

6 REASONS CATIA GIVES HEAVY MACHINERY ENGINEERS AN ADVANTAGE



INTRODUCTION

The **Heavy Mobile Machinery** (HMM) segment is a cornerstone of the global economy, powering industries such as construction, mining, agriculture, and material handling. These sectors are under constant pressure to deliver **higher productivity, greater efficiency, and sustainable growth** — and equipment manufacturers sit at the heart of this transformation.

Today's market environment is defined by rising **customer expectations**, stricter **regulatory frameworks**, and increasing **competition**. End users demand machinery that is not only safe, reliable, and durable, but also smarter, more connected, and adaptable to diverse operating conditions.

At the same time, manufacturers face the challenge of meeting these demands while controlling **costs**, managing **supply chain complexity**, and reducing **environmental impact**.

To succeed, companies must move beyond incremental improvements and embrace new ways of working. This means **accelerating design cycles** through advanced engineering, **optimizing production processes** for greater agility, and embedding digital technologies that **enable predictive maintenance, remote monitoring, and data-driven decision-making**.

Innovation is no longer optional — it is the key to differentiation, faster time-to-market, and **long-term profitability**. Ultimately, the winners in this segment will be those who can balance compliance with global **standards**, deliver superior **customer value**, and leverage innovation to create new business models that ensure **resilience** and **growth** in a rapidly evolving industrial landscape.

INTRODUCTION: CHALLENGES IN AN EVOLVING WORLD

6 REASONS TO GAIN A COMPETITIVE EDGE ON ENGINEERING:

1. Engineer anything, including large & complex assemblies
2. Benefit from real-time design collaboration across multi-site, multi-disciplines teams
3. Ensure manufacturability with confidence
4. Set in motion and validate your ideas
5. Optimize, test with simulation and deliver robust and safe designs
6. Bring product to manufacturing faster (incl. Model-Based Definition)

CUSTOMER SUCCESS STORIES

CONCLUSION



Supply **easy to use** machinery



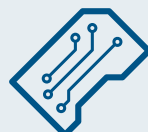
Demonstrate how their product operate with the **options** selected by the customer



Differentiate from their competitors



Share a **common data set** for design, approvals, also synchronized with production



Associative harness diagram linked to the circuit diagram



Conduct **virtual production simulations** during new product development to verify production lines



Shorten design and R&D **times**

WHAT IF YOU COULD TRANSFORM EVERY ENGINEERING CHALLENGE INTO NEW VALUE FOR YOUR CUSTOMERS?

Engineers must master **complex designs**, control **large assemblies** integrity and ensure **manufacturability**. For innovation, whether in machine design or tooling, they need to explore multiple options while maintaining stability. **3DEXPERIENCE** CATIA ensures quality throughout development with

- Exceptional **geometric accuracy**,
- **Resilient modeling** techniques,
- Faster **design sequence creation**,
- Efficient visualization and navigation for large assemblies
- **Intellectual property protection**

The **digital continuity** provided by the **3DEXPERIENCE** platform enables teams to meet rapidly changing market demands.

Discover **six key reasons** that can give you a competitive advantage.

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CUSTOMER SUCCESS STORIES

CONCLUSION



1. ENGINEER ANYTHING, INCLUDING LARGE & COMPLEX ASSEMBLIES

Design Without Limits

3DEXPERIENCE CATIA delivers superior **geometric precision** for **high-quality parts**. Its Visual Scripting interface makes it easier to create **sequences of design** steps than with a script, while **resilient modeling** enables stable modifications and exploration of **multiple design options**. The platform maintains **high performance** even with complex, feature-rich models.

Effortlessly Manage Large and Complex Assemblies

The **3DEXPERIENCE** platform efficiently manages **large assemblies** with advanced **memory** management for **realistic** visualization. The turntable feature enables **easy navigation** through assembly hierarchies down to individual components. Users can swiftly define and access their working context using **various filters** (configuration, attribute, selection, volume). Clash detection and clearance checks ensure **assembly integrity**.

Enjoy a smooth engineering process workflow

Work in a **unified environment** integrating all engineering disciplines, promoting **digital continuity from concept to manufacturing**. This seamless experience allows exploration of **innovative solutions** without delays, as 3D authoring and data management are unified. Users can **import** and **repair** large assemblies from various sources, then **explore, analyze, and annotate** them **on any device**, from tablets to laptops.

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CUSTOMER SUCCESS STORIES

CONCLUSION



2. COLLABORATE IN REAL-TIME ACROSS MULTI-SITE, MULTI-DISCIPLINES TEAMS

To accelerate innovation and streamline processes, the **3DEXPERIENCE** platform enables seamless collaboration among colleagues, suppliers, and partners—resulting in faster deployments, compressed cycles, and fewer late changes.

Work in parallel

Collaborating on the same project data within the same platform makes everything highly effective, including design co-reviews between designers. Besides, multiple stakeholders can securely access and work on the same project simultaneously, allowing them to work in parallel and save their individual modifications at the same time.

Protect engineering intellectual property

Safeguard intellectual property by assigning customized access permissions to collaborators—enabling read/write, read-only, or editing rights for specific product sections.

Develop a Scalable & Secure collaboration

Integrate external parties securely with user and license management, limit access to confidential data, and reduce costs by maintaining a unified, updated software environment for all stakeholders.

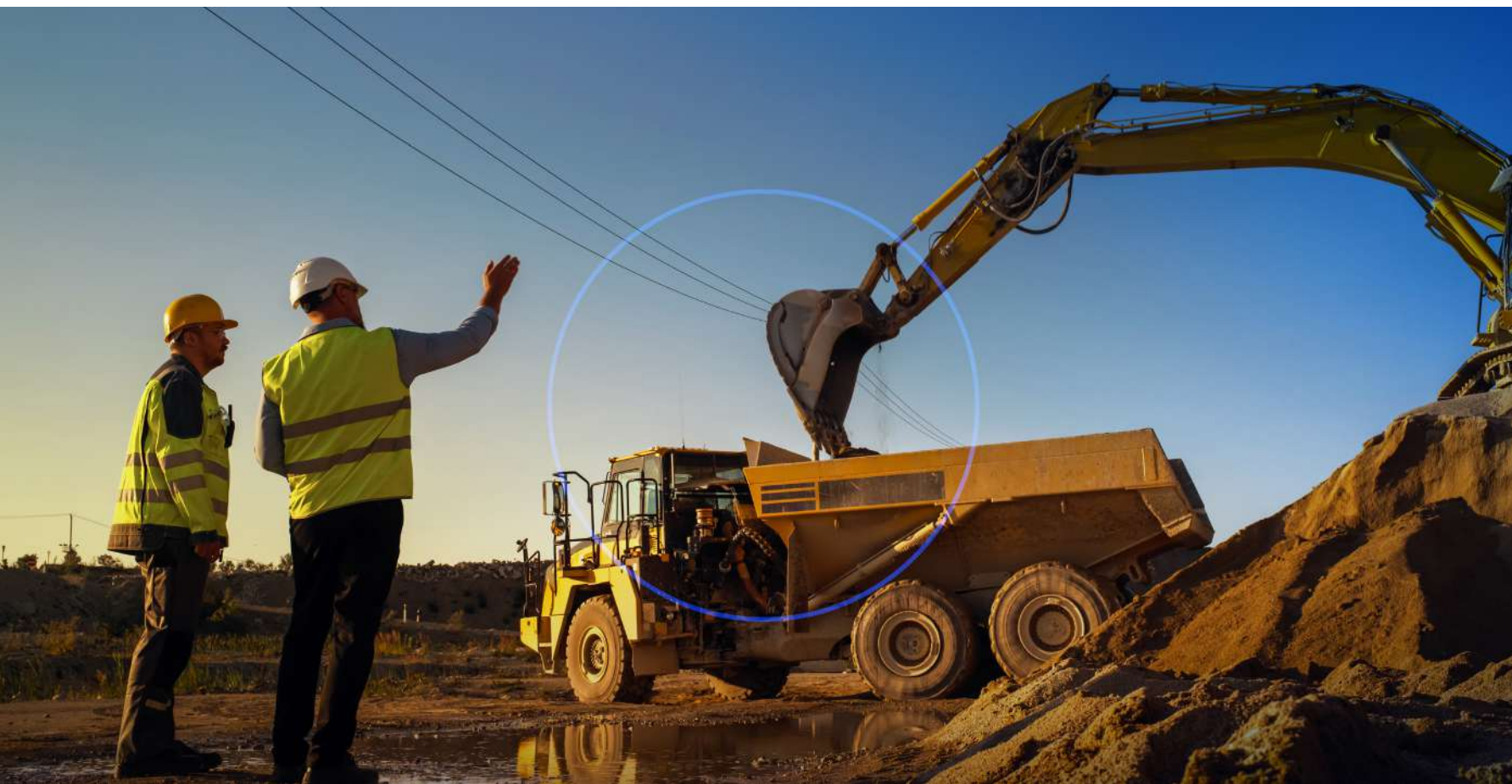
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CUSTOMER SUCCESS STORIES

CONCLUSION



3. ENSURE MANUFACTURABILITY WITH CONFIDENCE

Industrial Equipment companies benefit from shared product definitions that **bridge engineering and manufacturing**. This reduces errors, rework, and delays in development, resulting in:

- **Faster** market entry
- **Reduced** development **costs**
- Quicker **revenue generation**
- **Competitive** edge

Design for manufacturing

Address **manufacturability early** in design. Evaluate wall thickness, draft angles, and curvature while validating design manufacturability. Create necessary **tooling** and **manufacturing process** data.

Enhance **productivity** by computing and optimizing shapes to account for manufacturing deformation effects like springback, without redesigning products or tooling.

3DEXPERIENCE CATIA technology also optimizes the design of **plastic molded parts** with functional part design.

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CUSTOMER SUCCESS STORIES

CONCLUSION



4. SET IN MOTION AND VALIDATE YOUR IDEAS

Product engineers and designers need to minimize the use of physical prototypes by getting the design right from the beginning.

With **3DEXPERIENCE CATIA**, they can track and analyze the **kinematic and rigid dynamic motion** of complex assembly mechanisms and make necessary adjustments.

As constraints and joints are defined simultaneously, engineers and designers can easily establish engineering connections and **understand the structural behavior** of a product by simulating its motion.

For instance, users can analyze the effects of spring dynamics, friction, motor torque, and more.

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CUSTOMER SUCCESS STORIES

CONCLUSION



5. OPTIMIZE AND TEST WITH SIMULATION

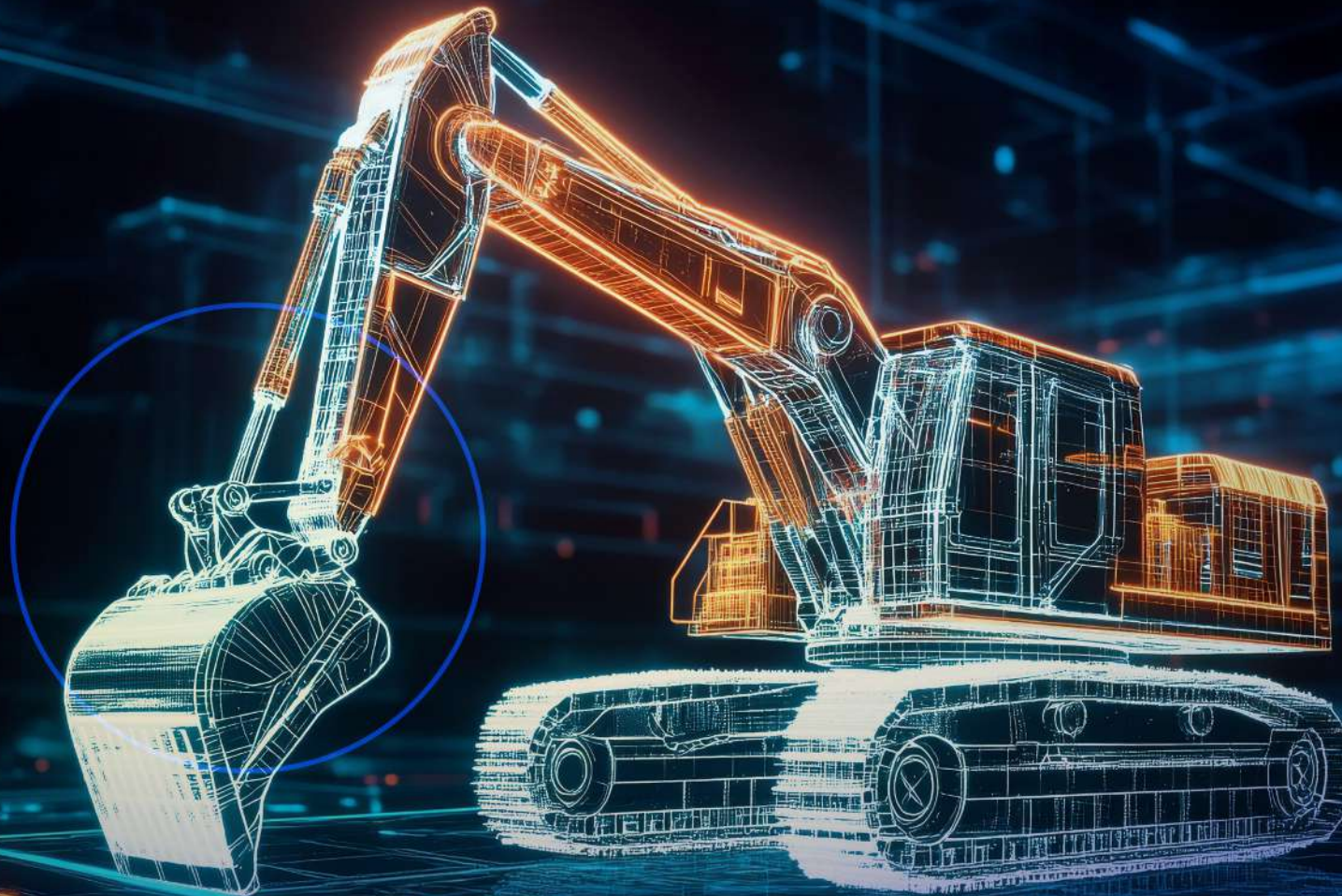
By **simulating** complex product **behavior** within a **unified environment**, decisions can be made **early** in the design process, preventing late changes and reducing the need for costly prototypes.

Concepts can be quickly validated for **structural strength** at an early stage using intuitive stress simulation tools for solid parts and assemblies.

Product definition considers how products will operate under various conditions (**mechanical, thermal, fluidic, etc.**).

This embedded simulation technology enhances problem understanding, enabling **quicker resolutions**. Ultimately, designs and concepts can be swiftly verified and validated **at an early stage**.

<https://www.3ds.com/insights/customer-stories/hyundai-everdigm-heavy-mobile-equipment>



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CUSTOMER SUCCESS STORIES

CONCLUSION

6. BRING PRODUCT TO MANUFACTURING FASTER

While **3D design** is widely used in product development, many still depend on 2D representations which can lead to errors and delays.

CATIA allows for the **full definition** of parts and assemblies in 3D, including **tolerances** and **annotations**, improving the accuracy of product definition for manufacturing and **accelerating** the development process.

Because functional tolerances are based on mechanical interfaces, users benefit from fast and automatic **generation of** standardized **Product Manufacturing Information**, such as dimensions and tolerances, while complying with **regulations** and standards.

The semantic tolerancing advisor also helps users create consistent dimensional definitions and **prevent errors**.

All this information is viewable on the 3D geometry via web applications. However, if necessary, **2D layouts** can be created from the 3D definition and **printed**. These representations are **associative** and synchronized with the 3D model, ensuring **consistency**.

In addition, users can also generate **manufacturing requirements** for use with DELMIA applications.

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CUSTOMER SUCCESS STORIES

CONCLUSION



CUSTOMER SUCCESS STORIES

How have large companies adopted 3DEXPERIENCE CATIA for large assembly design and engineering?

Let's learn from them.

- [Claas – tractor](#)
- [Hyundai Everdigm](#)
- [Kobelco](#)
- [Soosan Cebotics](#)

CLAAS

KOBELCO

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CUSTOMER SUCCESS STORIES

CONCLUSION



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As HMM manufacturers face pressures to reduce development costs and minimize errors, embracing **scalable and secure collaboration strategies** becomes necessary. The shared product definition methodology offered by the platform bridges the gap between engineering and manufacturing. The advanced capabilities of CATIA allow for intricate adjustments that cater to **manufacturing challenges**, thereby mitigating risks associated with design changes or production delays.

The **collaborative environment** of the **3DEXPERIENCE** platform results in faster time to market, lower development costs, and a clear competitive advantage in the heavy machinery landscape.

As the industry continues to embrace digital transformation, the integration of **advanced design and collaboration tools** will enable manufacturers to elevate their **capabilities**, meet **market demands**, and drive **sustainable growth**.

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CUSTOMER SUCCESS STORIES

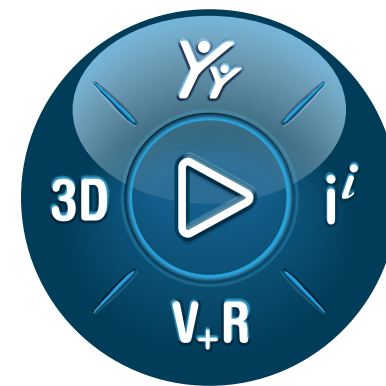
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Dassault Systèmes is a catalyst for human progress. Since 1981, the company has pioneered virtual worlds to improve real life for consumers, patients and citizens.

With Dassault Systèmes' **3DEXPERIENCE** platform, 370,000 customers of all sizes, in all industries, can collaborate, imagine and create sustainable innovations that drive meaningful impact.

For more information, visit: www.3ds.com



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