structural Analysis 2 (GAS). As an integrated product, it is used with CATIA design products to provide fully associative analysis specifications. This permits rapid assessment of design change impact, allowing high quality designs to be created or modified rapidly.

CATIA – Tolerance Analysis of Deformable Assembly 3 (TAA)

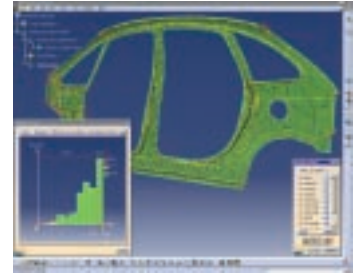
Is a new-generation CATIA product to predict the tolerancing build-up specified on a sheet metal assembly by taking the deformation due to the assembly process into account.

The CATIA -Tolerance Analysis of Deformable Assembly 3 (TAA) product can be used at the conceptual phase to help customers specify and/or validate the assembly process (i.e. assembly and welding/riveting order), the tolerancing specified, the geometry of the part, and the properties of the sheet-metal part relative to thickness and type of material.

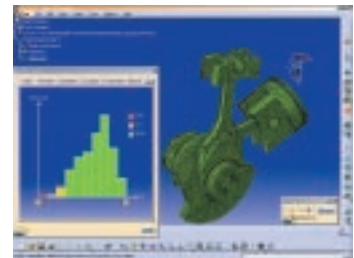
During the manufacturing phase this product can help customers identify ways to correct assemblies that show measured variations. For example, the welding order could be changed or locators could be moved, added or removed to resolve the assembly problems during fabrication.



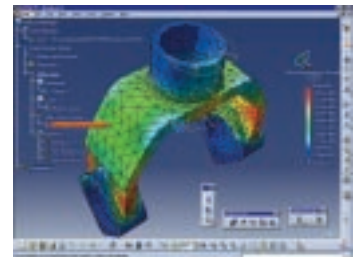
CATIA – Generative Assembly Structural Analysis 2 (GAS)



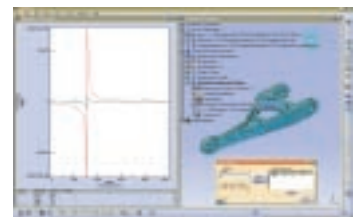
CATIA – FEM Surface 2 (FMS)



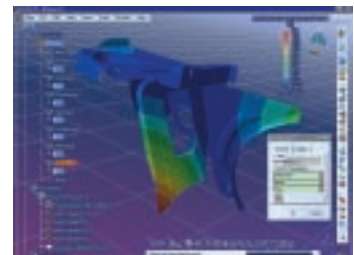
CATIA – FEM Solid 2 (FMD)



CATIA – Elifini Structural Analysis 2 (EST)



CATIA – Dynamic Response Analysis 2 (GDY)



CATIA – Tolerance Analysis of Deformable Assembly 3 (TAA)



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AMERICAS

USA	Toll-free 1 800 395 3339
Canada	(514) 938 6718
Argentina	(54) 11 4319 6594
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Mexico	(1) (52) 5 270 64 25

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Malaysia	(603) 7720 2069
New Zealand	+64 9 359 8785
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EUROPE / MIDDLE EAST / AFRICA

Austria	1 211 45 2273
Belgium	2 225 2901
CEMA	+42 12 4954 1225
Czech Republic	27 213 1742
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Russia	095 940 2000
Slovakia	+42 12 4954 1225
Slovenia/Croatia	01 479 6676
South Africa	0860 788 788
Spain	(34) 91 397 66 11
Sweden	8 763 4394
Switzerland	+41 58 333 5370
Turkey	0212 317 1305
United Kingdom	0870 010 2510

IBM Eurocoordination

Product Lifecycle Management
Tour Descartes
La Defense 5
2, avenue Gambetta
92066 Paris La Defense Cedex
France

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