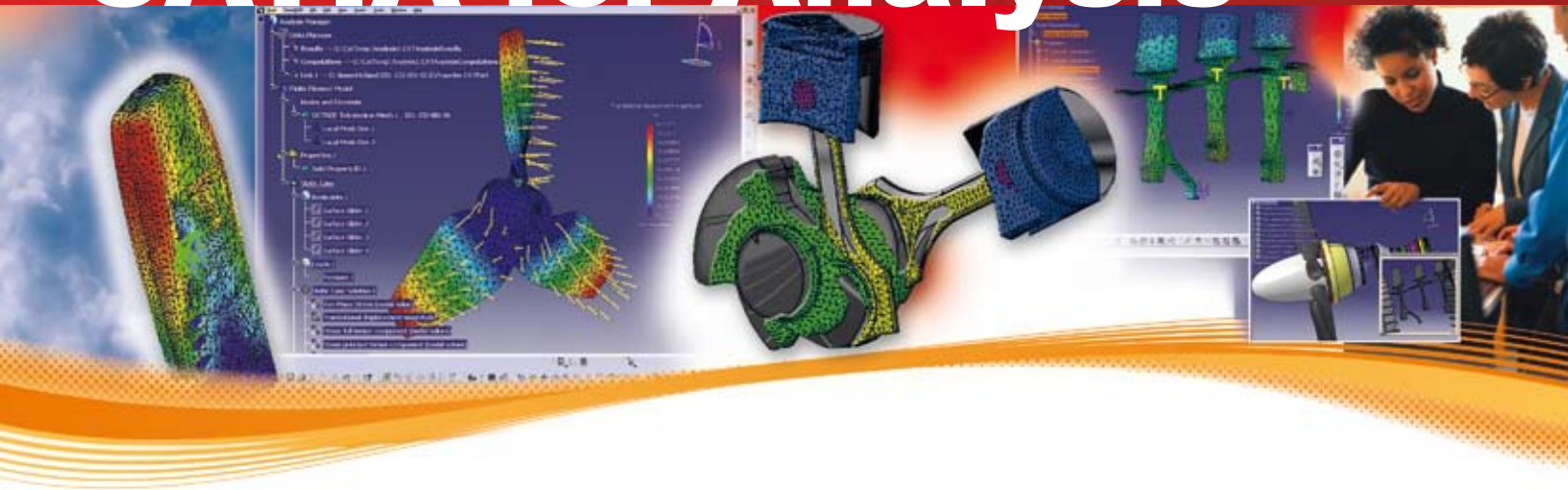
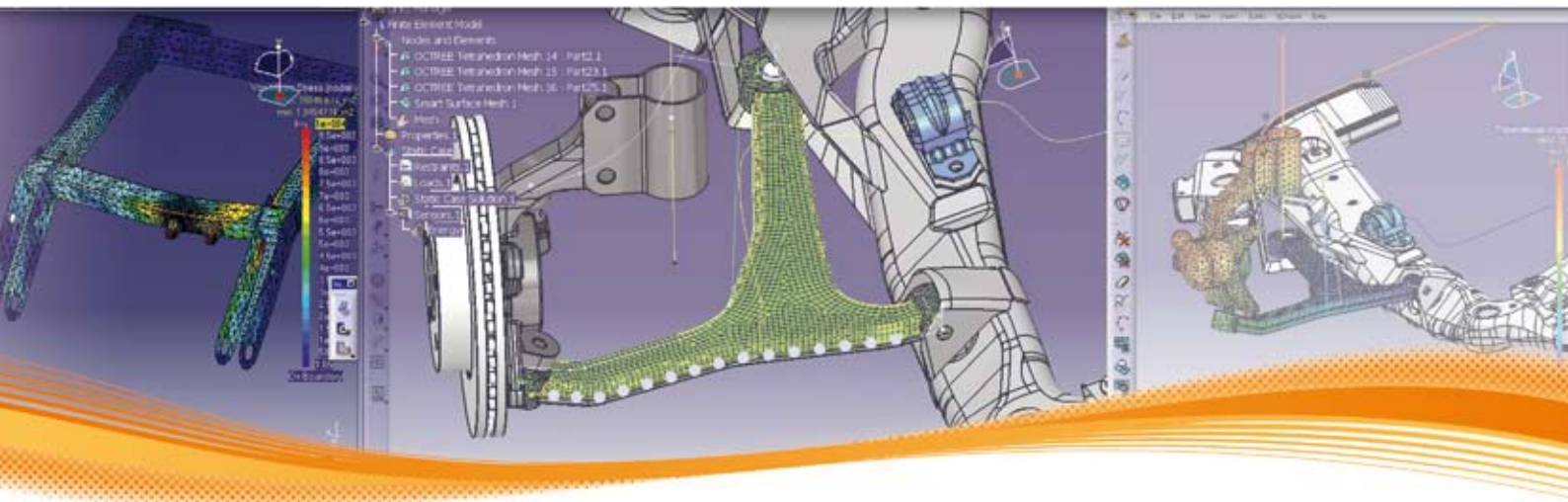


# CATIA for Analysis



# The challenges

There are significant quality and cost benefits when Analysis Simulation takes place in the product development lifecycle. Products become reliable and processes optimised. Software technology to perform three dimensional analysis has been around for over twenty years and offers significant improvements in obtaining meaningful results that can reduce cost of development, promote innovation, improve quality, and do it all faster.



The need to react more quickly to market demand is just one of the challenges faced by companies today – in all industries.

When it comes to designing, optimising, manufacturing, delivering and supporting products, manufacturers must also be more innovative and competitive. At the same time, they need to increase customer satisfaction and loyalty – while meeting tight deadlines.

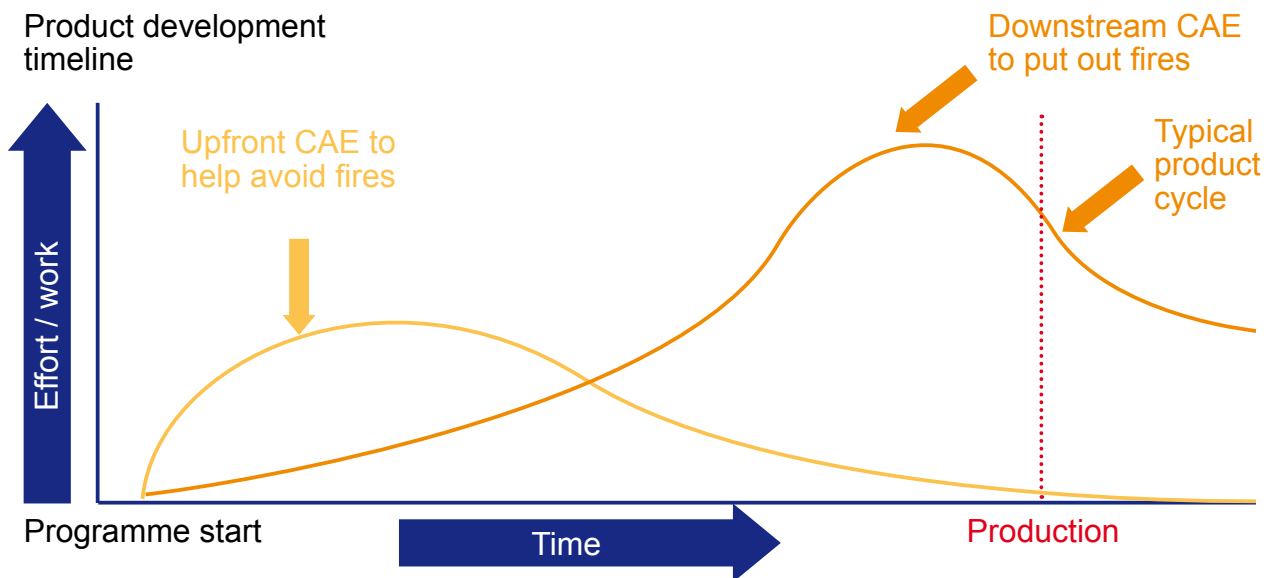
To address these challenges, companies increasingly rely on Computer Aided Engineering (CAE) solutions that:

- Improve product performance and quality
- Reduce subcontracting costs
- Reduce development costs
- Eliminate the need for physical prototypes
- Minimise design error (and costly re-designs)

Yet, there is a need to improve efficiencies further. Today's manufacturing industry demands an extended use of simulation to enable better product assessments earlier in the design process. Therefore, new CAE solutions must provide seamless integration with existing design environments and external solutions. What's more, they must be easy to use and scalable enough to cover all processes. The CATIA for Analysis solutions from Dassault Systèmes are designed to meet all of these requirements.

# Simulate reality, drive innovation

In order to improve their competitiveness, companies need to create new products in short times. Therefore, engineers need to optimise product design without sacrificing quality. They need to perform accurate analysis at any time of the design phase within an integrated and an easy to use environment. CATIA for Analysis offers complete finite element modelling and analysis solutions, native in the CATIA environment, covering a wide range of analysis processes for companies of all sizes.



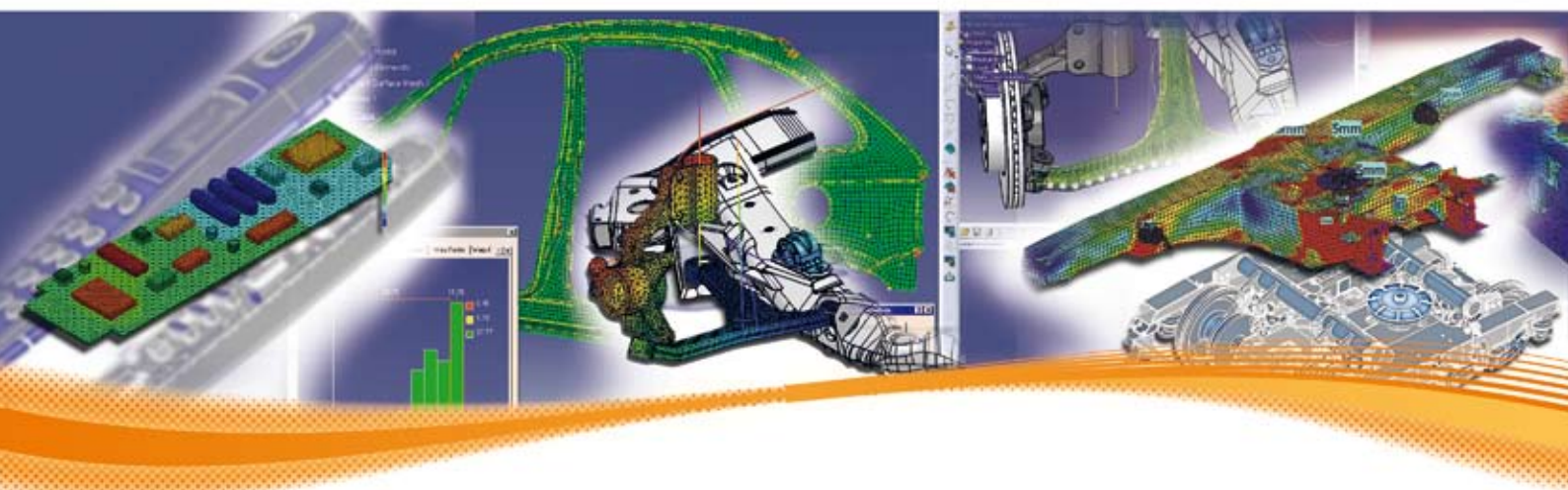
*“With CATIA, we have reduced the time required to go from idea to reality by a factor of five, mostly because complex prototypes that once took 16-20 weeks can be created in a week”*

Anton Ernest Hudic,  
Project Manager

DALEKOVOD D.D.

Today, companies need to control their development costs, while especially focusing on the costs of physical prototypes. They also need a solution that combines design and analysis in order to quickly validate and optimise product development. But the lack of up-front CAE tools forces over-design, increases manufacturing costs and lengthens product-development cycle time by pushing analysis to the end of the cycle.

CATIA for Analysis is the natural progression of CATIA, it provides fast design/analysis iterations for any type of products at early stage of the process. Its knowledge-based architecture facilitates product optimisation, using analysis specifications and results. And its unsurpassed ease of use makes this powerful tool accessible to both designers and specialists.



*“With CATIA, it's one click to move from design to analysis and then another click to move to NC programming. That's invaluable because each one of our engineers performs all three tasks, and they only have to learn one user interface (...) It has cut at least 50% off our development times.”*

Steve Oliver,  
Director of Design Services

EVERNHAM

### Fast design-analysis loops

For years, the systems used by analysts to validate designs have been so specialised that only the most experienced specialists could use them. This means designs were created on one system and analysed on another. But creating and analysing designs on different systems requires major gymnastics to move data from one to the other, and transfers mean breaks and data losses.

A common CAD – CAE (Computer Aided Design – Computer Aided Engineering) environment, with a generative specification-driven approach, enables you to make a larger number of product behaviour and sizing assessments earlier in the product development process. As analysis specifications are an extension to part or assembly design specifications, the impact of design changes can be rapidly re-assessed with automatic updates.

### Knowledge-based optimisation

By allowing both designers and specialists to use the same system, CATIA for Analysis creates a partnership between these two functions, allowing each to perform to its potential. By giving designers the tools to size their designs and analyst-driven templates to work toward, CATIA for Analysis improves a designer's ability to deliver the right design the first time, and reducing over-design.

The native CATIA knowledge-based architecture can be used within the analysis environment. It is designed to achieve highly sophisticated levels of design optimisation by capturing and studying the knowledge associated with part design and analysis. This way, you can make highly sophisticated product enhancements according to mixing design and analysis specifications. You can also verify the compliance of the project with company best practices, increasing the quality of your designs.

SEVAN

*“With CATIA we can now try different steel structures and perform new analysis several times a day to find the optimal solution.”*

Tom Erik Smedal,  
Project Manager



### Scalability and open architecture

The CATIA for Analysis suite provides core generative and knowledge-based applications; specific applications to address needs in various CAE domains; and industry applications to cover the complete industrial process.

CATIA for Analysis can be with a wide range of CATIA and partner products. Combined, these applications provide complete

solutions for the entire spectrum of CAE needs. All applications are built on CATIA architecture, and share the same user interface and the same reference model. Its intuitive user interface and fast compute times enable you to increase productivity, for a rapid return on investment. The analysis process is supported by a robust built-in finite element solver and mesh generators, balancing accuracy and speed.

SEVAN

*“We import products from subcontractors directly into our detailed General Assembly model to ensure all the interfaces between the parts are correct, perform clash tests and do different kinds of mass calculations.”*

Tom Erik Smedal,  
Project Manager

*“We strongly recommend that our local colleges, especially the University of Zagreb, begin to train students in CATIA.”*

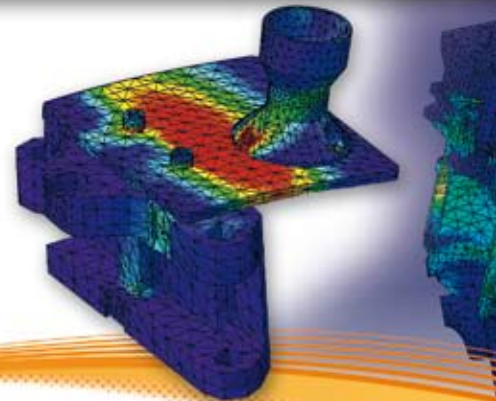
Anton Ernest Hudic,  
Project Manager

DALEKOVOD D.D.

### Ease of use

Characterised by ease-of-use, coupled with a common user interface and fast computation time, CATIA for Analysis provides a rapid return on investment. Users can rapidly review the characteristics of designs in a DMU environment to get a realistic idea of the mechanical behaviour. This provides an intuitive way to manipulate and understand products.

This 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 of CATIA for Analysis creates this user-friendly environment and acts as the foundation for all other analysis products. In addition, the CATIA tools and environment that are common to all CATIA applications and partner solutions eliminate the problems of lost productivity associated with using multiple applications.



*“When we first started using FEA in CATIA, it was so easy compared to what we had used before that I was worried, frankly, about how accurate it would be.”*

Steve Oliver,  
Director of Design Services

EVERNHAM

### High performances

The speed with which CATIA for Analysis operates frequently surprises designers as well as analysis experts familiar with other systems. The time it takes to create the finite element model, solve it and display the analysis results can be very few minutes.

Depending on the analysis being performed, more or less accuracy may be

appropriate. With its smart capabilities, CATIA for Analysis enables you to simply specify the degree of precision required. CATIA for Analysis transparently selects the optimal solving technology based on compute resources available and model size (in degrees of freedom), resulting in higher productivity. In addition, it supports concurrent engineering allowing users to work in tight coordination to avoid re-work and to save time.

**Designed to meet  
a wide spectrum of needs**

CATIA for Analysis is developed in response to the primary needs of these three levels of CAE users and applications:

- **Designer:** usually has CAD software, but rarely has access to analysis tools.
- **Engineering Analysis Specialist:** performs more generalised analysis, and typically uses a geometry engine to develop the analysis model.

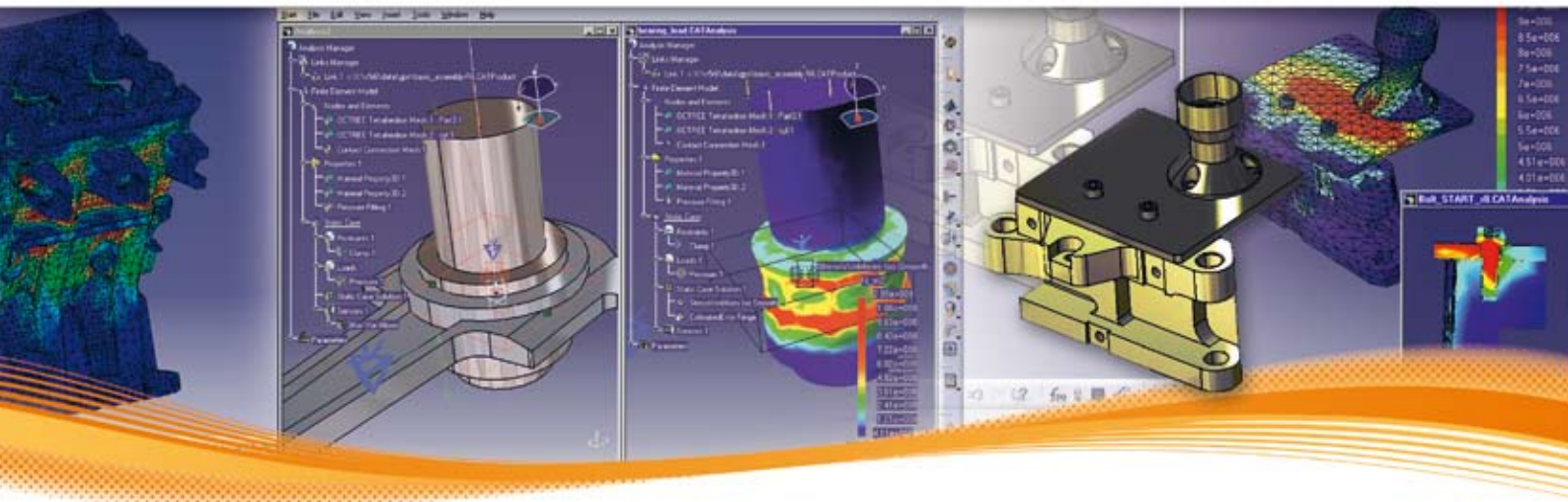
- **Advanced Analysis Specialist:** uses highly specific applications, some with no geometry engine.

Therefore, analysts and designers can work within the same environment, eliminating transfers, rework, and the need to maintain multiple systems for analysis and design.

SONY E-VEHICLE COMPANY

*“Since the interface is the same for design and analysis, more engineers can conduct analysis. We also are expecting our engineers to widen the analysis scope they can perform in the future.”*

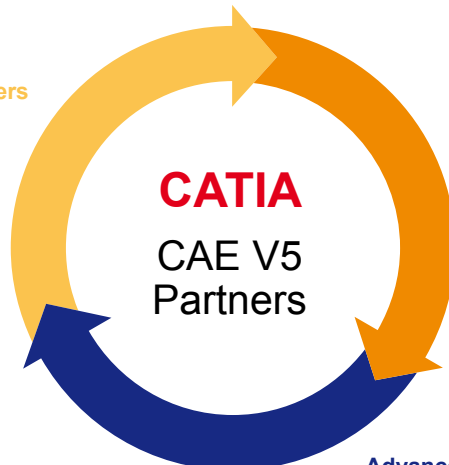
Takehiko Tanaka,  
Assistant Manager



**Short Analysis Loop**

- Ease-of-use
- Result reliability
- CAD environment
- Geometry associativity
- Design optimisation
- Computation speed
- Guidance

Designers



Advanced  
Analysis Specialist

**Detailed Analysis**

- CAD integration
- Ease-of-use for pre/post
- Meshing performance
- Easy update after design change
- Large model capacity

**Engineering  
Analysis Specialist**

**Advanced Analysis**

- Complex simulation
- In-house integration
- Openness to several codes
- Multiphysics applications
- Solver performance and flexibility
- Extensive pre/post processing

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