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Siemens PLM Software

NX for shipbuilding

NX shipbuilding solutions provide a compelling environment for design and manufacturing

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It is a formidable task to develop highly complicated ships and offshore structures while facing intense competition and price pressure.

Enhanced expectations

Shipbuilders are being called upon to improve their designs to be more energy-efficient, reliable and environmentally-friendly with better overall performance and lower total operating costs.

It is a formidable task to develop highly complicated ships and offshore structures while facing intense competition and price pressure as well as meeting all operational requirements over the service life of a ship. Vessels and offshore structures must endure the long-term effects of deep water environments. They are built in small production runs, are highly customized, include enormous amounts of data and require advanced production technology.

As a consequence, operating, maintaining and overhauling advanced ships can cost several times the purchase price, so new shipbuilding programs must meet goals for the total cost of ownership as well as requirements for capacity, performance and safety.

Streamlining the design process with NX

NX is fully integrated with Teamcenter software, the world's leading product lifecycle management (PLM) system

In the next-generation digital enterprise environment, shipbuilders require design and management systems that can be used to effectively work with enormous amounts of data while enabling efficient design of entire classes of ships. NX™ software is built on the fourth generation design (4GD) architecture of Siemens PLM Software, a technology for the design and management of large classes of products having millions of components and spanning a massive volume of space.

The 4GD technology allows shipbuilders the flexibility to organize ship data in multiple views, and empowers designers to rapidly search, retrieve and work collaboratively on the end-to-end systems that pass through common ship spaces. NX is fully integrated with Teamcenter® software, the world's leading product lifecycle management (PLM) system, and seamlessly integrates with Tecnomatix® digital manufacturing solutions to ensure optimal manufacturing and assembly.

Providing a focused environment

To remain competitive, shipbuilders must enhance productivity across the enterprise by achieving operational alignment as well as improve the processes used in managing ship design, construction, delivery and service. By creating a seamlessly integrated and synchronized enterprise that links designers, engineers, production specialists, support teams, partners and suppliers, shipbuilders can raise performance, maximize lifecycle productivity, thereby sustaining competitiveness.

NX provides a focused environment for modeling and manufacturing the structure of a ship, enabling users to conceptualize and model the surfaces and landing curves of the hull, decks and transverse and longitudinal bulkheads. It provides shipbuilding engineers with tools to easily create and detail the plates and profiles that make up the structure. It also enables development of the production planning and generation of the structural manufacturing data. The ship structure solution is comprised of three products: NX Ship Structure Basic Design, NX Ship Structure Detail Design and NX Ship Structure Manufacturing.

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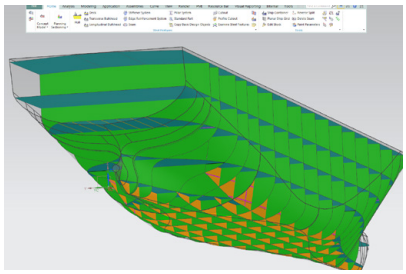
Enhancing the design process

NX Ship Structure Basic Design implements the concept of a structural system.

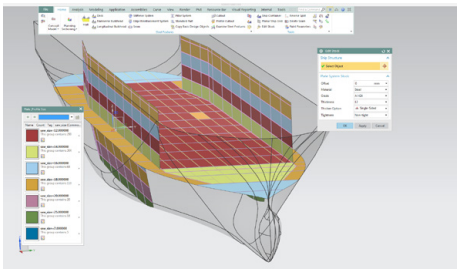
NX Ship Structure Detail Design provides all of the functionality necessary to define and modiy the structural detail parts.

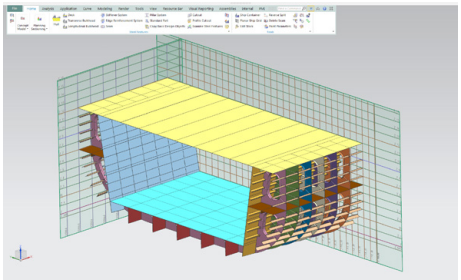
NX Ship Structure Manufacturing provides the functionality to create the data necessary for structural fabrication.



NX Ship Structure Basic Design

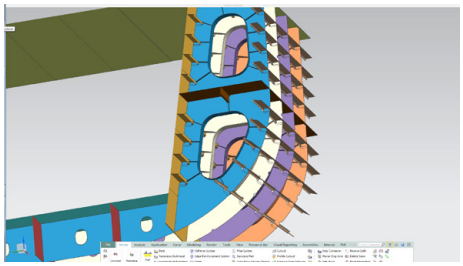
Ship Structure Basic Design implements the concept of a structural system, which enables the user to quickly model and modify a structural macro view of the ship to support early design stage analysis, drawing generation and easy transition to detail design. The structural system concept enables the user to define decks, bulkheads and the hull as single topologically-related objects that are subdivided into subsystems with independent material and scantlings. These subsystems are further subdivided by straking seams to define parts that can be manufactured.

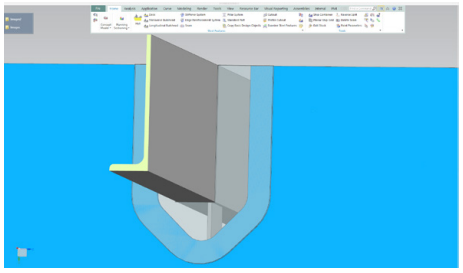




NX Ship Structure Detail Design

Ship Structure Detail Design provides all of the functionality necessary to define and modify the structural detail parts. It includes parametric detail feature definition for quick placement and modification of brackets, holes, profile cutouts, clips and collars, chamfers, end cuts, corner features, edge features and flanged plates.





NX Ship Structure Manufacturing

Ship Structure Manufacturing provides functionality to create the data necessary for structural part fabrication. Manufacturing parts are created from the detail design parts and include unfolded plates geometry, profile inverse bending curves, profile sketches, excess material, marking lines, shrinkage and XML output.

Providing specific functionality for shipbuilders

NX Rules Based Structure Welding
The NX Rules Based Structure Welding application enables shipbuilders to automatically define welds in the 3D model. This application generates a lightweight object to represent each weld joint, enabling very large quantities of welds to be defined and worked with in an NX session. Weld joint creation is automatic based on the 3D part geometry and material. The automatic weld joint creation includes the placement and bevel configuration. The bevel configuration is based on customizable rules that enable a customer to embed best practice solutions for each weld joint. Each weld joint has its own lifecycle and allows complete control through design and execution. This application supports varying bevels, 3D edge preparation, automated product manufacturing information (PMI) and drawing weld symbols.

NX Ship Drafting
NX Ship Drafting provides functionality specifically for shipbuilders, such as a frame bar command, area centerline, drafting lines, symbols, weld symbols, annotation, inverse bending line and shipbuilding baseline dimension option.

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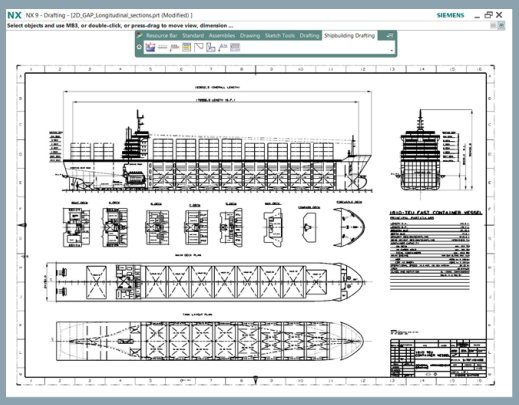
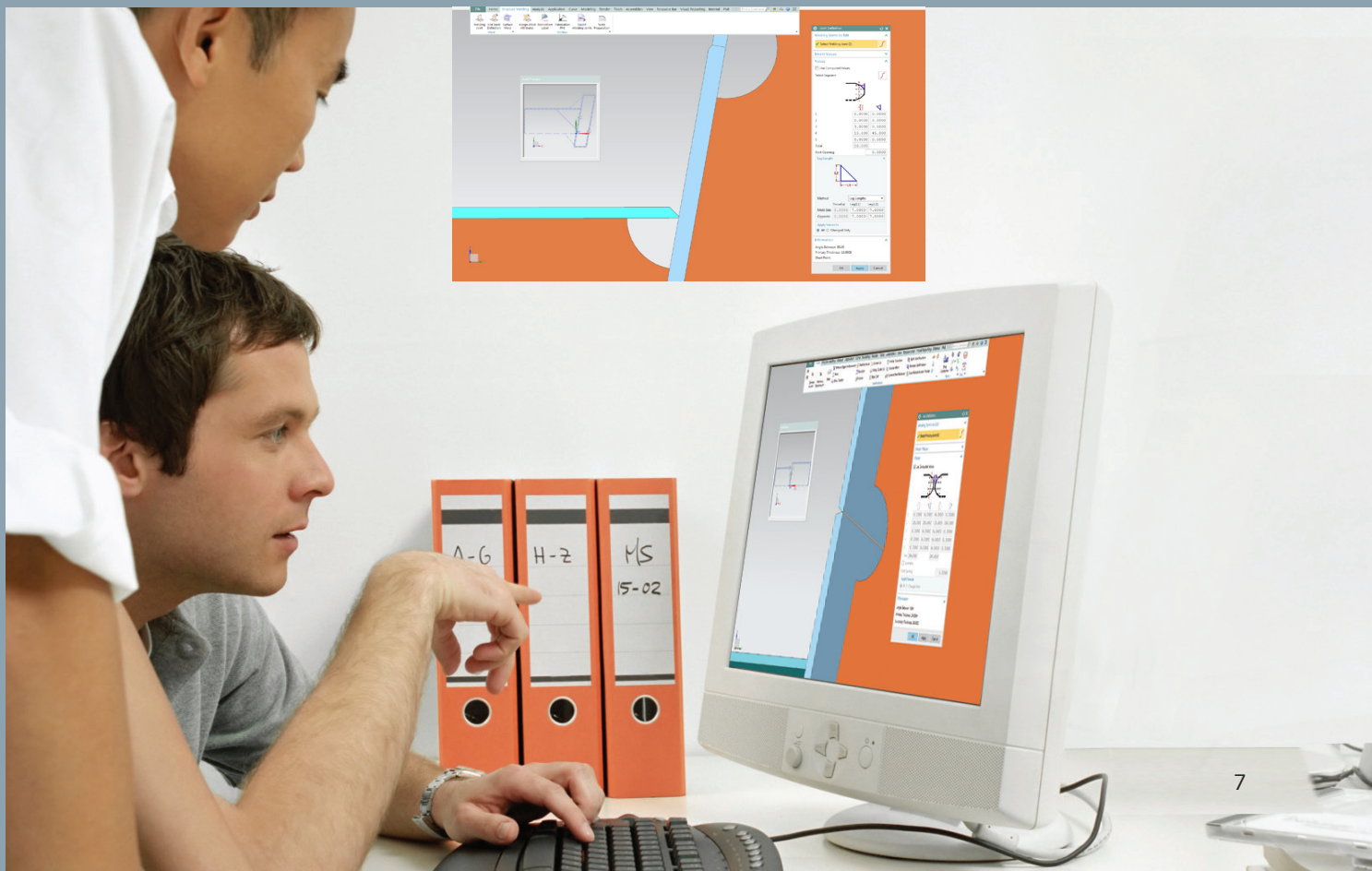




Ensuring functional and physical compatibility

NX Routing Process and Instrumentation Diagram (P&ID) software provides tools for 2D and 3D schematic layout of piping runs.

NX Routing Piping and Tubing provides 3D tools to create, modify, validate and document the design of piping and tubing systems.

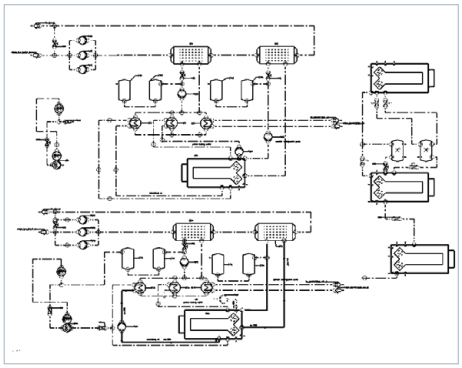
NX Routing Process and Instrumentation Diagram

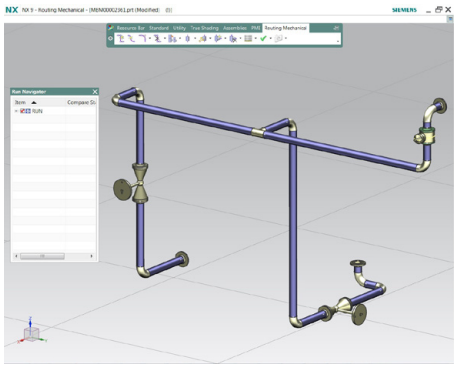
NX Process and Instrumentation Diagram (P&ID) software provides tools for 2D and 3D schematic layout of piping runs. This product enables an intelligent, logical definition of pipe runs that drive downstream 3D piping design. Piping specifications, a catalog of International Standards Organization (ISO) symbols, a flexible and configurable annotation or tagging system combined with highly productive path creation tools provide a complete set of capabilities to create, edit, document and validate logical piping diagrams and associated equipment and instrumentation.

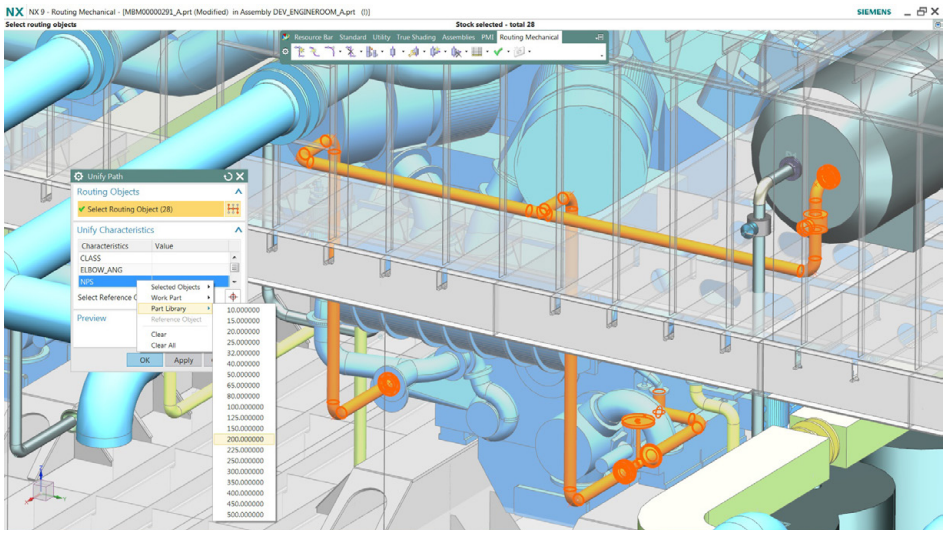
NX Routing Piping and Tubing

NX Routing Piping and Tubing provides 3D tools to create, modify, validate and document the design of piping and tubing systems. It enables the optimization of piping and tubing design workflows through intelligent path creation tools, specifications-driven part selection, smart part placement, collision detection, weight calculations and rules that concurrently validate designs against company and industry standards. The product supports both rigid and flexible pipes and tubes. Together with NX P&ID, it enables users to create and manage intelligent designs that ensure functional and physical compatibility.

Engine room – Logical diagram for cooling water and lubrication oil



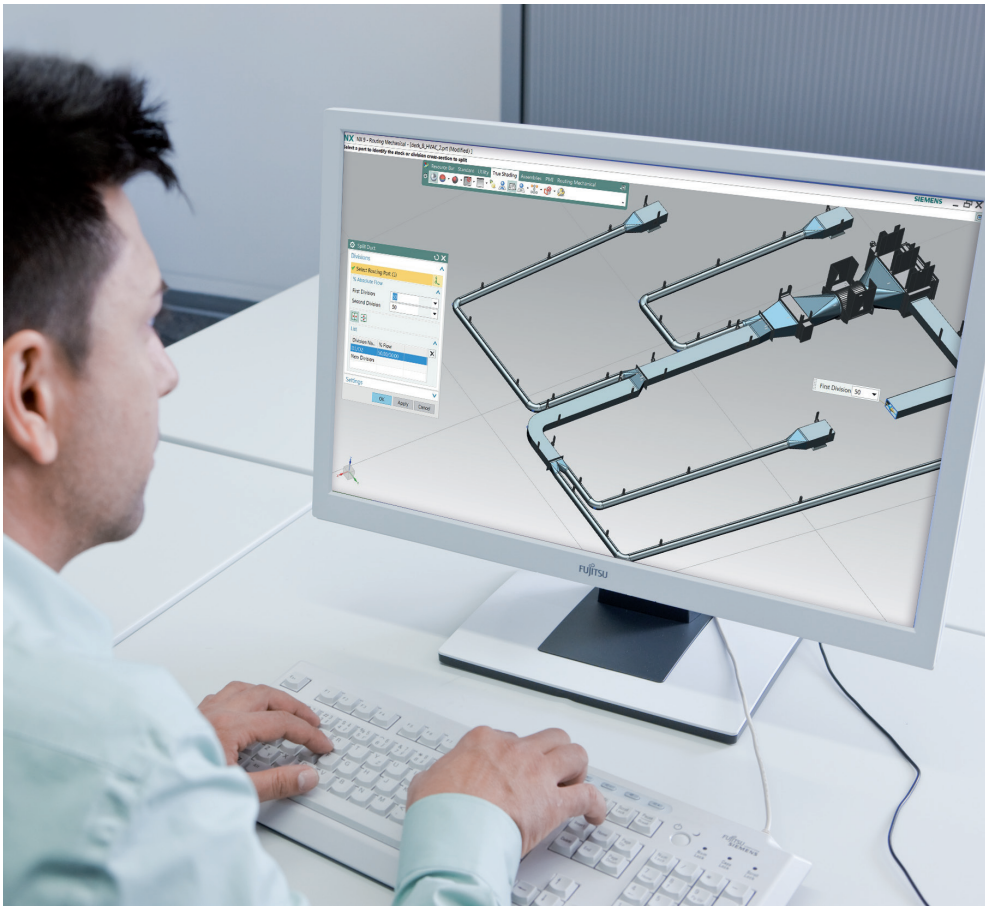


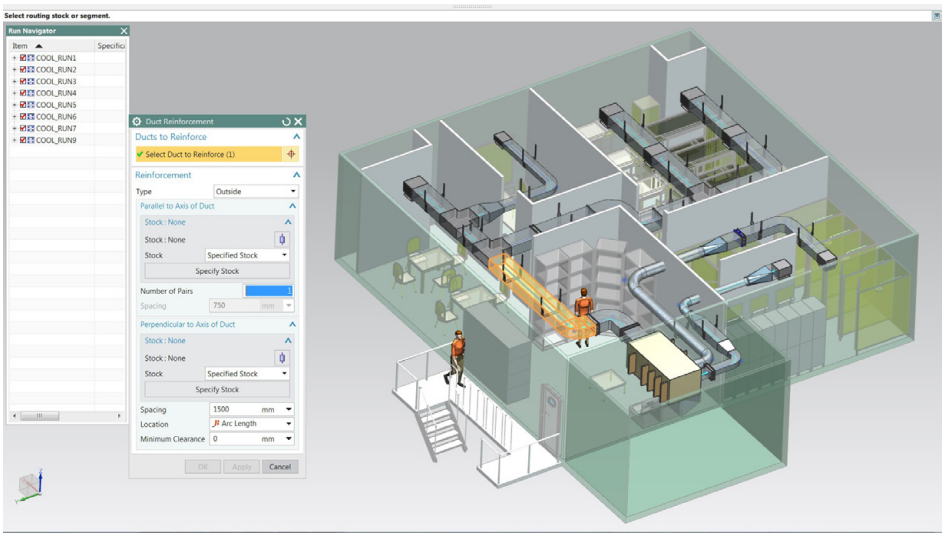


Delivering a lifecycle solution for HVAC design

NX Routing HVAC

NX Routing HVAC provides 3D tools to create, modify, validate and document heating, ventilation and air conditioning (HVAC) systems design. It enables the optimization of HVAC design workflows through intelligent path creation tools, specifications-driven part selection, smart part placement, collision detection, weight calculations, duct splits, duct size calculator and knowledge rules that concurrently validates designs against company and industry standards. The product enables the support of both a predefined catalog of HVAC parts and parametric templates that can be modified on-the-fly (smart sizing) to fit any space constraints. Together with other NX capabilities, such as hangers and sheet metal flat patterns, this product provides a complete lifecycle solution for HVAC design.





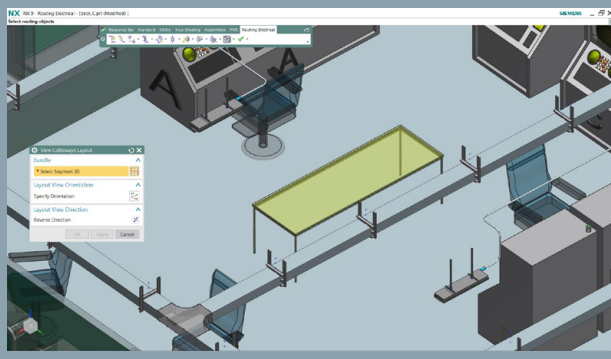
Enhancing routing cabling with NX

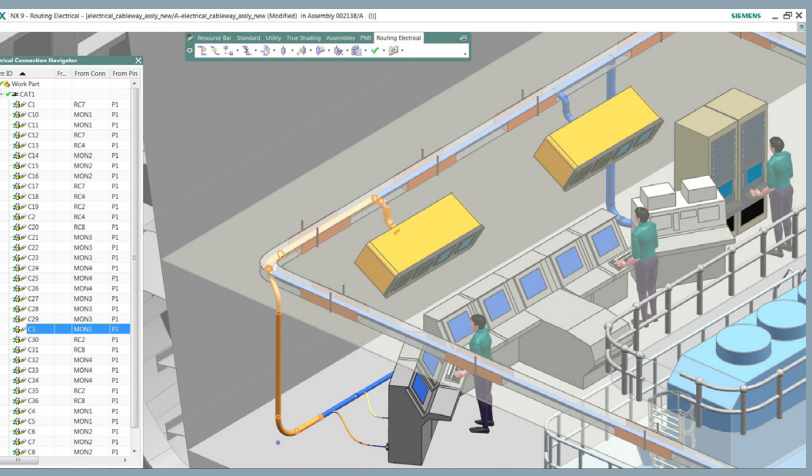
NX Routing Cabling can import a list of cable descriptions for connections between electrical devices.

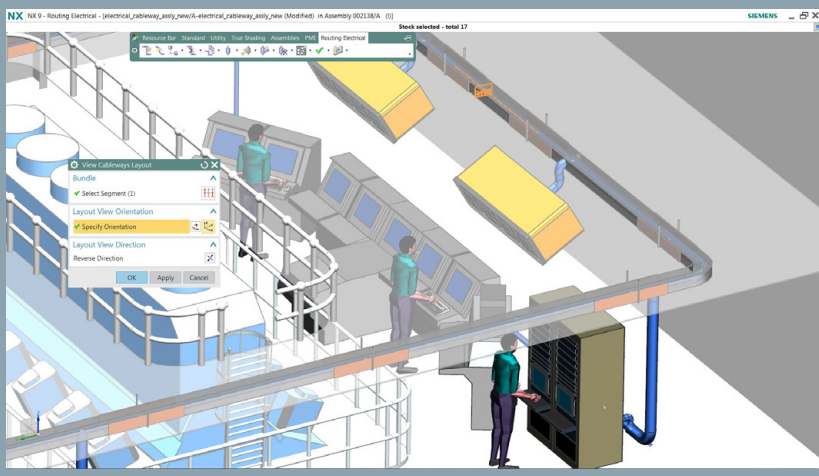
NX Routing Cabling
NX Routing Cabling provides the tools needed to route electrical cables in a product assembly via typical mechanical parts, and supports equipment such as conduits and raceways. The software can import a list of cable descriptions for connections between electrical devices. This connection list may be created from a 2D logical design application, such as NX Schematics or various other external ECAD-type applications.

By using NX Routing Cabling you can automatically find paths that have been routed between the devices, and can assign the cable descriptions to the path segments. The cable descriptions are used to define the cable diameters and to create solid cable models. Actual cable lengths and diameters may be automatically added to the connection list for feedback to upstream electronic computer-aided design (ECAD) applications or downstream to manufacturing applications. NX Routing Cabling also identifies rule violations, such as minimum bend radius and percent fill for cable trays and hangers.

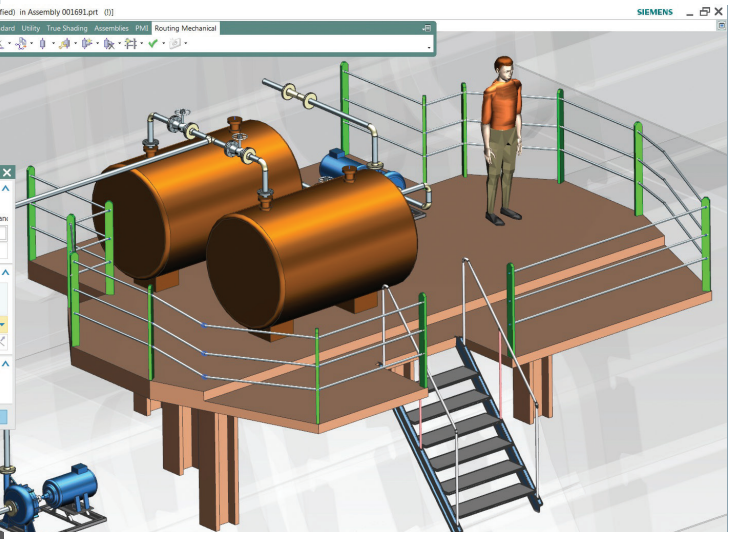
The system provides for the production of design documentation, such as 2D representations of the cable tray layout at selected points along the route.

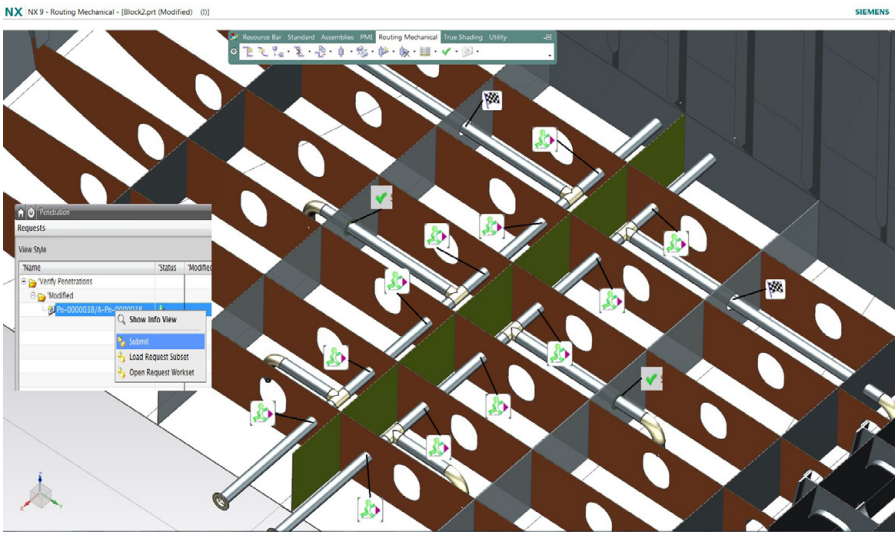






Improving design productivity





NX Platform Design

NX Platform Design enables the design of equipment support structures, access ways, walkways, maintenance platforms and similar steel structures. It maximizes a designers' productivity for modeling platforms, plating of platforms, reinforcements, corner conditions, handrails, stairs and ladders.

NX Penetration Management

NX Penetration Management is used by a routed system designer to request a penetration through structures that are designed and maintained by the structure group. A penetration request defines the location of the required cutout and initiates a workflow that can be customized by the end user to meet their needs. A typical workflow includes several review steps that must be completed before the cutout can be created to satisfy the request.

This product can be used by any company that has different groups, such as access way designers, who are responsible for routed system design and structures design. This module is a specific usage of the Teamcenter Change Management system, which includes a user interface in NX for creating, managing and responding to penetration requests. Penetration Management creates references to objects in NX Ship Structures Detail Design (or imported from other systems) and routing products.

NX Platform Design maximizes productivity for modeling platforms, plating of platforms, reinforcements, corner conditions, handrails, stairs and ladders.

NX Penetration Management helps coordinate routed systems design and structure design

About Siemens PLM Software
Siemens PLM Software, a business unit of the Siemens Digital Factory Division, is a world-leading provider of product lifecycle management (PLM) software, systems and services with nine million licensed seats and 77,000 customers worldwide. Headquartered in Plano, Texas, Siemens PLM Software helps thousands of companies make great products by optimizing their lifecycle processes, from planning and development through manufacturing and support. Our HD-PLM vision is to give everyone involved in making a product the information they need, when they need it, to make the smartest decisions. For more information on Siemens PLM Software products and services, visit www.siemens.com/plm.

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