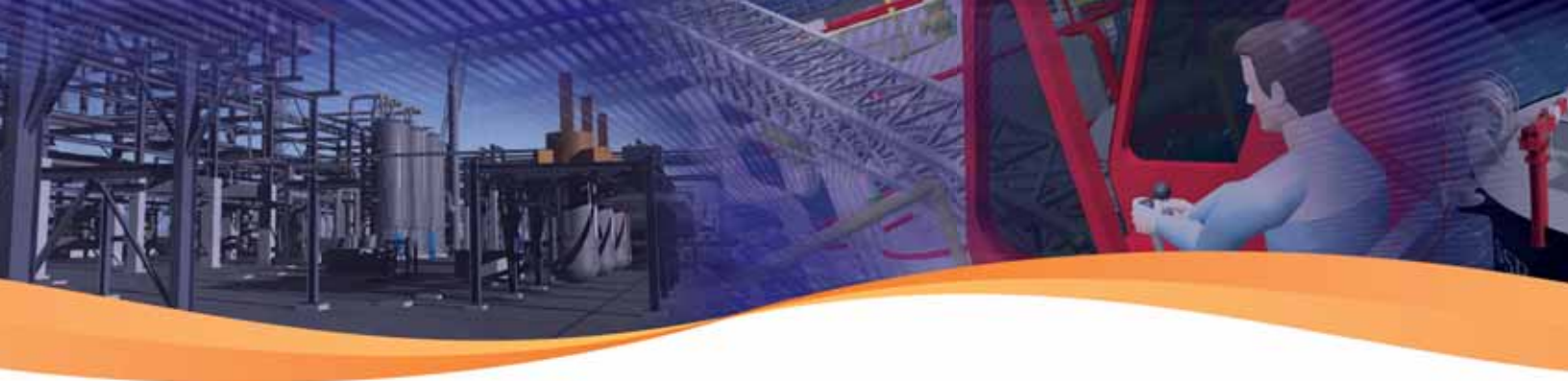


VIRTUAL CONSTRUCTION VALIDATION & SIMULATION





Digital Planning & Simulation Solutions

Construction planning and management involve innumerable elements that must be stringently coordinated and executed in order to complete a project on time and within budget. DELMIA from Dassault Systèmes (DS) offers digital construction solutions to support these activities with 3D design validation, 4D (time dimension) planning and schedule integration, human simulation and material flow simulations. Our solutions also perform interference and spending curve analyses, process monitoring, cost control, and overall, effective supervision of construction projects.

DELMIA provides significant efficiencies during project planning and the critical tools to project managers, construction coordinators, owners/operators, and general contractors to plan and coordinate construction activities, thereby minimizing delays and rework. The DELMIA product portfolio allows for increased productivity, predictable cost and schedule performance, and reduction in cost and project cycle-times. At the same time, you will also gain improved team collaboration, risk mitigation, and better Health, Safety & Environment performance.

Integrated Solutions for PLM

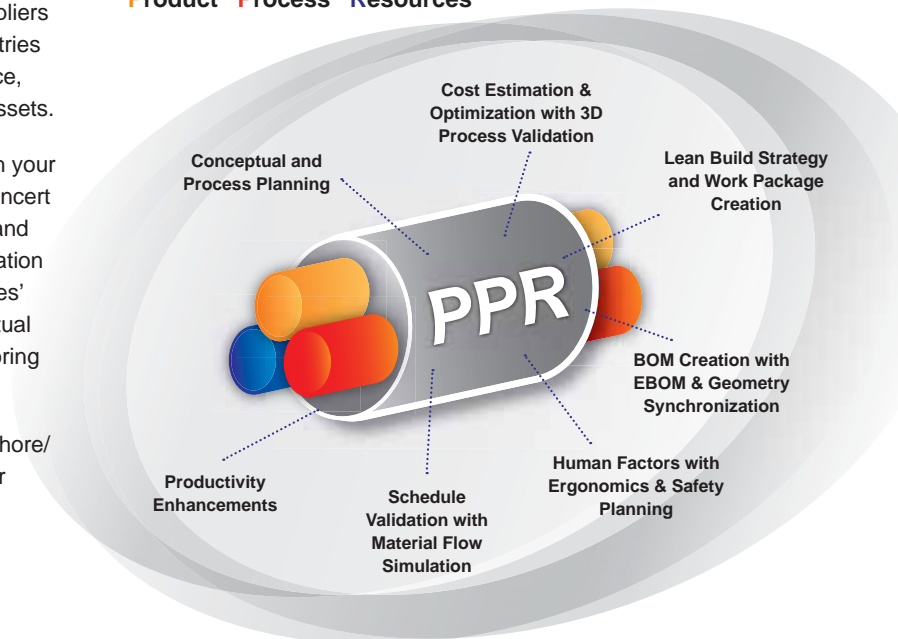
With Dassault Systèmes' comprehensive Product Lifecycle Management (PLM) solutions, owner/operators, engineering procurement and construction companies, and equipment suppliers in the Process, Power & Petroleum (PP&P) and Building industries can plan and execute the construction, operations, maintenance, repair, dismantling and decommissioning of plant and facility assets.

DELMIA solutions can be used as an independent solution with your current building, plant design and scheduling software, or in concert with the other DS brands – CATIA for virtual design/authoring and ENOVIA for virtual product lifecycle management and collaboration – for a complete PLM solution. As part of the Dassault Systèmes' V5 PLM offering, DELMIA provides a unique set of tools for virtual design, construction planning validation, simulation and monitoring solutions specifically tailored for PP&P projects.

Whether starting a new project, such as construction of an offshore/ onshore plant, or maintaining existing projects, such as nuclear outages/refueling, you can use the DS suite of products and integrate your current 3D data. Our technology can ensure your projects operate at peak efficiency.

DELMIA - Work Flow Solutions

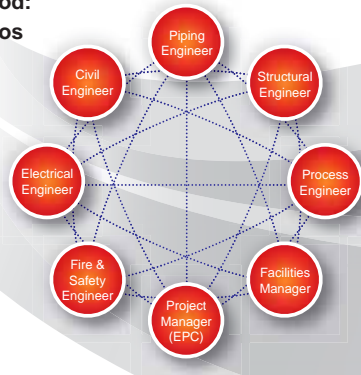
Product Process Resources



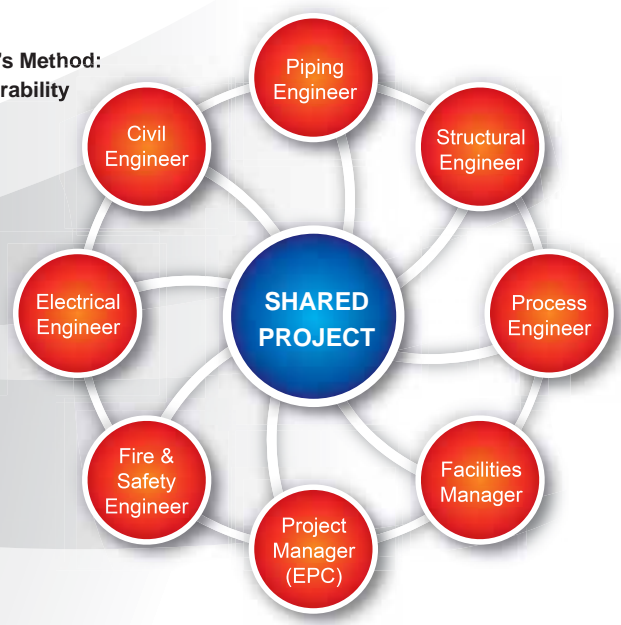
DELMIA can be utilized as a standalone product or together with the Dassault Systemes family of products including CATIA, ENOVIA VPLM, ENOVIA MatrixOne and ENOVIA SMARTEAM



**Traditional Method:
Information Chaos**



**DELMIA's Method:
Interoperability**



The traditional, “step-by-step” methodology that entails a lot of “back and forth,” more scattered communication (left chart). The DELMIA solution (right chart) illustrates the results of effectively sharing the same vision throughout the construction process. It is concise, streamlined, and straightforward.

“The capital facilities construction industry in the United States wastes \$15.8 billion annually due to inadequate interoperability among CAD, engineering, and other software systems. Improved interoperability leads to a decrease in time wasted and an increase in overall profit.”

– National Institute of Standards and Technology (NIST), 2004 study

Define, Plan, and Control the Physical World

DELMIA virtual design and construction solutions provide the use of integrated multi-disciplinary performance models of design-construction projects to support corporate and public objectives. DELMIA’s powerful planning and simulation tools enable all stakeholders to visualize the project and coordinate efforts for optimal efficiency.

Dassault Systèmes delivers a combination of proven industry solutions, knowledge, and business processes, along with best-in-class digital technology to design the right solution and address your specific needs. Solutions for virtual construction are built around common, shared project models. All stakeholders have access to status and current data during the construction process, eliminating the guesswork that can occur during a project and thereby improving overall communication. With these simulated processes and data available early on, the cost benefits from planning and coordination are significant and contribute to overall success of project execution. The result is also a better use of a contractor’s time and resources,

accurate tracking of performance against milestone dates and cost, and ultimately, projects completed on schedule and on budget.

Since real world events almost always require a change in plans, the DELMIA 4D planning environment allows for the quick assessment of alternative scenarios and “build-arounds” so that the revised plan will be as smooth and efficient as possible.

“Cost savings of detecting an issue during design vs. construction save thousands of hours spent on rework. Studies show that a change during design can be up to 100 times lower than performing this change during construction.”

By building it first in the virtual world, you can then build it right the first time in the physical world thereby reducing the cost of trial and error.



Getting Started

Stages of Virtual Construction Implementation

DS provides services to assist you in deploying virtual construction models into your organization. Together with a DS representative, you can select the solutions that best fit your needs. The virtual construction implementation process consists of three typical phases:

Stage 1:

Definition of business metrics for measuring a project's success.

This stage ensures that your goals and objectives are clearly defined, measurable and communicated properly;

Stage 2:

Systems-based integration of multiple models into the shared project model.

This facilitates visualization, description, analysis, evaluation, and prediction of your project cost and time to completion;

Stage 3:

Develop a collaborative environment presenting the plans, schedules and project status.

This provides an intuitive framework graphically communicating status and problem areas during all phases of design and construction. The collaborative environment is where walk-throughs, fly-throughs, and project progress visualizations occur.

How to Contact Us

To find out more about how DELMIA can help you control time and costs to your next construction project, contact your DS representative, send an e-mail to info@delmia.com or call us toll free at 1-800-382-3199.

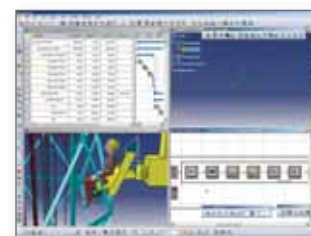
Customer References

Southern California Edison

Largest generator of electricity in Southern California to simulate generator replacement and outages with V5 PLM

"When we replace the steam generators there is no chance to practice. Virtual mockups in V5 PLM will help us get it right the first time."

- **Steve Stephens, V5 PLM Administrator, San Onofre Nuclear Generating Station, Southern California Edison**



Yantai Raffles

Chinese Shipyard using CATIA, ENOVIA and DELMIA for global ship, offshore rig and FPSO projects

"Manufacturing today essentially uses decades-old processes streamlined with new technology. The goal isn't to speed up the old ways of doing things or worry about interoperability and archaic standardization arguments. It's about finding new ways to accomplish sustainable development, adoption of best practices, knowledge reuse and ultimately on-time delivery."

- **Brian Chang, CEO Yantai Raffles**



Hydro Québec

Canadian hydroelectric power provider leveraging V5 PLM for new and existing energy projects

"Hydro-Québec will be able to collaborate more effectively with its partners and expedite the resolution of problems that can occur during the project development stage."

- **Jean-Paul Rigg, Director, Generation engineering, Equipment division, Hydro-Québec**





Construction & Manufacturing Challenges

A typical construction or retrofitting project involves a variety of complex and interconnected activities, all of which need to be planned and coordinated between various teams for optimal results. Visualization of the schedule helps all the stakeholders understand the impact of the sequence of construction so that they collaborate to reach the optimum sequence and eliminate costly changes and rework.

Whether construction is for a new site or working in an existing facility around ongoing operations, current methodologies and tools leave room for improvement.

Recently reported statistics include:

- 30% of construction work is rework
- More than 40% of projects are late or over budget
- Errors in planning lead to rework accounting for 15% of total project cost
- 40% of the manpower used on construction sites can be wasted

In addition, current construction planning has limitations:

- Little or no visualization of the site environment
- An inability to accurately capture the physical behavior of construction activities
- Little or no construction analysis
- Difficulty in evaluating alternative construction methodology or schedules
- Challenges in appraising spending curves.

DELMIA solutions address these challenges and enable you to minimize the above-mentioned inefficiencies in your next project. DELMIA virtual construction solutions will help your team bring construction projects to fruition, on time and within budget.

Value to Our Customers

DELMIA solutions help owners and operators minimize costs and reduce schedule times for construction projects. The virtual construction methodology enables Planning, Scheduling, Sequencing, & Simulation to work together to assist in the coordination of project design, construction processes, and implementation. The owner, general contractor, all construction trades, and public agencies are able to review the construction plan in 4D from concept development, construction readiness reviews and daily reviews of the status of the construction schedule. This facilitates each subject matter expert being able to contribute to the most efficient construction plan and schedule from start to finish.

Our virtual construction portfolio offers multiple capabilities not found elsewhere in the industry. They enable you to create simulations of a construction project, which include:

- Schedule integration with tools such as Primavera and MS Project
- Human simulations which enable review of human specific aspects such as vision, display and motion
- Feasibility studies for remotely operated devices
- Material handling and material flow to the site and storage
- Spending curve analysis on material and resources
- Equipment placement
- Operations/maintenance activities
- Ability to integrate 3D plant data and asset information coming from various Plant, AEC or MCAD software, scanned data or create 3D data with CATIA

These simulations are beneficial because they provide all participants with a clear understanding of how to perform job duties, motions in the area of activity, possible interference problems, and collision detection between crafts, equipment or scaffolding. They also offer a more accurate time and cost analysis of a project.

Dassault Systèmes Corporate Office

Dassault Systèmes Headquarters
9 quai Marcel Dassault, BP 310
92156 Suresnes Cedex, FRANCE
Tel: +33 1 40 99 40 99
Fax: +33 1 42 04 45 81

Geography Headquarters

Dassault Systèmes
9 quai Marcel Dassault, BP 310
92156 Suresnes Cedex, FRANCE
Tel: +33 1 40 99 40 99
Fax: +33 1 42 04 45 81

Dassault Systèmes of America
University Research Park
Two Resource Square
10926 David Taylor Drive
Suite 300, Charlotte, NC 28262 USA
Tel: +1 704 264 8800
Fax: +1 704 264 8888

Dassault Systèmes Kabushiki Kaisha
Pier City Shibaura Bldg 10F
3 - 18 - 1 Kaigan, Minato - Ku
Tokyo 108-0022 JAPAN
Tel: +81 3 5442 4011
Fax: +81 3 5442 4040

Brand Headquarters

DELMIA
World Headquarters
900 N. Squirrel Road
Suite 100
Auburn Hills, MI 48326 USA
Tel: +1 248 267 9696
Fax: +1 248 267 8585

CATIA
9 quai Marcel Dassault, BP 310
92156 Suresnes Cedex, FRANCE
Tel: +33 1 40 99 40 99
Fax: +33 1 42 04 45 81

ENOVIA
University Research Park
10330 David Taylor Drive, Charlotte, NC
28262, USA
Tel : + 1 704 264 8902
Fax: + 1 704 264 8888

ENOVIA SMARTTEAM
5 Hagavish St-Ovadia House
Kfar Saba 44422 ISRAËL
Tel: +972 9 764 4000
Fax: + 972 9 764 4001

SOLIDWORKS
300 Baker Avenue Ext.
Concord, MA 01742 USA
Tel: +1 978 371 5000
Fax: +1 978 371 7303

SIMULIA
Rising Sun Mills
Attn: Michele Rivard
166 Valley St.
Providence, RI 02909-2499
Tel: +1 401-276-4400

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