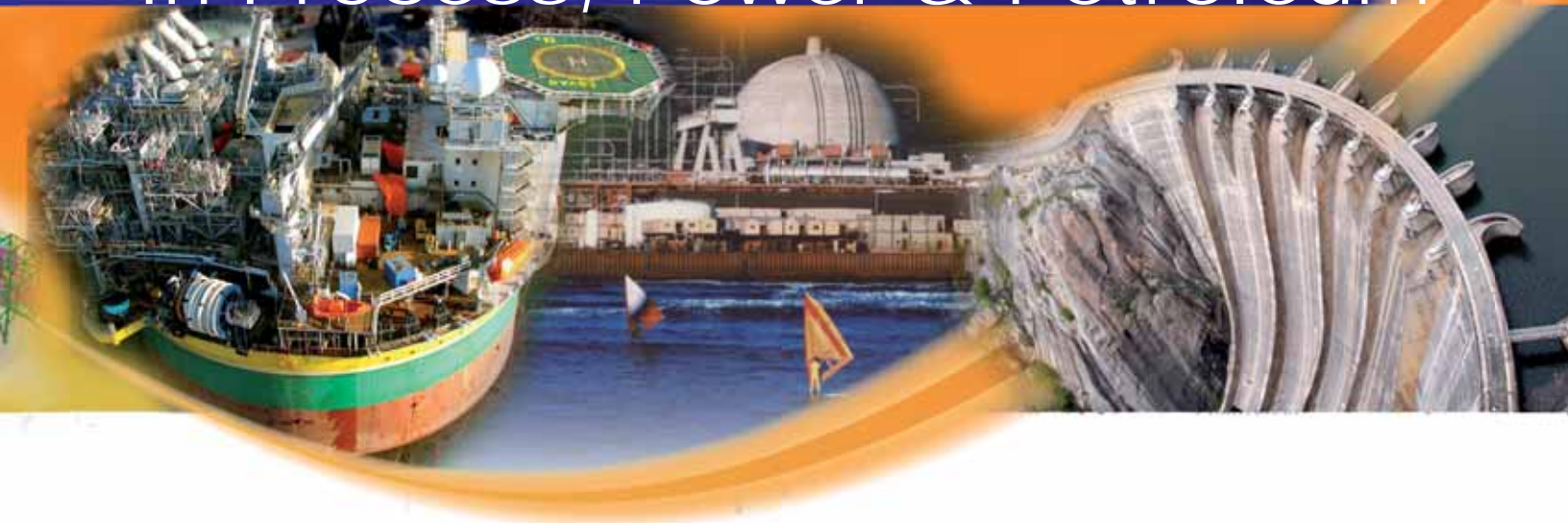


# PLM Solutions in Process, Power & Petroleum



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*See what you mean*



## Innovative Approach to Plant Design, Construction and Management

Modern plants are incredible machines. They extract minerals from ores and oil from the ocean floor, process food, and produce energy to light up entire regions. With major economies and population relying on them, the repercussions of project delays and operational failures are enormous. Once online, these plants and structures must operate efficiently round-the-clock for at least 20-30 years.

Across the **Process, Power and Petroleum (PP&P)** industries, customers are demanding. With trillions of dollars worth of assets, owners & operators realize that operating profitability is as important as the initial price paid. The EPC (Engineering Procurement & Construction) firms responsible for plant design and construction are under pressure to deliver quality construction, maximum availability and a design that requires minimal staff to operate.

Design and business innovations are needed to deliver an energy efficient plant that meets strict regulatory standards and brings lifetime values. With organizations shifting businesses from total design-build to an assembly model where significant components are outsourced, no one can afford to do business as usual.

### **Dassault Systèmes PP&P Product Lifecycle Management (PLM)**

**Solutions** advance the pursuit of innovation by integrating business environment with cutting-edge tools for design and engineering. Turning innovative ideas into market-leading products demand flexible business processes supported by integrated engineering solutions. Internally and throughout your value chain, our solutions serve to enable innovation by bringing people and processes together and providing them with the resources they need to design, construct, operate and maintain the plants. With centralized, 3D-based repository plant lifecycle information available throughout the enterprise, stakeholders can plan, operate and perform changes to the plant functions more easily and with less financial repercussions.

We have helped owners and operators, EPCs, services providers, suppliers and contractors across the PP&P spectrum - ranging from chemicals, mining, oil & gas, metals, to paper, power and utilities - become information-based, flexible and profitable organizations that deliver and own outstanding plants and structures.

Take on a new, innovative approach to plant lifecycle management!

Here are the benefits brought by our solutions:

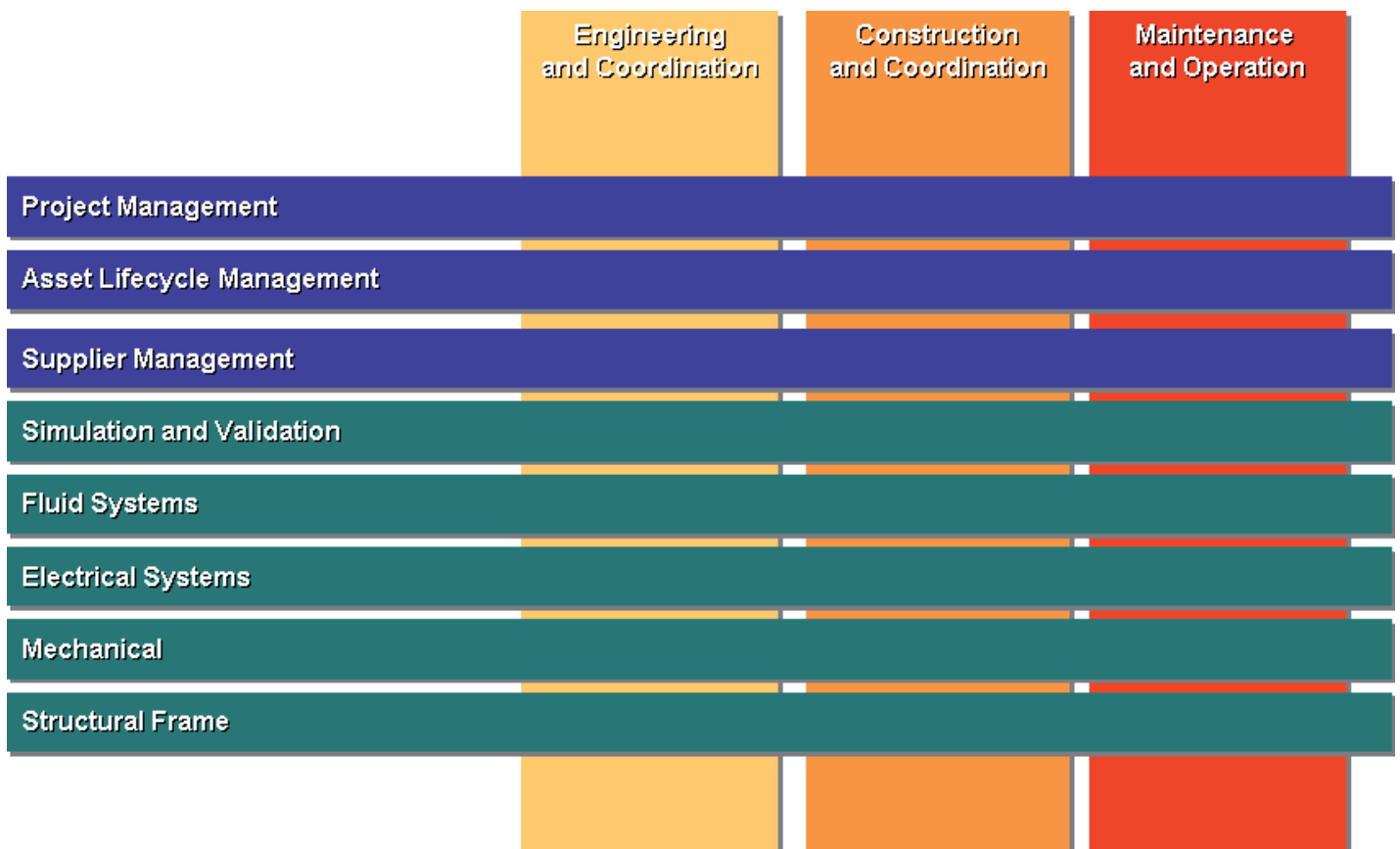
- Accurately assess initial requirements before committing to capital equipment orders.
- Efficiently balance owner requirements with best practices and regulatory compliance.
- Perform as much design work and simulation as early as possible – ideally before bidding for a project – to ensure the plant can be built profitably at the price quoted.
- Better project execution with real-time information that is updated automatically through links to business processes, tasks, documents, deliverables and other data sources.
- Design and engineer multi-disciplinary components – from structure to electrical and fluid systems – to ensure that the plant is built right the first time.
- Virtually plan how plants and structures will be constructed to minimize costly rework.
- Optimize operation and maintenance processes to reduce downtime and deliver long term profits to the owners.
- Ensure compliance to regulatory and safety standards
- Maximize design and knowledge reuse from one successful project to another.
- Manage complexity, including sophisticated plant systems, and the interdependent work of engineering consultants, suppliers and the construction sites.
- Give visibility of evolving design and changing requirements to all stakeholders during new or retrofitting projects.
- Provide owners and operators a primary repository to all plant information and the processes that govern them throughout their lifecycle.



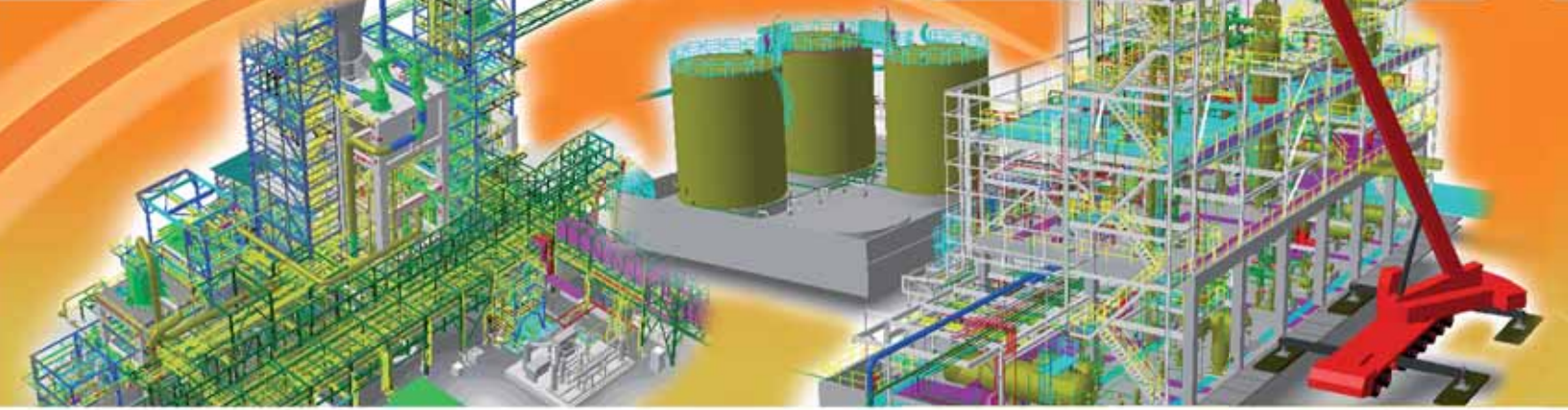
## Fuel Innovation! Spark Collaboration with Integrated Solutions!

Dassault Systèmes PP&P PLM solutions are a suite of applications, services, and industry proven methodologies that address the unique needs of the Process, Power & Petroleum industries. Our solutions are built upon a set of integrated design, engineering, manufacturing, and business process management applications (\*) that are based on a common architecture.

Each solution can be purchased and implemented individually to solve specific engineering or business challenges. Together, these complete set of advanced, industry specific solutions help you manage your entire product lifecycle, from concept to decommissioning, taking you from one successful project to another.



(\*) Dassault Systèmes industry solutions leverage the strengths of our brands (CATIA for designing the virtual product, SIMULIA for virtual testing, DELMIA for virtual production, ENOVIA for collaboration and business process management, and 3DVIA for customer experience) and can be complemented by specific offerings from our partners.



## Engineering and Coordination

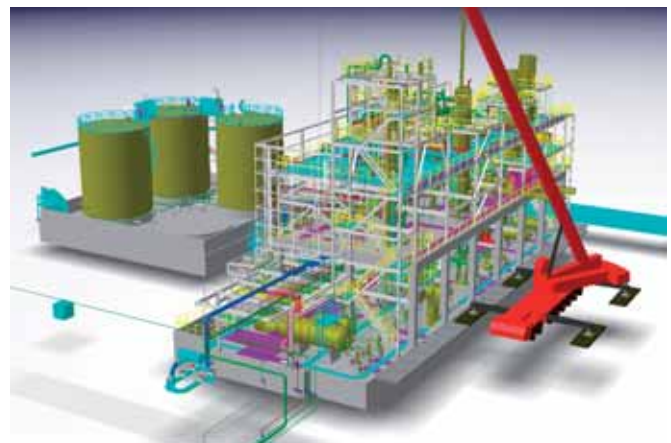
Plant engineering is a highly collaborative and cross-discipline effort. Coordinating plant engineering across stakeholders is a daunting task as pressure increases to meet more complex design requirements. Ongoing engineering changes – especially in cases where there are multiple configurations involved – make it difficult to keep bills of materials (BOMs) and other product data accurate and synchronized across the enterprise and the product lifecycle.

EPCs, suppliers, and regulatory groups are turning to DS to handle both engineering and the coordination tasks associated with it. These tasks begin with early project specifications and extend through to initial construction planning. DS PLM provides a single repository for all data, from product specification to manufacturing requirements, in order that data can be securely accessed in real-time across the enterprise. Project data coming from various disciplines – mechanical, fluid, electrical, concrete and steel structure, etc. – are captured within a unified product definition for rapid access, concurrent engineering, and design validation.

DS PLM configuration management capability, advanced through intense research and development activities in various complex manufacturing industries, enables companies to manage design options for a single plant or reuse design across projects. Coupled with workflow and shared catalogs, changes specific to a configuration or across projects can be rapidly communicated to related stakeholders. In contrast to traditional PDM systems, in-work product structures, digital mockups and Engineering BOMs can be made available to construction planner or customers before a design release, providing valuable early insights to on-going project development and giving construction planning a head start.

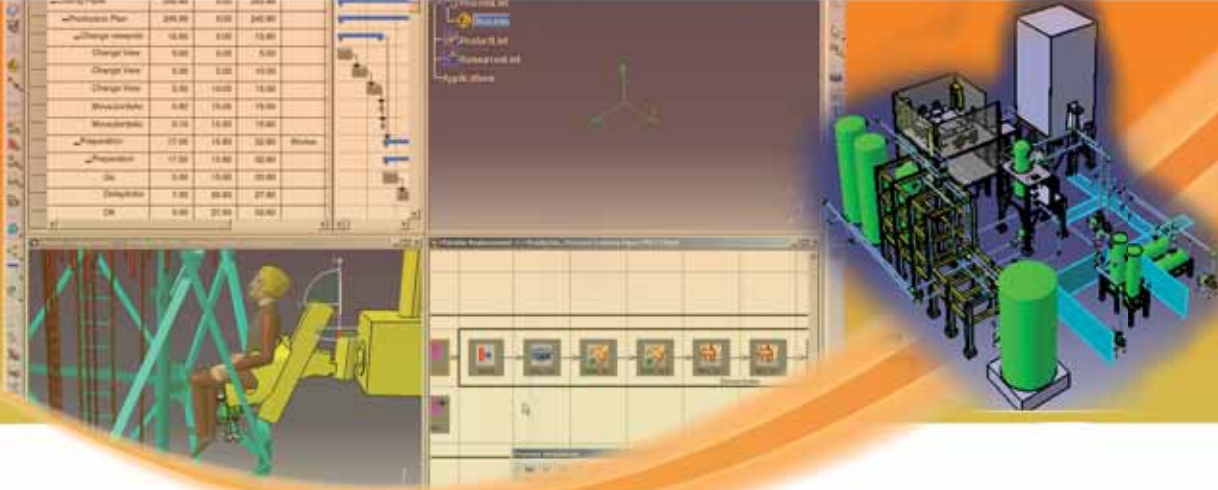
PP&P Engineering and Coordination solution also includes functionality developed especially to meet the unique needs of PP&P industries. For example, there is a function that automatically identifies clashes in the plant design, which can be solved as penetrations for routing piping, HVAC or electrical cableways. This advanced type of clash detection offers a flexible way of automating cross-discipline engineering and eliminates last minute errors that so often seem to occur with paper-based or disparate systems.

As customers bring in teams from multiple organizations, there is usually a need to accommodate multiple CAD systems. Multi-CAD support is built into our solutions so that teams can freely review and exchange data while tracking changes and configurations across multiple CAD systems. These functions are available to a broad range of mechanical CAD systems including CATIA, PTC, UGS, and Autodesk, as well as plant design solutions from Intergraph, AVEVA and Bentley.



### PP&P Engineering and Coordination solution includes:

- Design change and configuration management
- Engineering BOMs
- User, team, and organization information flow
- Workflow management
- Product structure and work breakdown
- Penetration and clash management
- Digital mockup review
- Multi-site collaboration
- Multi-CAD management
- Catalog management



## Construction and Coordination

In an industry where 80% of projects experience tremendous cost overruns and schedule delays, EPCs are more focused than ever in managing construction costs and schedules. A typical construction or retrofitting project involves innumerable elements that must stringently coordinated and executed in order to complete a project on time and within budget. Whether the construction is for a new site or upgrading an existing facility with on-going operations, interconnected activities must be carefully planned to reach the optimum, safest sequence and with minimum downtime.

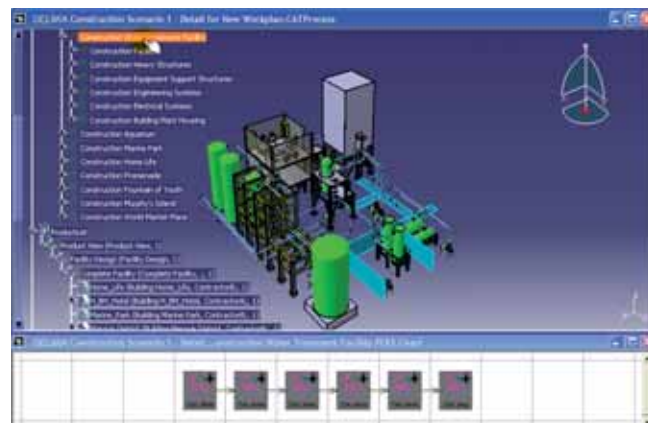
EPCs rely on DS fully integrated PLM environment that supports design-to-construction approach in order that both design and construction processes can be optimized concurrently and in ways that would best utilize available resources. DS PLM virtual construction portfolio offers extensive capabilities unmatched in the industry. Early and throughout the design process, plant construction planning, scheduling, and sequencing can be virtually defined and simulated to reduce the occurrence of construction-delaying problems that typically arise when the structural systems and large equipment are ready to be placed.

This solution includes scheduling integration with tools such as Primavera and MS Project, equipment placement, human simulations including aspects of vision, display and motion as well as feasibility studies of remotely operated devices. In addition, material handing and flow to the site or storage and spending curve analysis on material and resources can be studied ahead of time to minimize project risks. As all components are included in the planning, initial requirements, costs, and construction time can be estimated quite accurately prior to capital orders.

DS PLM environment maintains the relationships between design data and construction data. This helps EPCs track late changes, identify parts that may be impacted by design changes and study the impact of the changes on construction. This integrated PLM environment gives EPCs the information they need to predict the cost of changes in dollars and time so that they can decide whether or not to renegotiate the terms of the contract.

Although interconnected and change controlled, the construction and maintenance structures and sequences can be rearranged independent of the design structure, providing full flexibility to support an EPC's preferred organization for construction. Since changes are inevitable in the real world, DS PLM offers functionality to rapidly assess different alternatives to the construction process and 'build-around' so that the revised plan will be as smooth and efficient as possible.

Upon completion of the design and virtual construction, plant design, plan details and specification data are transferred to the workers in form of easy to follow instructions that includes 3D replay of the sequence to help minimize errors and trainings.



### PP&P Construction and Coordination solution includes:

- Work and process flow
- Construction planning and scheduling
- Construction work instructions, documentations and simulation
- Construction simulation
- In-process product modeling
- Human simulations
- Manufacturing BOMs
- Process equipment and layout optimization



## Maintenance and Operation

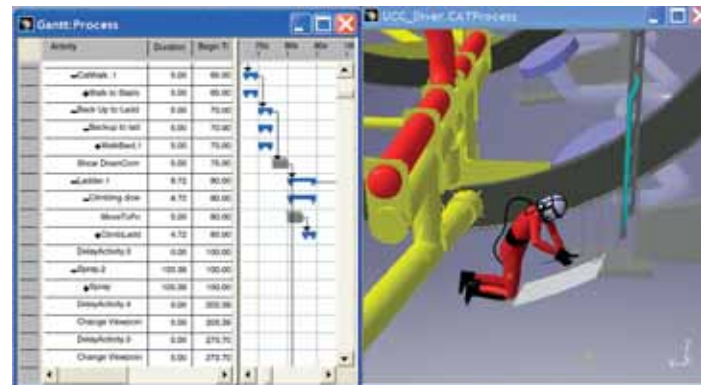
In an industry where \$15.8 billion is lost every year due to operational inefficiency and shutdowns costing anywhere between \$1 million to \$5 million a day, informed users realize that total lifetime ownership costs is as important as the initial price paid. With trillions of dollars worth of assets in the field and having just one plant, generator or oil rig out of service for a few days can have tremendous impact on volatile profits. Owners/operators in diverse industries, from chemicals, mining, metals, oil and gas to paper, power and utilities must be able to conduct maintenance in as short period of time as possible and they are pressuring the EPCs to deliver plant designed with this goal in mind.

In DS fully integrated PLM environment, operational and maintenance processes of a plant are optimized early during plant design development. Engineers can leverage safety rules and environmental protection requirements that have been entered in the system to ensure that plan operation and maintenance sequences are safe for the workers and protect the public from potential hazards. This solution includes human simulations including aspects such as vision, display and motion as well as feasibility studies of remotely operated devices. As components and the human aspects are included in the planning, operational and maintenance sequences can be optimized for safety, time and costs.

The process of virtually defining a plant captures and produces records of tremendous value to owners and operators, including original system specifications, classification society documents, equipment attributes and machinery arrangements. This data, when maintained along with the repair records, technical documents, and maintenance and operations records, is a vital asset.

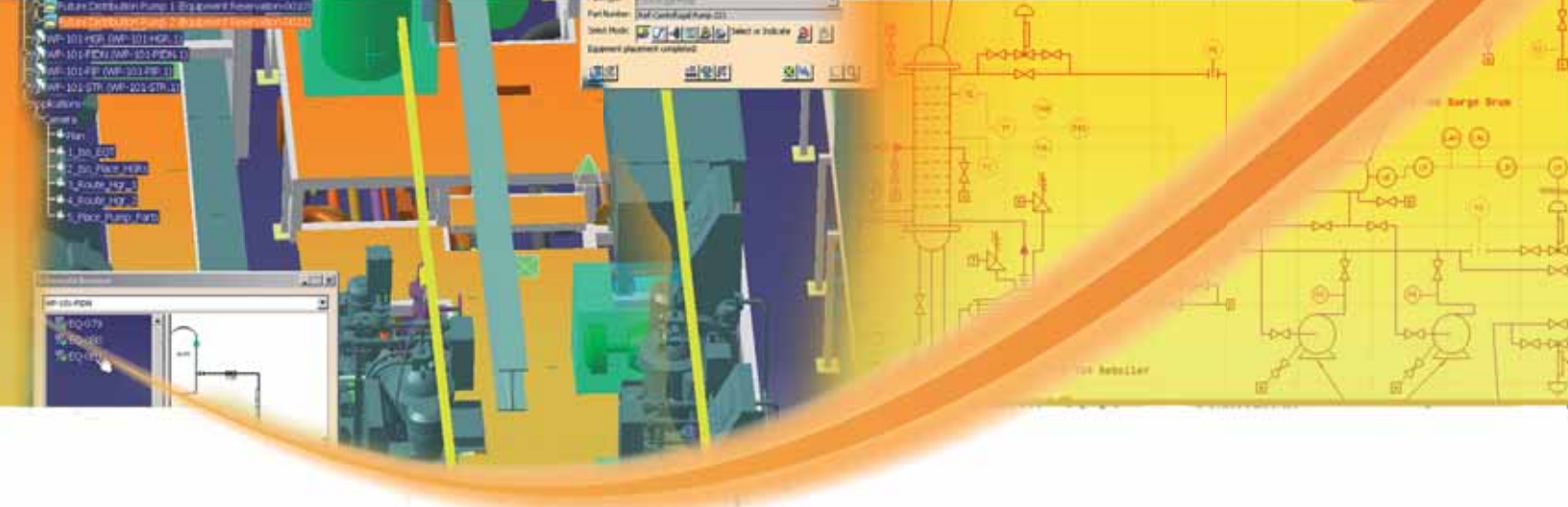
The benefit of maintaining and re-using this information throughout the lifecycle of the plant is obvious. DS PLM therefore offers EPCs an opportunity to extend their current business by offering owners and operators well-defined data for use in ongoing operations. In operating a complex plant, many well documented processes must be executed to satisfy different organizations, from safety to security to maintenance operations such as equipment overhaul or replacement.

DS PLM environment has the ability to store and manage both processes and best practices for reuse in future plants and to simulate these processes to optimize operation of the plants. By re-using the product structure template to organize the data set, the information becomes accessible to operations personnel. Databases can then be replicated and shared and new information can be added to support operational requirements. In cases where new and unproven tasks must be conducted, for example, digital mockup and simulation can be of great value in planning and testing different alternatives.



### PP&P Maintenance and Operation solution includes:

- Systems diagrams, including Piping and Instrument Diagrams (PID), schematics and electrical one-line-diagrams
- Operations and maintenance simulations
- Hazard and safety assessment
- Shutdown and turnaround planning
- Equipment and systems inventories
- Equipment replacement
- Engineering document and specifications management



## Project Management

Delivering a complex plant such as a nuclear generator, oil refinery, offshore platform or other complex plants need a strong backbone to ensure consistency along the development and construction time. EPCs, owners and operators must know how to manage complex collaboration involving internal and external teams of prospects, customers, suppliers and partners from the onset of the project to commissioning so that the plant is constructed with superior quality, on time and on budget.

Owners/operators and its value chain can concentrate critical resources on the most profitable projects while standardizing on business processes across the extended enterprise. PP&P Project Management solution provides project pipeline dashboards management that gives real-time visibility into a project's status in terms of schedule, resources, process and costs. This collaborative project management solution dramatically increases the productivity of globally distributed users by executing projects and programs with real-time information that is updated automatically through direct links to business processes, tasks, documents, deliverables and other data sources.

Our robust requirement management capabilities promote collaboration between project managers and technical teams while capturing and processing the voice of customer, coupled with regulatory compliance requirements. Based on the list of candidate requirements, engineering can establish a proposed list of features which represents the customer's view of the product capabilities prior to the availability of the actual technical solution.

This solution enables companies to optimize staffing plans with real-time utilization reports to assess availability of key skills across all projects and drive a phased-base decision making process using best-in-class process templates with predefined phases, gates and milestones. With the increase of product development complexity combined with a more widely distributed product development team has fueled the demand for solutions that will help companies in their transition from traditional linear processes to solutions that support parallel development. Advances in data collection, collaboration,



and analysis tools allow teams to work together and share information more effectively.

As in any product with a long life cycle, sometime there is a need to add or change plant functions after it has been commissioned. This solution can help you with major retrofitting projects as well as new projects

### PP&P Project Management solution includes:

- Requirement Management
- Project template management
- Project content management
- Project work breakdown structure
- Project resource management
- Project planning and scheduling
- Project dashboard
- Business/ROI analysis



## Asset Lifecycle Management

A plant is a large and complex system of mechanical equipment piping, instrumentation and process automation, electrical supply, steel structures and civil engineering. Many disciplines of engineers, and a multitude of experts in finance, purchasing, equipment supply, as well as operating and maintenance workers, work in various ways to create and use information relating to a plant. Plant physical assets are extremely valuable and so is all the information relating to the plant that owners and operators need for operation and maintenance. Within the life cycle, plants may undergo revamps to accommodate changed formulations, new products or processes, or just to extend the operational life of the plant.

The cost of transferring information for a major facility from the commissioning to the operations phase can cost millions. PP&P Asset Lifecycle Management solution is intended to provide the primary repository to an organization's information and the application used by all people working within teams to manage information and the processes that govern them throughout their lifecycle. Dassault Systemes PLM system stores information and relationships about plant information and to manage associated processes throughout the enterprise. Users may find new assignments, comments and markups on their work, approval and disapproval from reviewers and files from teammates. It is a source of information about the state of the organization's products or assets and processes that can be explored graphically.

We provide a technology to enable people to gain control over information, cut tedious administration, work more effectively and cope better in the highly competitive jungle. While many design-oriented companies initially feel their need is to manage all the documents and the entire set of CAD they create, we provide a system to manage data for use in the whole plant life cycle that includes operation and maintenance, rather than documents for the construction phase alone. A major competitive strength of our solution is that it is a flexible PLM system that can be customized to meet many customer requirements and is easily changed and updated when needed. The information may have been created using many different software tools that generate files, such as CAD, analysis and office tools.



### PP&P Asset Lifecycle Management solution includes:

- Data vault and document management
- Workflow and process management
- Operation scheduling
- Operation work instructions and documentation
- Operation simulation (equipment and human)
- Systems diagrams, including Piping and Instrument Diagrams (PID), schematics and electrical one-line-diagrams
- Hazard and safety assessment
- Shutdown and turnaround planning
- Equipment and systems inventories
- Equipment replacement
- Engineering document and specifications management
- Bill of Materials





## Supplier Management

Across the PP&P industry, the percentage of value created in supply chain continues to increase. Globalization of design and construction calls for a product development platform that can handle the complexity of a globally dispersed ecosystem. With direct materials and engineered goods representing more and more of an organization's spending, engaging value-chain members early in the process will bring the greatest benefits.

PP&P Supplier Relationship Management solution is designed to cover the entire spectrum of managing a plant development sourcing ecosystem. This includes understanding the business drivers that can differentiate utilities & power, oil & gas and process plants.

With our solution, engineers and quality managers can give their suppliers real-time access to relevant project information, making them an integral part of the early design collaboration, quality management and supplier execution processes. The suppliers are assigned responsibilities related to specific parts, allowing multiple suppliers to work together on the same assembly with differing visibility and access. Part quality plans can be assigned at the same time, ensuring the suppliers follow standardized improvement and planning methodologies and best practices.

Supplier performance is tracked through supplier scorecards comprised of report metrics on Key Performance Indicators (KPIs) from plants, certifications and supplier capabilities. As a result, development plans can be devised together with the suppliers to maximize the value of strategic relationships. This enables the ability to perform continuous improvement to processes and hand-offs between OEMs and key supply chain stakeholders.

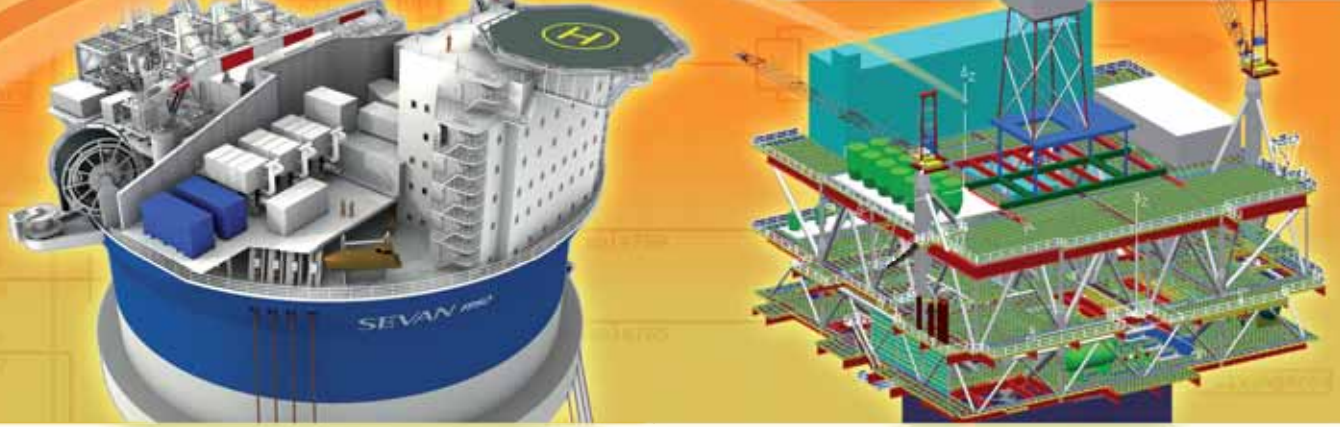
Organizations can reduce operational costs and improve profit margins by leveraging bill of material and other related data to build standard request-for quotes (RFQs) and quote responses for complex products and as well as off-the-shelf components. We help companies streamline sourcing and product cycles through improved supplier communication, resulting in reduced supplier bid



response time and improved bid accuracy. Suppliers can submit ECRs (Engineering Change Requests) and collaborate with different functional groups early and throughout the product lifecycle allowing companies to reduce development costs and accelerate time-to-market.

### **PP&P Supplier Relationship Management solution includes:**

- Supplier management
- Supplier qualification and ranking
- Supplier capabilities management
- Supplier spend management
- Supplier process collaboration
- E-RFx & bidding
- IP management
- Engineering package exchange



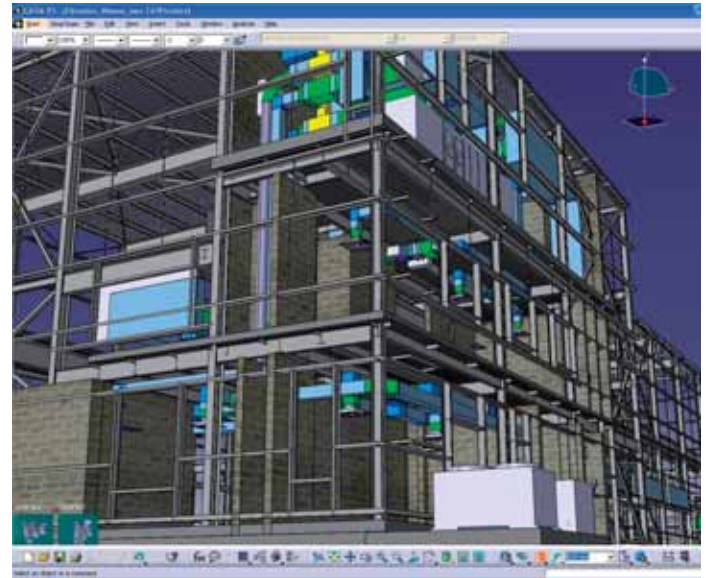
## Structural Frame

Plants typically involve large and heavy equipment and their structures must often be built around this. This particularly applies to projects in the oil and gas, nuclear, mining, hydroelectric and pharmaceutical industries. Plant structure and the coordination of construction with plant equipment is one of the most important considerations in plant design. Unlike generic CAD solutions, the PP&P Structural Frame solution from DS has been developed in cooperation with leading EPCs. This ensures that applications follow professional practice and meet the requirements of EPCs and classification societies.

PP&P Structural Frame solution provides intelligent templates that allow the designers to capture and re-use knowledge and design intent to greatly reduce the time required for design. This solution supports a smooth transition from general arrangement (the output of the project development phase) to the basic design or class design, where rules and strength calculation are required. FEM analysis can be carried out either by CATIA or through interoperability with commercially available solvers such as MSC-Nastran, ANSYS, or GTSTRUDL.

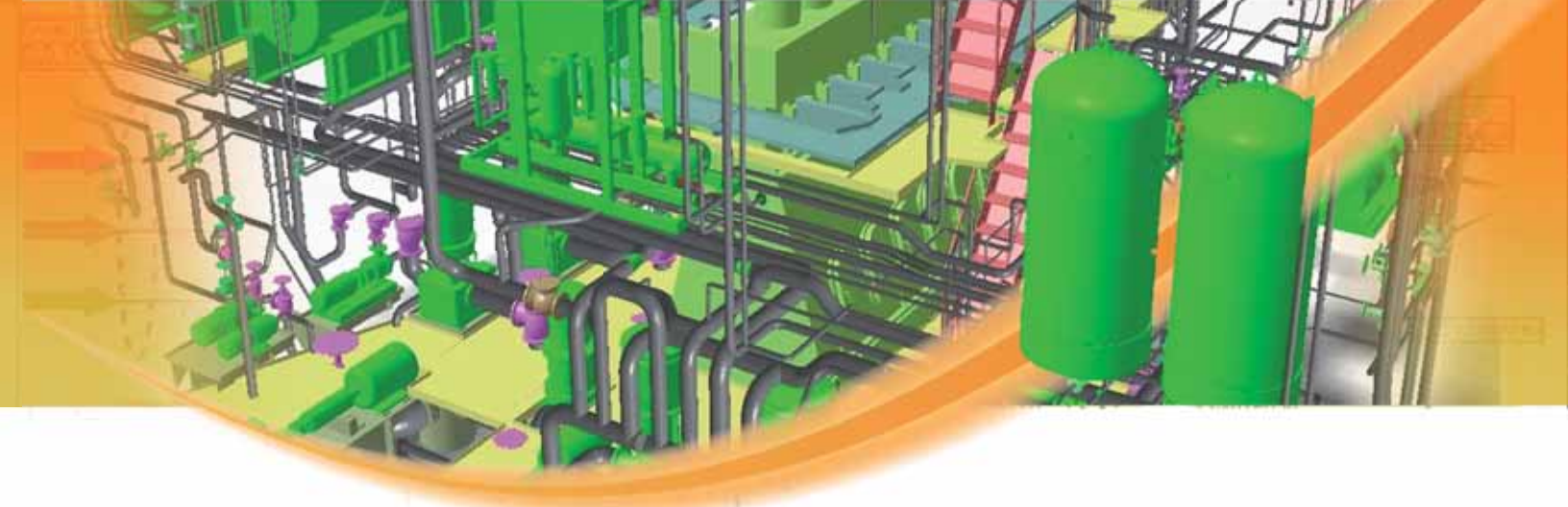
We provide knowledge templates to automate many difficult cases while maintaining all project specifications. As not all structural details are standard, this solution provides efficient interactive tools to create individual details that still carry the full spec-driven implementation. Copy and paste interactions allow for reusing of existing design components to rapidly complete the detailing.

During the detailing stage, additional data is produced to represent the different stages of each part. These stages can include variables such as special plate profile or beam cutting. For non-traditional steel work, an interface to ALMA is provided where nesting and specialty plate steel cutting can be performed.



### PP&P Structural Frame solution includes:

- General steel frame layout and zone-split
- Structural foundation and secondary structure
- Steel frame structure detailed design
- Offshore structure functional and detailed design
- Special section structure lofting, including template creation
- DPM for construction assembly simulation
- ALMA integration for nesting and steel cutting



## Fluid Systems

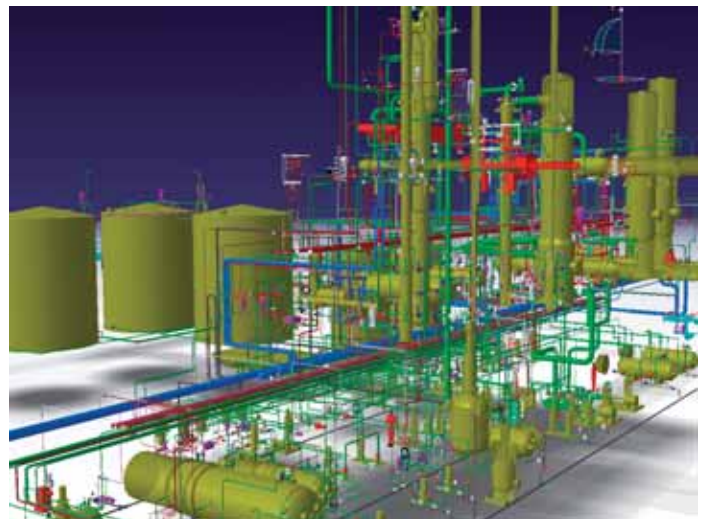
The PP&P Fluid Systems solution provides a full complement of traditional piping and HVAC design functions. System diagrams provide logical process definitions and convey specifications for both piping and HVAC routing. The software allows users to define connections across disciplines. These connections can be analyzed and tracked within the PLM environment, which facilitates tracking of design modifications.

Moving from the basic design, where the main layout is decided, the solution allows the re-use of the zone-split schema. Originally defined for plant structure breakdown, the zone schema is used at this stage to decide how piping and other system should be spooled, which improves construction planning by associating system components and BOMs with particular zones of the plant.

Because the basic design is organized in a single view of zone assemblies, detailing is highly automated and takes advantage of the knowledge defined and saved in the specification catalogs. In addition, logical diagrams and design rules help automate parts placement and catalog component selection. This allows designers to spend more time on optimal layouts and reuse practices proven successful on previous projects.

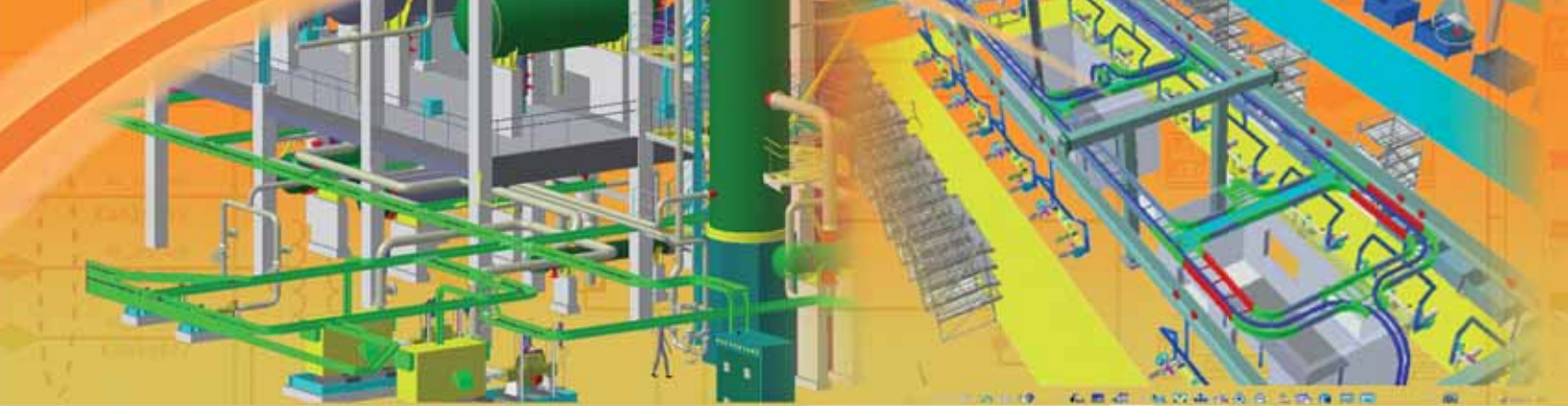
Detailed design activities are actually preparation for construction because critical manufacturing data for pipe bending and flanging is being captured. DS PLM can also interface with standard isometric diagramming applications, like ISOGEN from Alias.

All plant process systems follow the same logical breakdown structure as the plant's structural zone plan. This benefits users because final plant construction sequences that apply to the zone also apply to process systems. More detailed processes, such as pipe bend simulation, can be conducted to verify whether a given spool can be manufactured or whether adjustment are required before part manufacturing will become practical.



### PP&P Fluid Systems solution includes:

- Piping and instrumentation diagram
- HVAC diagrams
- 3D functional design
- Piping detailed design
- Piping manufacturing extraction (spool drawing)
- HVAC detailed design
- HVAC manufacturing drawing extraction
- Support and hangers design



## Electrical Systems

DS delivers a unique solution to address the complex electrical design requirements of today's plants. Capabilities range from simple diagrams to major cable pulls. Depending on the design strategy used by the EPCs, DS supports designs that use ladders and cable trays, as well as direct routing through hangers when space is limited.

Leveraging the integration with EDSA electrical simulation application from EDSA Micro Corp., this solution allows electrical designers to simulate short circuits and manage load capacities. By using its network of diagrams, users can manage and route very large network of cables using a dedicated cable database implementation. Cables are routed as the realization of the logical design in the diagram, taking the pathway of 3D hanger layout into account. The ability to maintain the cable data in the same PLM environment as the rest of the design data provides unique integration.

To support construction by zones, trays and hangers can be structured within the same assembly structure as the rest of the physical parts. This enables higher level of supplier coordination, component delivery and palatising ready for installation. For actual cable pulls, cable lists can be produced from the PLM environment to support the work instructions.

### PP&P Electrical Systems solution includes:

- Electrical diagram
- 3D cableway layout
- Detailed design with ladder, trays or hangers
- Cable and wire routing
- DPM assembly
- Work instruction extraction (cable lists)
- Power distribution, simulation, load analysis and outage analysis





## Mechanical

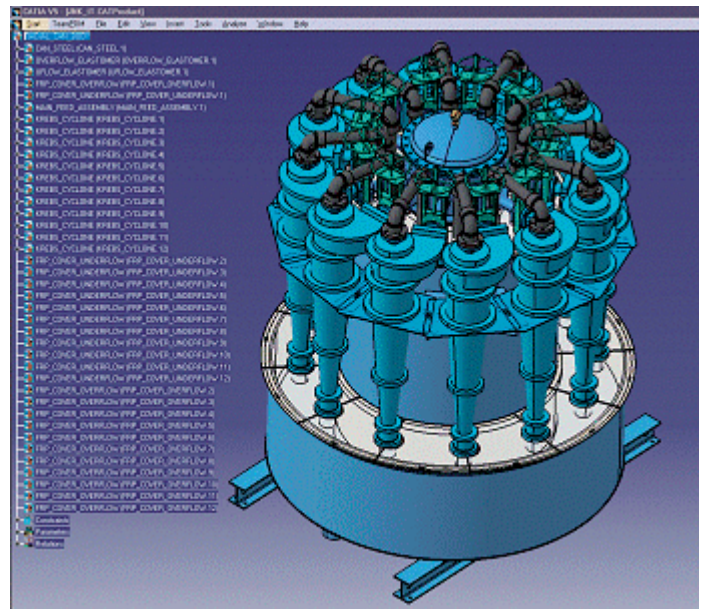
As the demand for flexibility in engineering continues to rise, the need for mechanical CAD in the design of plants and offshore facilities is increasing. Due largely to its strong history in industries such as automotive and industrial products, DS supports a large range of CAD translators and industry exchange standards, including STEP and IGES. This makes design re-use easier than if the software had been designed exclusively for plant design and offshore industries.

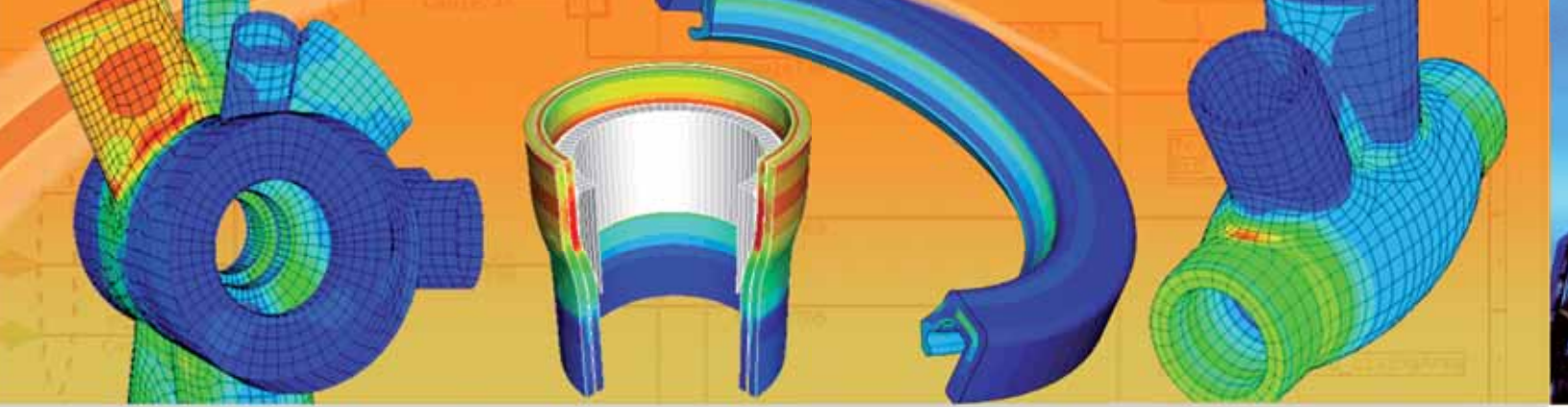
Some EPCs have the need to design and construct not only the plant, but some of the equipment used within the plant. For those EPCs, the benefit of DS PLM is especially high, as they can design multiple products while supporting only one global PLM environment. This reduces the cost of maintaining and operating the system, as well as training costs as engineers need to learn just one user interface and toolset, regardless of the discipline.

In mechanical design, where forged and machined parts must be produced, DS PLM manages manufacturing processes, including workflow, equipment optimization, stock management and NC programming.

### PP&P Mechanical solution includes:

- 2D layout for 3D designers
- Assembly and part design
- Surface and shape modeling
- Sheet metal design and production
- Composite design and production
- DPM machining, NC milling and lathe machining
- Manufacturing drawing generation





## Simulation and Validation

Organizations in the Process, Power & Petroleum industry must address tough challenges, such the need to meet stringent environmental and safety requirements and accurately simulate large structures and component parts that are subjected to myriad stress and wear scenarios. The effects of severe wind, water, radiation, and earthquake loads are critical to predict accurately.

PP&P Simulation and Validation solution, based on the Abaqus Unified FEA product suite and Multiphysics capabilities from our SIMULIA brand, enables you to accurately predict complex real-world behavior. This includes strength and deformation in large structures and equipment in linear and nonlinear analyses, the impact of thermal loads, vibrations, and degradation due to corrosion, and how fluids, gasses, and structures interact. Our industry-leading modeling and visualization software coupled with our sophisticated analysis solvers provide a complete and reliable solution for the PP&P industry.

Accurate structural analysis is imperative to ensure the safe and economical design of offshore structures, which need to withstand heavy loads from fluid currents, waves, wind, and earthquakes. The interaction of risers and pipelines with their foundations and underlying soil also warrants serious consideration. A range of material models along with special contact and loading conditions are required. Engineers must also perform fully nonlinear large displacement dynamic analyses to include time-dependent loads and structural response.

Our field consulting offices have worked with companies all over the world and have gained extensive experience. We can help you get started with the simulation and can support the implementation of our solution within your organization.

### PP&P Simulation and Validation solution includes:

- A wide range of material models including metal plasticity, soil, creep, geotechnical and concrete damage
- Nonlinear implicit and explicit dynamic analysis
- Inclusion of fluid current and hydrodynamic wave loading



- Pipe-in-pipe and pipe-soil interaction special elements
- Modal and buckling analysis, response spectrum analysis, random response analysis
- Embedded elements and rebars with pre-stress for modeling reinforcement
- Quasi-static analysis capability for modeling creep
- Thermo-mechanical and stress-diffusion analyses
- Sophisticated contact modeling
- Fully coupled stress-diffusion analysis
- Pore pressure cohesive elements for modeling hydraulic fracture
- Adaptive meshing for modeling material erosion



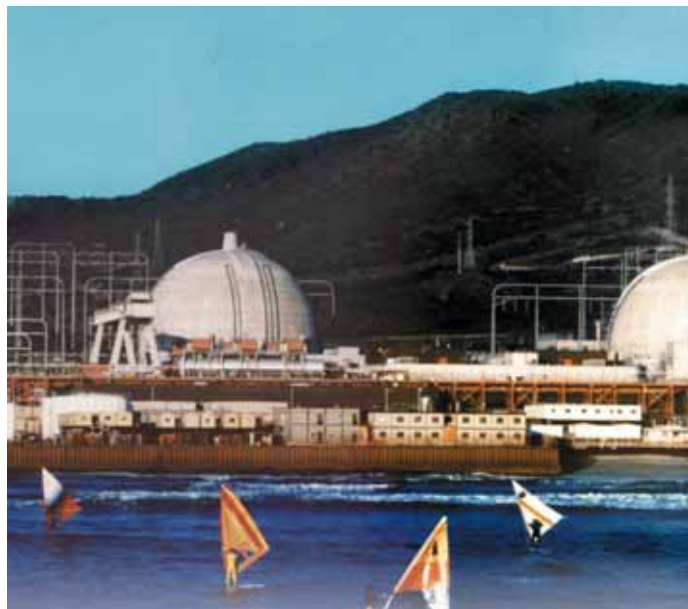
## The Proven, Real World Solution

Customers such as Hydro-Quebec, ITER, Edison International, Yantai Raffles, AREVA, Washington Group and many others are driving their successes by using our solutions. Here are their stories:

At Hydro-Quebec, CATIA V5 and ENOVIA enables enhanced collaboration with partners, and accelerated problem resolution during the project development stage – from analysis and optimization of variants, to engineering validation respecting design intent. Engineers can better integrate data from multiple disciplines, including mechanical equipment, fluid and electrical systems, and concrete and steel structures, in a single development environment. This supports shorter deadlines, enhanced quality and design, and improved cost control.

Yantai Raffles Shipyard cut conceptual design time by almost 70% during an advanced offshore stabilized platform project and met oil industry's toughest challenges. Access to unified, real-time product data allowed Yantai Raffles and their suppliers to collaborate and accelerate decision making. Intuitive, 3D-based instructions increased worker productivity, significantly reducing learning curves and errors. Financial and schedule impact analysis throughout the development and commissioning phases enabled on-time and on budget delivery to a very satisfied customer.

Our solution helps ITER, a joint international research and development project of a safe, cost-effective nuclear fusion device, manage massive amounts of data. The ITER machine alone will be made up of around 10 million parts coming from several hundred global suppliers, who will be able to collaborate efficiently across the development, manufacturing, and assembly phases of the machine. With our solution, data coming from multiple disciplines – mechanical, fluid, electrical, concrete and steel structures, etc. – will be captured within a unified, digital product definition for rapid access and design validation.

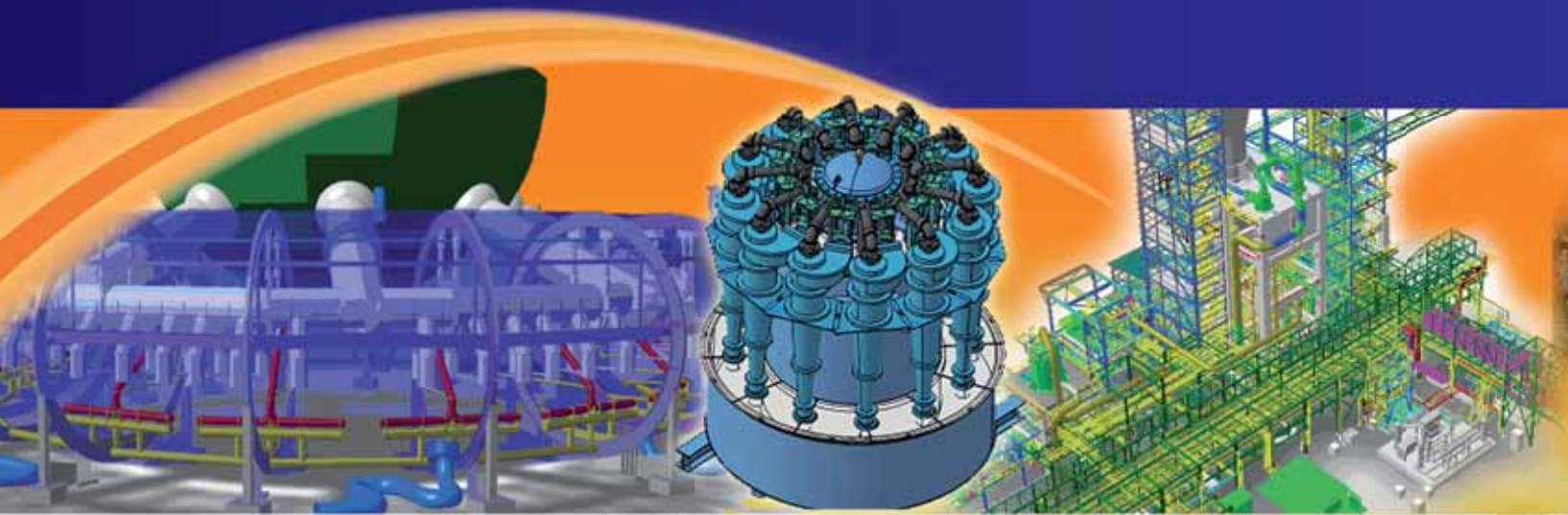


San Onofre Nuclear Generating Station (SONGS) creates and validates requirements and accurately assess proposals by requiring contractors to include 3D simulations in their bid requests. In addition to project planning, SONGS uses 3D models and simulations for training purposes, letting workers “see” the procedures they will perform during an actual project. Lessons learned on each routine task, such as refueling, are captured so that procedures can be studied and the most efficient sequences identified and documented. Our solution enhances SONGS' ability to perform one-of-a-kind projects efficiently, cost-effectively, and most importantly, safely.

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#### About Dassault Systèmes

As a world leader in 3D and Product Lifecycle Management (PLM) solutions, Dassault Systèmes brings value to more than 100,000 customers in 80 countries. A pioneer in the 3D software market since 1981, Dassault Systèmes develops and markets PLM application software and services that support industrial processes and provide a 3D vision of the entire lifecycle of products from conception to maintenance to recycling. The Dassault Systèmes portfolio consists of CATIA for designing the virtual product - SolidWorks for 3D mechanical design - DELMIA for virtual production - SIMULIA for virtual testing - ENOVIA for global collaborative lifecycle management, and 3DVIA for online 3D lifelike experiences. Dassault Systèmes is listed on the Nasdaq (DASTY) and Euronext Paris (#13065, DSY.PA) stock exchanges. For more information, visit <http://www.3ds.com>

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