

MARINE & OFFSHORE



 **INTERGRAPH®**

SmartVoice

Intergraph® Process, Power & Marine
Customer Success Stories

VOLUME 2





INTRODUCTION

Advances and innovations in engineering technology during the last three decades have changed the way people approach their work, the methods and tools they use, the collaborative partnerships they develop, and the solutions they employ to ensure the success of their businesses.

With more than 40 years' history, Intergraph has been helping customers around the world to improve safety, quality, and productivity in their process, power, marine, and offshore facilities. Today, our advanced technology is helping customers change the way they do business by offering solutions that enable them to capture and reuse their intellectual capital across the entire enterprise, enhancing their global competitiveness.

In SmartVoice, you will learn how our customers of all sizes and in all industries are transforming their businesses with Intergraph solutions. Intergraph empowers you to make better, faster operational decisions, leverage best practices from around the world, and explore how other customers are generating more value with Intergraph products and services.



GLOBAL LEADER

Intergraph’s Process, Power & Marine division creates solutions that enable the design, construction, and operation of process and power plants, offshore platforms, and ships, and provide the information management capabilities to build and operate those facilities.

Intergraph has been ranked the No. 1 overall worldwide provider of engineering design solutions for industry, according to the ARC Advisory Group. Our leadership position is backed by a proven track record of high-quality product development, a global customer base of industry leaders, and a worldwide sales and support network. Intergraph Process, Power & Marine’s business is based on a strong financial foundation and steady growth.

Our customers use Intergraph software and services to design, build, and operate many of the world’s largest and most elaborate industrial facilities.

“More than two-thirds of the plants built worldwide are designed using Intergraph software.”

HISTORY OF EXCELLENCE

Since offering its first solution for plant design in 1978, Intergraph has focused on developing industry-leading plant and marine design solutions, enabling our customers to use integrated applications to execute projects for increased efficiency and effectiveness. Today, Intergraph is the leading global provider of enterprise engineering software to the process, power, and marine industries. We offer a full suite of solutions that enable proven productivity gains for engineering, procurement, and construction (EPC) firms and owner operators, improving engineering efficiency by up to 30 percent.

1987	Offered our first piping application for plant design.
1984	Launched the leading 3D plant design system.
Late 1990s	Created first data and document management system specifically for the plant design industry.
2000s	Presented suite of integrated, intelligent 2D solutions. Offered leading material management and procurement system specifically for the plant design industry.
Today	Providing the only next-generation 3D solutions for process, power, and marine industries.

INTERGRAPH ENTERPRISE ENGINEERING COMPONENTS

3D MODELING & VISUALIZATION

Save project time and increase production efficiency

For manufacturing and power industries, meeting higher production goals and stricter regulatory requirements begins with building a better plant. Intergraph provides an integrated design environment for plant construction that defines and manages the 3D plant model. The intelligent, rule-based 3D environment enables faster, silo-free plant design and engineering, better collaboration, and reduced time to market. Innovative plant modeling software from Intergraph provides consistent 2D/3D integration between process engineering and detailed engineering disciplines, and true workflow-managed integration across the project enterprise.

INFORMATION MANAGEMENT

Ensure consistency and accuracy of your engineering data

Plant designers and plant owners need plant management software with enhanced decision support capabilities to facilitate global design, production, and life cycle optimization of the plant. Intergraph's information management software maximizes efficiency for industrial and manufacturing plant maintenance and provides plant operation solutions. From concept and design through plant maintenance, operations, and decommissioning, Intergraph enables electronic management of all of the plant's engineering information, integrating information on the physical asset, processes, and regulatory and safety imperatives.

ENGINEERING & SCHEMATICS

Increase data quality and consistency across tasks

To keep a plant operating smoothly over its 30- to 40-year life requires efficient and intelligent plant engineering from the beginning. Intergraph's comprehensive plant engineering solution has been developed for today's 24/7 global engineering workshare environment. All engineering disciplines are intelligent and fully integrated — an engineering change in one area automatically triggers change in all associated objects, no matter where the change occurs. Designed to drive plant optimization, the rule-driven environment prevents engineering errors, thus avoiding shutdowns and lost production.

PROCUREMENT, FABRICATION & CONSTRUCTION

Reduce material surpluses and shortages

With Intergraph's efficient and accurate plant control system for procurement, fabrication, and construction, plant designers and owners save valuable production time during plant construction. The solution spans the complete project management life cycle — from materials specification and change management through procurement and tracking to inventories, forecast, and material issuing. Intergraph lowers labor costs throughout engineering, procurement, and plant construction. Designed to drive efficiency, our solutions for plant project management can help avoid costly material surpluses and shortages, and reduce overall project risk.

ANALYSIS

Streamline your plant design validation processes

For plant owners and designers, the need to integrate plant design and engineering analysis is vital. One without the other could result in delays and unexpected costs. But with the two working together, you have the ability to validate your plant's design as you go, saving you costly time and resources.

With Intergraph's acquisition of COADE, we now provide plant analysis solutions that set the standard for the industry. Leading plant engineering companies and owner operators worldwide count on our software to deliver accurate, reliable results. Intergraph has transformed primarily manual, time-consuming, and error-prone tasks into seamless and accurate processes. From pipe stress analysis to automated full vessel and oil tank analysis, our software helps you improve safety and reliability while tightening the entire design process to save time and money.





MARINE & OFFSHORE

Design, construction, operation, and data management of marine and offshore facilities, and ships

Marine, shipbuilding, and offshore engineering must deal with many obstacles: physical space constraints, extreme weather conditions, deep water, and remote locations. These constraints create an extreme environment for the engineer to develop a sound, reliable, and safe operating platform. Integration of hull and plant designs is another difficulty for the engineer to overcome. After a marine, offshore, and shipbuilding facility is turned over to operations, the challenges do not become any easier. Maintaining and operating in a safe environment with access to accurate and reliable data to make informed decisions is critical to improving uptime.

Intelligent Information Management Drives Better Decision-making

CNOOC launches its sophisticated EDIS project with SmartPlant Foundation

China National Offshore Oil Corporation (CNOOC) was established in 1982, and today it is the largest offshore oil and gas producer in China. It is one of the top 50 global oil companies, as well as a Fortune Global 500 company.

CNOOC has evolved from an upstream company into an integrated energy company, possessing high-performance core business and other related businesses along the value chain.

DEDICATED PROJECT

CNOOC identified its need to establish an information management system that could support the entire project life cycle.

In response, CNOOC set up the Engineering Digital Information System (EDIS) project to implement a sophisticated information management system across all the company's business units.

This system would be deployed enterprise-wide to support the construction and management of new oil fields.

The company determined that Intergraph SmartPlant Foundation is one of the most advanced and technically superior solutions available in the market. Using SmartPlant Foundation as the basis

of EDIS, CNOOC is able to manage the engineering information of its offshore platforms and oil fields. It provides the company with accurate information downstream, promoting effective management optimization of the supply chain. This minimizes costly shutdown periods and improves the safety of CNOOC's facilities. Regulatory compliance with both local and international standards will also be easier to achieve and maintain.

"To continue advancing our business, we needed a comprehensive information system that can support our projects across the entire life cycle," said Jin Xiaojian, general manager of the Engineering & Construction department at CNOOC. "SmartPlant Foundation is the leading information management solution in the market, giving us full confidence to develop our EDIS project using SmartPlant Foundation."

SmartPlant Foundation is the world's No. 1 standards-based cPLM solution with proven performance in the process, power and marine industries. It has been selected as the information management and integration system of choice by more than 500 customers, including EPC companies and owner operators worldwide in projects both large and small. SmartPlant Foundation has the broadest solution footprint in the industry with capabilities that span the entire project

“To continue advancing our business, we needed a comprehensive information system that can support our projects across the entire life cycle.”

Jin Xiaojian | General Manager, Engineering & Construction Department | CNOOC

life cycle, ranging from simple document management to configuration management in highly regulated industries. The solution gives CNOOC the ability to manage massively interrelated, interdependent and rapidly evolving data, while ensuring its quality and accuracy.

SOPHISTICATED ENGINEERING PLATFORM

CNOOC developed its EDIS project using SmartPlant Foundation, establishing a sophisticated data center platform with its customized specifications and requirements. The intelligent Intergraph solution has the capability to manage tremendous amounts of data over the lifetime of a project, and is well-suited for challenging, large-scale projects. SmartPlant Foundation enables CNOOC to integrate all data, documents and models that were generated in design, construction and production stages to be linked to its other systems, such as SAP® and FileNet. With full interoperability, all key stakeholders can access accurate engineering data from a single source.

"SmartPlant Foundation enables us to move away from traditional paper-based data and document management," said Jin. "Based on SmartPlant Foundation, EDIS allows us to manage and access intelligent data easily, while also meeting our strict data specifications and reducing inaccuracies from human error."

BUSINESS-DRIVEN TECHNOLOGY

A key element of the CNOOC EDIS project is that it supports the needs of the business across the entire project life cycle. With SmartPlant Foundation's data-centric capabilities and single-source-of-information concept, CNOOC is able to leverage intelligent technology for effective management and implementation of engineering changes according to business requirements. This delivers enhanced safety, improved quality of data and increased productivity and efficiency.

"With an integrated information management system, we can ensure secure access to engineering information of our offshore assets whenever and wherever it is needed," said Jin. "This enables our business units to make critical decisions more quickly and efficiently based on accurate data for significant cost- and time-savings."

CONTINUED SUCCESS

To achieve its long-term strategic goals, CNOOC plans to continually evolve the EDIS project to ensure that it continues to meet its business requirements and drive growth. The company will further enrich the EDIS database so that it can be used by an even broader group of users for enhanced data sharing across additional facilities.

"Intergraph has a highly experienced and knowledgeable SmartPlant Foundation team in China to support our EDIS project, making it a great success," said Jin. "We plan to expand the project in the near future to include the rest of our existing offshore platforms."

ABOUT CNOOC

CNOOC is one of the largest state-owned oil companies. Headquartered in Beijing, the company employs approximately 98,750 people. CNOOC has maintained strong growth momentum, evolving from a pure upstream oil and gas exploration outfit to an integrated group of energy-related companies, with promising primary businesses and a complete industrial chain. The six main business units are oil and gas exploration and development; professional technical services; refining, sales, and fertilizers; natural gas and power generation; financial services; and alternative energy resources.

www.cnooc.com.cn



COOEC Uses SmartPlant Foundation for Information Management of Offshore Projects

Intergraph technology enables an integrated system to manage detailed design and engineering information for effective decision-making



PROFILE

Company: CNOOC Offshore Oil Engineering Company Limited

Website: www.cnoocengineering.com

Description: COOEC is a subsidiary of CNOOC. It is the largest offshore engineering construction enterprise and the only large-scale general contracting company in China integrating offshore oil and gas exploration and production design, onshore production and offshore installation, and commissioning and maintenance. COOEC deals with the exploration of oil and gas fields, the design and construction of auxiliary projects, and offshore installations as its major businesses.

Industry: Offshore

Country: China

PRODUCTS USED

- SmartPlant Foundation

KEY BENEFITS

- Enhanced information management with easy access to high-quality, accurate engineering data
- Improved information sharing between stakeholders and across disciplines
- Effective decision-making for increased safety, quality, and productivity of engineering projects

IDENTIFYING GOALS

CNOOC Offshore Oil Engineering Company Limited (COOEC) is a subsidiary of CNOOC, and provides offshore engineering and construction services to CNOOC and companies all around the world. COOEC specializes in the design, construction, and offshore installation and commissioning of oil and gas fields.

COOEC determined that it needed to improve its information management process. Most of its information sharing was still done manually, which is tedious and unreliable, resulting in data inconsistencies and inaccuracies. A traditional information management method also impeded the efficient sharing of information between disciplines and departments, which could result in a bottleneck and slow down project schedules. This was a critical issue that COOEC needed to address, particularly as it takes on more offshore engineering projects. Such information management inefficiencies needed to be eliminated in order for COOEC to meet its project schedules.

OVERCOMING CHALLENGES

- Eliminate manual information sharing via paper records
- Improve data consistency and accuracy
- Enhance resource coordination and accelerate project schedules

REALIZING RESULTS

After a comprehensive evaluation of all solutions available in the market, COOEC chose Intergraph SmartPlant Foundation. The Chinese offshore engineering company determined that SmartPlant Foundation was the best fit for its requirements, enabling it to establish an information management system to share design and engineering information effectively. COOEC could also then allocate its resources more efficiently, making the overall project management process smoother and more accurate.

SmartPlant Foundation is the leading, standards-based cPLM solution for the process, power, and marine industries, and is applicable for projects both large and small. It has been selected as the information management and integration system of choice by over 500 owner operators and EPC companies worldwide, including COOEC.

SmartPlant Foundation has the broadest solution footprint in the industry with capabilities that span the entire project life cycle, ranging from simple document management to configuration management in highly regulated industries. Its forte is the ability to manage massively interrelated, interdependent, and rapidly evolving data that is the backbone of SmartPlant Enterprise, Intergraph's multi-discipline integrated engineering suite.

Intergraph worked closely with COOEC for the implementation of SmartPlant Foundation, helping to customize the system to meet the company's design engineering project requirements. Based on the workflow processes established in SmartPlant Foundation, COOEC engineers are able to complete the configuration for each design task, which is then recorded in the Intergraph system. This enables an automated and

accurate flow of task information, reflecting the actual progress of the project.

With SmartPlant Foundation as its integrated information management system, COOEC is able to store and share critical engineering information centrally across multiple disciplines. This also provides management and key stakeholders with quick, easy access to accurate information for effective decision-making. Making the right decisions early helps to improve project efficiency and productivity for significant time and cost savings.

SmartPlant Foundation also enables COOEC to manage information from any subcontractors involved in the project. Even if a design has been created offsite, all the engineering information is tracked via the central SmartPlant Foundation system. COOEC is able to supply real-time project information from all disciplines and subcontractors to owners, which is accurate and consistent.

MOVING FORWARD

COOEC is looking to expand the use of SmartPlant Foundation to several new projects. The Intergraph solution has helped COOEC to improve productivity and save costs, and the company wants to maximize the benefits of SmartPlant Foundation by applying the solution across its business operations.



www.cnoocengineering.com



MARINE & OFFSHORE



Det Norske Veritas Succeeds with PV Elite Vessel Modeling and Design Review

Headquartered in Oslo, Norway and with 9,000 employees and 300 offices in over 85 countries, Det Norske Veritas (DNV) is an International Association of Classification Societies organization and one of the world's largest providers of risk management services to the maritime, energy, food and beverage, and healthcare industries. In Brazil, DNV has completed a number of projects for oil giant Petrobras and is the country's leading management systems certification body. The company has also been active in Brazil's shipbuilding industry.

CERTIFYING VESSELS FOR BRAZILIAN TEG PROJECT

DNV has been providing Brazilian companies with gap analysis and technical safety studies to align their safety management systems to meet new code requirements. One project was a 300M triethylene glycol (TEG) facility with 30 pressure vessels that were part of the floating production storage and offloading (FPSO) units for two Brazilian shipyards under construction. The project involved converting the old vessel hull into a FPSO hull. The P-58 shipyard is in Pernambuco in the northeast, and the P-62 shipyard is at Rio Grande do Sul in southern Brazil. DNV's task was to provide design review and approval and certification of all equipment according to the facility's classification requirements.

MEETING TIGHT SCHEDULES WHILE WORKING ON SIMULTANEOUS PROJECTS

Two major challenges on this project were meeting the tight project schedules and working on the two facilities simultaneously. Based on DNV's past successes with Intergraph PV Elite, they decided the software was right for this project. Using manufacturer drawings and calculations, DNV modeled the vessels in PV Elite and then used PV Elite to analyze the equipment according to the ASME VIII Div. 1 code. They performed quality system management audits, welding production tests, visual and dimensional inspections and monitored hydrostatic tests, and their technicians attended all specified verification points during the fabrication.

DEVELOPING ACCURATE DESIGN AND SURVEY VERIFICATION REPORTS WITH PV ELITE

"PV Elite provided accurate design review data necessary which helped us develop reliable and consistent surveyor and approval reports," explained Rafael Silva, mechanical engineer at DNV Brazil. DNV was able to identify mistakes in the manufacturer's models and issue precise comments to address them. "Because the manufacturer had also used PV Elite for its calculations, we were able to deliver a more comprehensive analysis," Silva added.

ELIMINATING INCONSISTENCIES AND DELAYS

PV Elite helped eliminate inconsistencies and avoid delays. "We saw faster design reviews which allowed us to communicate our results to surveyors immediately and follow up with the manufacturer, avoiding costly rework due to vessels being built with designs out of compliance with project code," Silva explained. PV Elite allowed DNV to perform not only an independent and professional analysis of pressure vessel designs but also ensure the designs met all the technical safety requirements. "Our manufacturer and client were confident with the design approval process and PV Elite's efficiency and reliability in providing clear reporting and accurate 3D models for fabrication," Silva concluded.

www.dnv.com



INPEX Uses SmartPlant Enterprise Solutions for Ichthys Mega-project

Intergraph technology enables INPEX to establish integrated information management system



PROFILE

Company: INPEX Corporation

Website: www.inpex.com.au

Description: INPEX Corporation is among the world's leading oil and gas exploration and production companies. Headquartered in Tokyo, INPEX has more than 70 projects in 26 countries. Listed on the Tokyo stock exchange, it is among the top industry players globally. INPEX boasts a well-balanced portfolio of exploration and production assets, with a growing focus on LNG. This includes interests in Tangguh LNG and Bontang LNG in Indonesia and Darwin LNG in Australia. Planning is also well advanced on two new LNG projects – Abadi in Indonesia and Ichthys off the coast of Western Australia. These projects will see INPEX emerge as a new global force in LNG by the middle of this decade.

Industry: Oil & Gas

Country: Australia

PRODUCTS USED

- SmartPlant Enterprise for Owner Operators
- SmartPlant 3D
- SmartMarine 3D
- SmartPlant Instrumentation
- SmartPlant P&ID
- SmartPlant Electrical

KEY BENEFITS

- Integrated information management system with a single point of access
- Smooth commissioning and start-up phase
- Reduced data handover costs

IDENTIFYING GOALS

With the energy and resources boom, Australia is seeing an increase in projects that are of a scale and complexity unlike anything seen before in this country. Ichthys is one such mega-project and INPEX is tackling the challenge head-on using Intergraph software solutions.

The Ichthys LNG Project is a joint venture between INPEX and Total, Tokyo Gas, and other participants. Gas from the Ichthys field, in the Browse Basin approximately 200 kilometers offshore Western Australia, will undergo preliminary processing offshore to remove water and extract condensate. The condensate will be pumped to the floating production, storage, and offloading (FPSO) facility anchored nearby, from which it will be transferred to tankers for delivery to markets. The gas will be exported to onshore processing facilities in Darwin via an 889-kilometer subsea pipeline. The Ichthys LNG Project is expected to produce 8.4 million tons of LNG and 1.6 million tons of LPG per annum, along with approximately 100,000 barrels of condensate per day at peak. The operational life of the facilities will be up to 40 years, with the vessels staying on station continuously, making it a huge and complex project.

Traditional project development practices create disconnects between the various project phases, resulting in poor information sharing. For Ichthys, there are multiple EPC contracts, this adds another layer of complexity and potential disconnects. The conventional maxim is that the information handover costs are between 2-4% of the total installed cost (TIC), which for the \$34-billion Ichthys project would be measured in hundreds of millions of dollars. INPEX intends to eliminate the handover stage and its associated costs by better information management throughout the project development.

OVERCOMING CHALLENGES

- Eliminate poor information sharing and associated costs
- Provide operations team with maximum access to design and operational data
- Ensure consistency and accuracy in design information across all engineering contractors

REALIZING RESULTS

INPEX determined early in the project that the desired outcomes for the facilities would be achieved by providing its operations group with maximum access to design and operational data both during the project and into operations. The vision set by INPEX for information management on the operating facility was an environment like Google or Wikipedia, with all information access from a single portal using a “point-and-click” approach, allowing users to move seamlessly between data sources as diverse as the 3D model and the plant production records.

All data and documents will be cross-referenced and linked with easy access via a single portal. INPEX will be using a combination of SmartPlant Enterprise for Owner Operators (built on SmartPlant Foundation) and SAP to meet this requirement. It has also committed to use Intergraph's SmartPlant Enterprise suite of engineering solutions for project operations, including SmartPlant 3D and SmartMarine 3D (collectively known as Smart 3D), SmartPlant Instrumentation, SmartPlant P&ID, and SmartPlant Electrical.

INPEX chose Intergraph because of its leadership in enterprise engineering software with the proven expertise and capabilities to tackle complex information management requirements for mega-projects. The ARC Advisory Group ranks Intergraph as the No. 1 overall worldwide provider of engineering design solutions for the industry. Intergraph software is widely used within the contractor community, allowing INPEX to carry the design tools into the operations and maintenance phase by specifying a delivery of design information from the EPC contractors mounted in Intergraph SmartPlant Enterprise databases.

INPEX has also taken a different approach to the way data is collected on the project. The traditional “handover” stage (at which tremendous amounts of data are delivered to the client) has been replaced by a progressive delivery as the plant is designed and built. Documents are delivered as they are produced and the design tools (such as the 3D model) are delivered in monthly increments. This makes a big difference to the operational staff: they can have access to the data and own the design long before they have to take responsibility for

the plant. This smooths the commissioning and start-up phase, making a big contribution to the reduction in the handover costs.

Such an approach has not been without its challenges. This is not a conventional method of data collection but INPEX has worked constantly with its EPC contractors to establish working procedures that achieve the desired results without increasing their costs. As part of this strategy, INPEX has employed its own team of experts in the design tools to assist the EPC contractors in using the Intergraph SmartPlant Enterprise tools and ensuring their correct usage as both design and operational tools. They have had to deal with differences in working practices between contractors and have developed new methods to ensure consistency between design tools, bridging the gap between design and operational usage.

“Intergraph technology combined with our drive towards consolidating our handover documentation in the Intergraph environment is fundamental to delivering our vision of an integrated information management system with a single point of access,” said Conor Walker, operations director of the Ichthys LNG Project.

MOVING FORWARD

Walker said, “We anticipate an expanded role for Intergraph tools as the project progresses into the operating phase, leveraging from the increasing volume of data held in the engineering data warehouse, which has been built on the SmartPlant Enterprise for Owner Operators platform.”

INPEX

www.inpex.com.au

PV Shipyard Standardizes on SmartMarine 3D for Offshore Projects

Next-generation 3D solution delivers significant time and cost savings with improved design quality



PROFILE

Company: Petrovietnam Marine Shipyard

Website: www.pvshipyard.com.vn

Description: Petrovietnam Marine Shipyard was established in 2007 with a goal of implementing the policy of the Vietnamese government to develop the manufacturing of oil and gas drilling rigs in Vietnam. PV Shipyard specializes in the construction, conversion, and repair of diversified types of mobile drilling units and facilities, including a wide range of complex offshore structures. With the aim of creating technical solutions with international standards, and completing projects of high quality at a competitive price, PV Shipyard expects the Vietnamese mechanical manufacturing field to reach a higher position with the industrialization and modernization of the Party and State in the near future.

Industry: Offshore

Country: Vietnam

PRODUCTS USED

- SmartMarine 3D

KEY BENEFITS

- Fast implementation
- Improved engineering productivity, and optimized design accuracy and quality
- Reduced project timelines by 50%
- Significant cost savings

IDENTIFYING GOALS

Petrovietnam Marine Shipyard (PV Shipyard) is based in Vung Tau City, Vietnam, and it specializes in construction, conversion, and repair of diversified types of mobile offshore drilling units and marine facilities. The shipyard was established in 2007 to meet the growing demands of the offshore oil and gas industry in Vietnam and the region.

As a growing company, PV Shipyard faced the challenging mission of developing capabilities to design and build offshore facilities such as jack-up rigs, as well as acquiring the necessary skills to support its operations. The company has ambitious plans and strives to be the preferred contractor for offshore jack-up projects in Vietnam. It was highly critical that PV Shipyard proved its capabilities and made a mark in the industry in order to establish itself as the premier design and construction company in Vietnam for offshore facilities.

In 2009, only two years after its establishment, the shipyard was awarded its first project to design, build, and deliver a 90-meter LeTourneau Super 116E jack-up rig. PV Shipyard needed to implement next-generation engineering technology to ensure quality, accuracy, and automated processes in producing the deliverables required for this project and all future projects. This is aligned with the company's long-term goal of taking on global projects.

OVERCOMING CHALLENGES

- Establish engineering technology standard to develop capabilities for the design and construction of offshore facilities
- Generate accurate, high-quality deliverables through automated processes
- Ensure its young team of engineers is fully trained in next-generation technology and supported throughout the project

REALIZING RESULTS

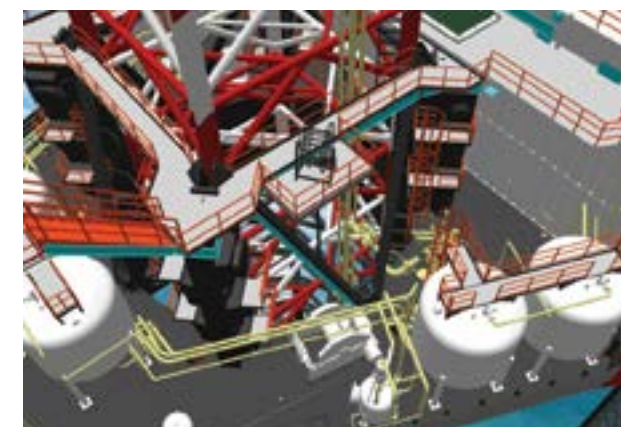
After an intensive evaluation of all the solution providers in the market, PV Shipyard chose Intergraph and the SmartMarine 3D solution to design and build its first jack-up rig, with local distributor support from Credent Technology, Intergraph's partner in Vietnam.

"As a young and dynamic company, we needed a reliable and proven vendor that could support our goals as we drive our business and establish ourselves in the market," said Phan Tu Giang, managing director of PV Shipyard. "We are very impressed with SmartMarine 3D's rule-based, automated technology, which is the perfect match for our requirements."

SmartMarine 3D is the world's most advanced offshore and shipbuilding design solution, featuring breakthrough engineering technology that is data-centric, knowledge- and rule-driven to improve delivery schedules, with increased detail and manufacturing design productivity of up to 30 percent. SmartMarine 3D provides PV Shipyard with the capabilities it needs to gain and maintain an edge in a highly competitive industry by improving safety, increasing quality, and boosting productivity.

PV Shipyard purchased SmartMarine 3D for its group of young engineers, most of whom had just graduated from university. Intergraph and Credent fully supported PV Shipyard's training program, providing in-depth training and giving them the opportunity to use the application on a pilot project before implementing SmartMarine 3D for the jack-up rig project.

"Intergraph was very committed in helping us, providing PV Shipyard with dedicated local support through Credent," said Phan Thanh Son, engineering manager at PV Shipyard. "Intergraph also has extensive industry experience, providing us with great advice, which we appreciate very much. It is clear that we made the best choice when choosing Intergraph and Credent as our technology partners."



Within six months, PV Shipyard moved into production, utilizing SmartMarine 3D for detail design and modeling of the jack-up rig. The implementation of SmartMarine 3D was a tremendous success for PV Shipyard. The company was able to complete the design of the jack-up rig on time and within budget, and it is on track to deliver the rig within the planned schedule.

"We are the first company in Vietnam to use 3D technology to design and model jack-up rigs, and it has been very successful for us," said Phan Thanh Son. "SmartMarine 3D reduced the time involved in the project by 50 percent, bringing down costs significantly, while improving the quality of design and delivery."

MOVING FORWARD

Today, SmartMarine 3D is the 3D engineering and design solution of choice for PV Shipyard, and the Intergraph solution is used for all its offshore projects. PV Shipyard was also a 2010 Golden Valve award winner with its SmartMarine 3D model in the Judges' Choice Offshore category.

The company has also expanded its use of Intergraph technology by selecting other solutions from the comprehensive SmartMarine Enterprise suite, including SmartPlant Foundation, SmartPlant Instrumentation, SmartPlant P&ID, SmartPlant Electrical, SmartPlant Reference Data, and SmartPlant Review. PV Shipyard will use these solutions in an integrated environment for the design, construction, production, and planning of offshore facilities for improved efficiency and quality.

"We are preparing for our next major project and the implementation of an integrated suite of SmartMarine Enterprise solutions will enable us to meet our productivity requirements," said Phan Tu Giang. "We are confident we will gain even more business benefits, and the Intergraph solutions will prove to be invaluable to us at PV Shipyard."

www.pvshipyard.com.vn



SmartMarine 3D Enables Ship Design Automation for SKDY

Next-generation Intergraph technology delivers significant time savings via rule-based design automation and optimization



PROFILE

Company: Shin Kurushima Dockyard Group

Website: www.skdy.co.jp

Description: Shin Kurushima Dockyard Group is a group of companies specializing in shipbuilding. The group comprises Shin Kurushima Dockyard, Toyohashi Shipbuilding Company Limited, Shin Kochi Juko Company Limited, and Kanax Corporation. Since each of these companies specializes in building its own specific types of ships, the group emphasizes its ability to meet the diversified needs of its customers. Shin Kurushima Dockyard's main products are value-added vessels, such as car carriers, chemical tankers, and product tankers, with the company accomplishing 50 shipbuilding projects each year.

Industry: Shipbuilding

Country: Japan

PRODUCTS USED

- SmartMarine 3D

KEY BENEFITS

- Reduced time for ship design with increased quality
- Enhanced ship design automation for increased reliability and efficiency
- Improved productivity with high-quality engineering data deliverables

IDENTIFYING GOALS

Established in 1987, Shin Kurushima Dockyard Company Limited (SKDY) is one of the world's most productive shipyards today. Japan-based SKDY is recognized as a world-class brand, and the company prides itself in being among the top car carrier and chemical tanker producers in the world. SKDY also designs and constructs other types of vessels, including tankers, roll-on/roll-off ships, liquefied petroleum gas carriers, and many more.

SKDY is facing the challenges of an ageing work force with a decrease in the number of professional engineers in the shipbuilding industry, as well as those in the design and manufacturing divisions. However, to remain competitive in the global marketplace, the Japanese shipyard needs to continue executing its design processes effectively, while still maintaining high quality for its engineering projects. SKDY decided it needed to leverage leading-edge technology to increase its leading productivity numbers, as well as to drive improved quality and performance.



OVERCOMING CHALLENGES

- Establish automation rules and object relationships to accommodate all ship models, including non-standard designs
- Eliminate time-consuming and inefficient process of verifying design
- Improve quality of production and overall productivity

REALIZING RESULTS

SKDY found Intergraph SmartMarine 3D to be the perfect match for its requirements, being truly a next-generation solution with rule-based technology for ship design automation.

"To achieve our goals, we decided to introduce SmartMarine 3D as our 3D CAD system," said Isshin Fuji, general manager of the ship design department at SKDY. "This ensures that even engineers who are new to the industry and not as experienced can maintain quality, and utilize SmartMarine 3D's automated technology for a more efficient operation."

SmartMarine 3D is the world's most advanced offshore and shipbuilding design solution, providing SKDY with the capabilities it needs to gain and maintain an edge in a highly competitive industry. SmartMarine 3D is breakthrough engineering technology that is automated, knowledge- and rule-driven, streamlining marine asset design processes and improving delivery schedules, with increased detail and manufacturing design productivity of up to 30 percent. SmartMarine 3D is endorsed and used by leading offshore and marine companies globally, including the most productive shipyard, the top offshore owner operator, the top fabrication yard, and the top classification society in the world.

Leveraging SmartMarine 3D's unique rule-based architecture, SKDY can include and enhance its own sophisticated automation rules to continuously drive productivity numbers. These custom rules allow the automated creation of parametric structure detail, as well as manufacturing parts through either manual or automatic selection. SKDY has succeeded in changing part selection rules from manual to automatic through the integration of its unique shipbuilding know-how and expertise into SmartMarine 3D.

SKDY has also established object relationships in SmartMarine 3D to help automate modification of ship design. Any required corrections can be identified quickly and easily, minimizing the impact on production. With the established automation rules, design time is now significantly reduced, and manual verification is also no longer needed.

SmartMarine 3D's proven efficiency and ability to include further design automation has enabled SKDY to reduce labor costs without sacrificing quality. With SmartMarine 3D, SKDY continues to enhance its competitiveness in the global shipbuilding industry.

"With its rule-based capabilities, SmartMarine 3D is the best solution for SKDY," said Fuji. "The innovative Intergraph solution with proven design automation will enable us to reduce the costs and time of building ships, while enhancing safety, quality, and productivity."

MOVING FORWARD

SKDY has now standardized on Intergraph SmartMarine 3D for its ship design department, using it as the shipyard's enterprise solution of choice for all of its projects. The Japanese company will use SmartMarine 3D for full production, including early, detail, and manufacturing design, as well as fabrication planning. SKDY also plans to expand the use of SmartMarine 3D for all new ship design and production across all of its shipyards.

www.skdy.co.jp

**SHIN
KURUSHIMA**

MARINE & OFFSHORE

Vietsovpetro Adopts SmartMarine 3D for Offshore Design and Review

Scientific and engineering division at Vietnamese oil and gas company leverages next-generation Intergraph technology to enhance design of offshore platforms



PROFILE

Company: Vietsovpetro

Website: www.vietsov.com.vn

Description: VSP is a Vietnamese-Russian joint venture that was established in 1981. It is focused on the production of oil and gas from offshore sources, exploration and survey work for the oil and gas industry, well drilling, as well as the design, assembly, and repair of offshore facilities. VSP has become the main force of Vietnam's petroleum industry and economy. About 80 percent of Vietnam's produced oil and gas comes from VSP, ranking Vietnam third in oil production and export in Southeast Asia. The company contributes about 25 percent of Vietnam's national revenue, making it the largest contributor to the state's economy.

Employees: 6,500

Industry: Oil & Gas

Country: Vietnam

PRODUCTS USED

- SmartMarine 3D
- SmartPlant Foundation
- SmartPlant Instrumentation
- SmartPlant Electrical
- SmartPlant P&ID
- CADWorx
- CAESAR II
- PV Elite

KEY BENEFITS

- Visualization in 3D environment for easier design modifications and changes
- Accurate engineering deliverables for improved data integrity
- Increased productivity and data quality

IDENTIFYING GOALS

Vietsovpetro (VSP) is a leading pioneer in the Vietnamese oil and gas industry, and is among the world's largest oil and gas companies. VSP's output has exceeded 200 million tons, and continues to grow. The Science Research and Design Institute (NIPI) is VSP's scientific and engineering division, and it is responsible for the design of offshore facilities for oil and gas appraisal, exploration, and production.

VSP has been a longtime Intergraph customer – the company chose to partner with Intergraph because of its global leadership position in the industry with a complete portfolio of engineering solutions to satisfy VSP's project execution needs. With a dedicated focus on design and engineering, it was important for NIPI to have access to next-generation technology. It first adopted PDS; however, as the institute took on more complex offshore projects, it became apparent that NIPI needed to update its engineering design application.



OVERCOMING CHALLENGES

- Increase efficiency of design and review process for offshore platforms
- Generate accurate, high-quality engineering deliverables
- Improve quality of engineering data and overall productivity

REALIZING RESULTS

VSP and NIPI learned about Intergraph's Smart 3D (SmartPlant 3D and SmartMarine 3D) technology, featuring rule-based engineering and automation capabilities. The company decided it should adopt Smart 3D solutions to support its offshore projects, which is aligned with VSP's vision to leverage advanced technology to improve its engineering processes.

"Without a doubt, Smart 3D is the future of engineering, and we plan to apply SmartMarine 3D for any new projects from now on," said Mr. Le Viet Dzung, deputy director in charge of engineering at NIPI. "We recognize the importance of investing in next-generation technology to address our project needs and drive continued success, and Intergraph's SmartPlant and SmartMarine Enterprise suites of solutions will deliver great value to our business. Recently, NIPI has completed 3D design of our satellite platforms – BK16, BK17, and RP3_DGCP – by using SmartMarine3D."

SmartMarine 3D is the world's most advanced offshore and shipbuilding design solution, providing VSP with the capabilities it needs to gain and maintain an edge in a highly competitive industry. It features breakthrough engineering technology that is automated, knowledge- and rule-driven, streamlining marine asset design processes and improving delivery schedules, with increased detail and manufacturing design productivity of up to 30 percent. SmartMarine 3D is endorsed and used by leading offshore and marine companies globally, including the most productive shipyard, the top offshore owner operator, the top fabrication yard, and the top classification society in the world.

With SmartMarine 3D, NIPI could review and easily make any design changes for VSP's offshore platforms in a 3D environment. It was also easy for NIPI to manage and monitor the development of its design projects, with the ability to generate engineering deliverables quickly and accurately, including MTOs. As SmartMarine 3D is a powerful solution, NIPI could apply it to large and complex projects with ease.

VSP has also adopted other Intergraph engineering solutions, such as SmartPlant Foundation, SmartPlant Instrumentation, SmartPlant Electrical, and SmartPlant P&ID, as well as Intergraph CADWorx & Analysis Solutions, including CADWorx, CAESAR II, and PV Elite. VSP was confident to expand its use of Intergraph technology because of the high level of support it receives from Intergraph and its local partner in Vietnam, True Technology Company Limited (previously known as Credent Technology).

Mr. Le said, "We definitely see productivity benefits in using SmartPlant and SmartMarine Enterprise solutions. By giving our employees access to the latest technology, we can enhance their professional knowledge and improve execution of our projects."

MOVING FORWARD

VSP plans to continue expanding its use of SmartPlant and SmartMarine Enterprise solutions in an integrated engineering environment. This will ensure that VSP has a complete solution across the entire project life cycle to support the development of its offshore facilities. It will also build up its engineering database with the relevant catalog and specification items to support all of its assets.

www.vietsov.com.vn



ABOUT INTERGRAPH

Intergraph is the leading global provider of engineering and geospatial software that enables customers to visualize complex data. Businesses and governments in more than 60 countries rely on Intergraph's industry-specific software to organize vast amounts of data to make processes and infrastructure better, safer and smarter. The company's software and services empower customers to build and operate more efficient plants and ships, create intelligent maps, and protect critical infrastructure and millions of people around the world.

Intergraph operates through two divisions: Process, Power & Marine (PP&M) and Security, Government & Infrastructure (SG&I). Intergraph PP&M provides enterprise engineering software for the design, construction, operation and data management of plants, ships and offshore facilities. Intergraph SG&I provides geospatially powered solutions, including ERDAS technologies, to the public safety and security, defense and intelligence, government, transportation, photogrammetry, and utilities and communications industries. Intergraph Government Solutions (IGS) is a wholly owned subsidiary of Intergraph Corporation responsible for the SG&I U.S. federal business.

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