Design Smarter, Operate Better: The OpenPlant® Advantage

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Introduction

In the rapidly evolving world of plant design and engineering, firms face increasing pressure to improve efficiency, reduce costs, and ensure compliance with regulatory standards. Legacy design methods, disconnected workflows, and poor collaboration lead to inefficiencies, costly errors, and project delays. Additionally, increasing project complexity demands advanced tools that ensure accuracy and seamless coordination among teams.

OpenPlant, Bentley's comprehensive plant design solution, addresses these challenges with a comprehensive suite of interoperable products. By enabling open data exchange, streamlined collaboration, and intelligent automation, OpenPlant empowers engineers, designers, and operators to optimize workflows and deliver accurate, high-quality plant designs while maintaining compliance and reducing rework.

Breaking Down Industry Challenges in Plant Design

Disconnected teams, disorganized data

- Siloed teams and tools create inefficiencies and lead to miscommunication.
- Inconsistent data across disciplines results in design errors and costly rework.
- Lack of a centralized system prevents real-time collaboration and version control.

Outdated design methods slowing progress

- Traditional 2D-based design approaches are time-consuming and prone to human errors.
- Manual drawing generation and revision tracking slow down project timelines.
- Lack of automation and parametric modeling leads to inconsistencies in design deliverables.

Interoperability roadblocks

- Proprietary file formats restrict seamless data exchange between disciplines and vendors.
- Incompatibility with other software tools leads to redundant work and integration challenges.
- Limited access to shared data impedes real-time collaboration and decision-making.

Budget overruns and scheduling chaos

- Inaccurate project information and late-stage design changes lead to unexpected costs.
- Rework due to design errors disrupts project schedules and increases material waste.
- Inability to efficiently track project progress results in delays and cost overruns.

Navigating compliance and safety hurdles

- Ensuring compliance with international standards is complex and time-consuming.
- Manual processes increase the risk of design errors, regulatory non-compliance, and safety violations.
- Inefficient documentation management makes audits and inspections more challenging.

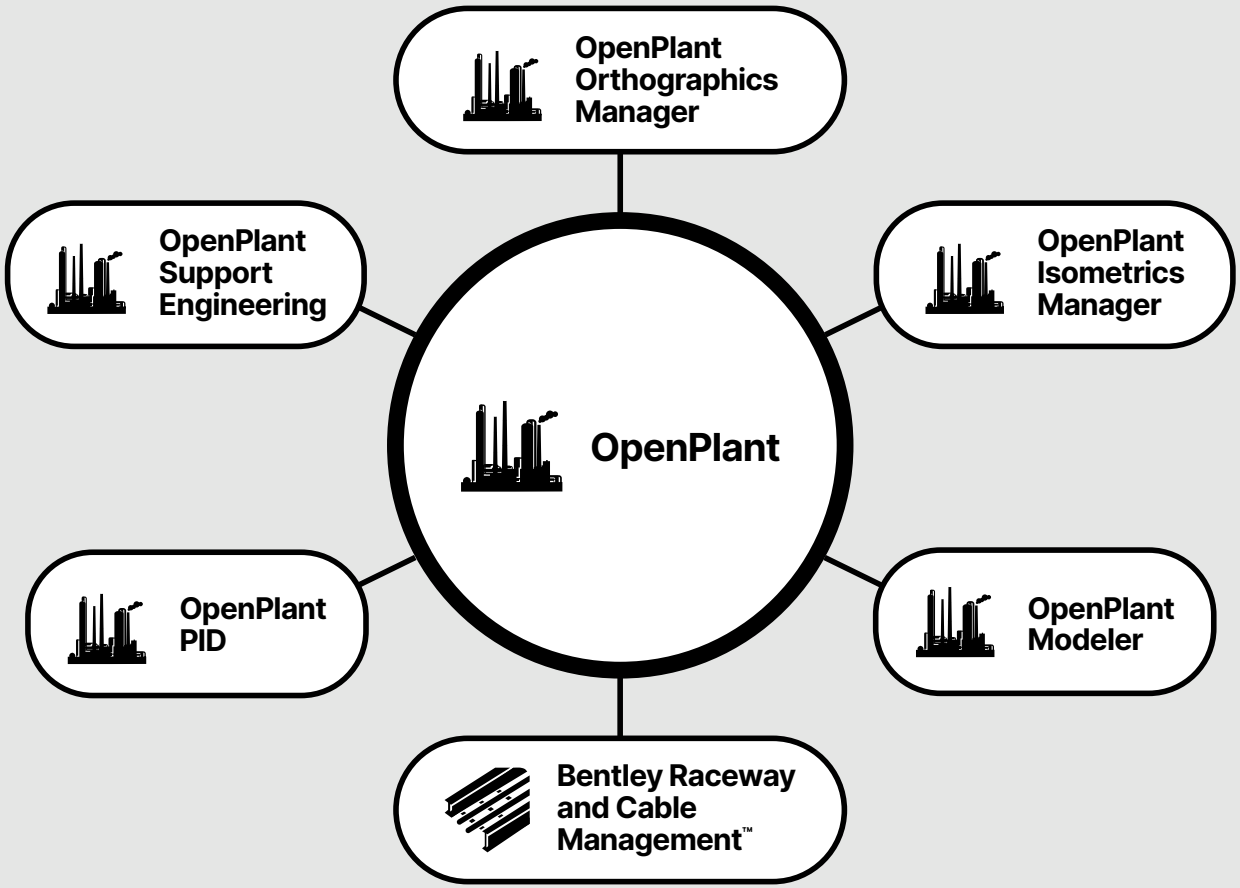
OpenPlant:
A Smarter, More Connected Solution

OpenPlant is Bentley's comprehensive plant design solution that fosters interoperability, efficiency, and collaboration. Built on open data standards and powered by intelligent automation, OpenPlant enables teams to work more efficiently, reduce errors, and meet project deadlines with greater confidence.

Why choose OpenPlant?

- **Connected workflows:** Cloud-based solutions provide real-time updates, improving coordination across disciplines.
- **Intelligent design tools:** Boost productivity and design accuracy with intelligent P&IDs, clash detection, 3D modeling, and automated extraction of 2D deliverables from 3D models.
- **Interoperability:** Seamlessly integrate with a wide range of design applications and ProjectWise® to improve collaboration and accelerate project review cycles.
- **Usability:** Simplify complex plant design processes with an intuitive, user-friendly interface that supports all phases of the design workflow.
- **Scalability and flexibility:** Suitable for projects of all sizes, from small-scale plant modifications to large industrial facilities.

OpenPlant:
Comprehensive Applications for Smarter, Faster Plant Design

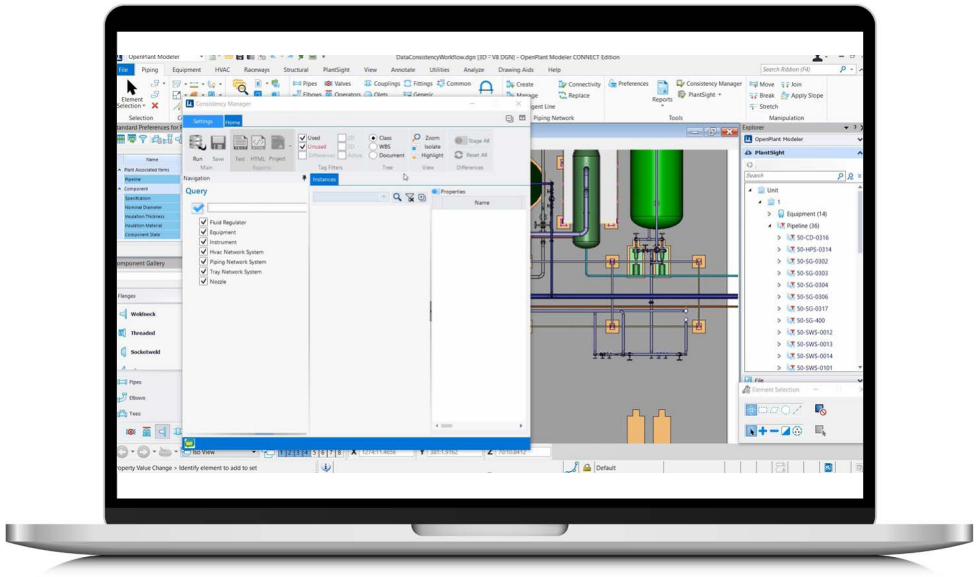


OpenPlant Modeler: Perform Multidiscipline 3D Modeling

OpenPlant Modeler enables fast and efficient creation of intelligent 3D plant models, featuring parametric equipment modeling, specification-driven piping, HVAC, electrical cable trays, and structural steel libraries—all within an open, intuitive, and collaborative environment.

Key features:

- **Streamlined 3D plant modeling:** Quickly and easily create 3D plant models with parametric equipment modeling, specification-driven piping, HVAC, electrical cable trays, and structural steel libraries in an open, intuitive, and collaborative environment.
- **Flexible cloud-based collaboration:** Work in a cloud-based environment that supports project teams working together online, offline, or remotely. Remote collaboration allows scalability for any number of users across small and large projects.
- **Accurate engineering with specification-driven parametric modeling:** Enable precise engineering designs for projects of any size using specification-driven parametric modeling.
- **Consistent 2D and 3D workflows:** Leverage workflows that maintain 2D and 3D consistency, helping to avoid costly rework.
- **Digital twin integration with PlantSight (Bentley's digital twin application for the process sector):** Integrate with PlantSight to utilize component-based workflows and create a digital twin during the design phase of the project.

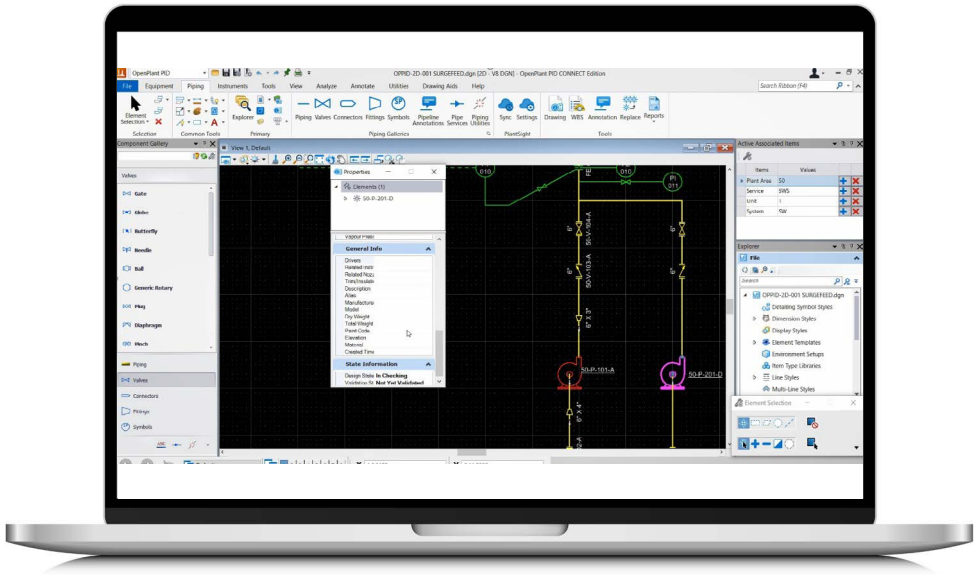


OpenPlant PID: Produce and Share Intelligence Piping and Instrumentation Diagrams

OpenPlant PID offers an advanced solution for creating and managing intelligent piping and instrumentation diagrams, providing seamless integration with 3D models and ensuring accuracy, consistency, and efficient data flow throughout the design and operation processes.

Key features:

- **Rapidly create intelligent P&IDs:** Accelerate plant design and improve accuracy by quickly generating intelligent P&IDs that adhere to project piping specifications, all within a streamlined interface designed for easy adoption with ribbon-based navigation, picklists, and simple configuration.
- **Consistent and accurate tag management:** Ensure a uniform tagging format across all P&ID documents and maintain consistency with project naming conventions. Enable seamless tagging across 2D and 3D designs in PlantSight, preventing duplication and enhancing project accuracy.
- **Cloud-enabled design management:** Boost P&ID efficiency with secure, up-to-date access to design data online, offline, or remotely. View and edit P&ID data from anywhere using the web portal with Data Manager through PlantSight.



OpenPlant Orthographics Manager: Automatically Generate Accurate Drawings

OpenPlant Orthographics Manager enables the efficient generation of precise, intelligent orthographic drawings, seamlessly integrating with 3D models to maintain consistency and foster enhanced collaboration across teams.

Key features:

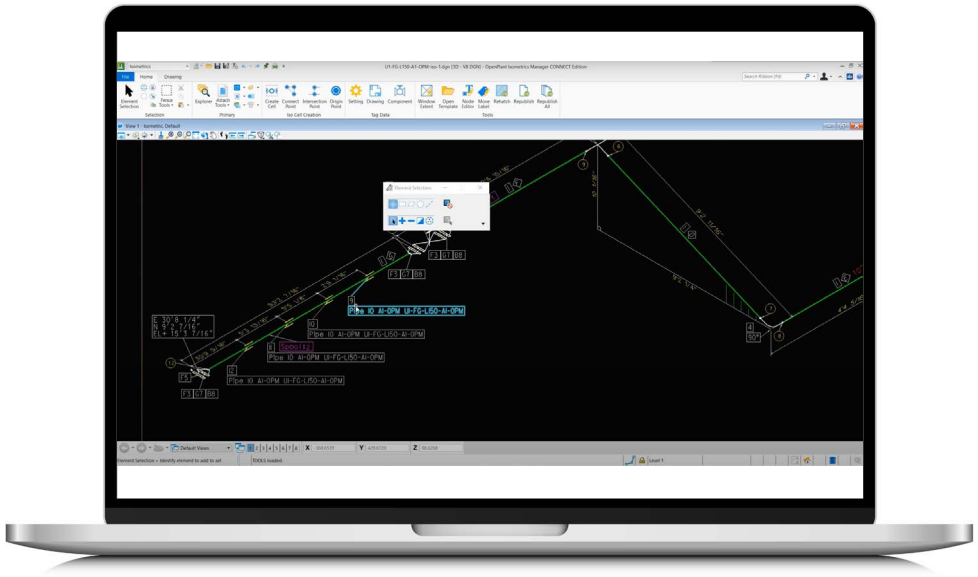
- **Create accurate drawings:** Generate faster, higher-quality arrangement drawings by automating the extraction of 2D files from 3D models, with the ability to quickly regenerate drawings using various annotation and labeling options. Ensure up-to-date drawings through a faster revision process, including automatic single and double-line drawings, annotations, and dimensions.
- **Save time and effort:** Automate drawing production to spend less time extracting 2D files, reduce costs, and boost design productivity by allowing non-designers to produce and manage drawings independently from the design application.
- **Seamless integration:** Integrate with ProjectWise for efficient project information management and collaboration, ensuring drawing information is always accessible for quick sharing and use by all team members.

OpenPlant Isometrics Manager: Extract Intelligent Drawings from Multiple 3D Sources

OpenPlant Isometrics Manager simplifies the creation of intelligent, spec-driven isometric drawings directly from 3D models, ensuring optimal accuracy while streamlining the plant design process.

Key features:

- **Rapid project startup:** Accelerate project setup with an intuitive graphical interface for isometric configuration, eliminating complex files and enabling faster, more accurate project execution.
- **Automated production for higher quality isometrics**: Generate accurate isometrics from multiple 3D sources with optimized layouts, automatic sheet splitting, and faster project-ready deliverables.
- **Integrated users and projects for enhanced collaboration:** Enable seamless collaboration with ProjectWise integration, allowing version-controlled isometric access, improved information sharing, and visibility into project activity across teams.
- **Simplified management for accurate, up-to-date isometrics:** Broad configuration options, including features to augment isometric drawings with project information via pre- and post-processing functions, as well as out-of-session isometric generation to reduce review time and improve accuracy.

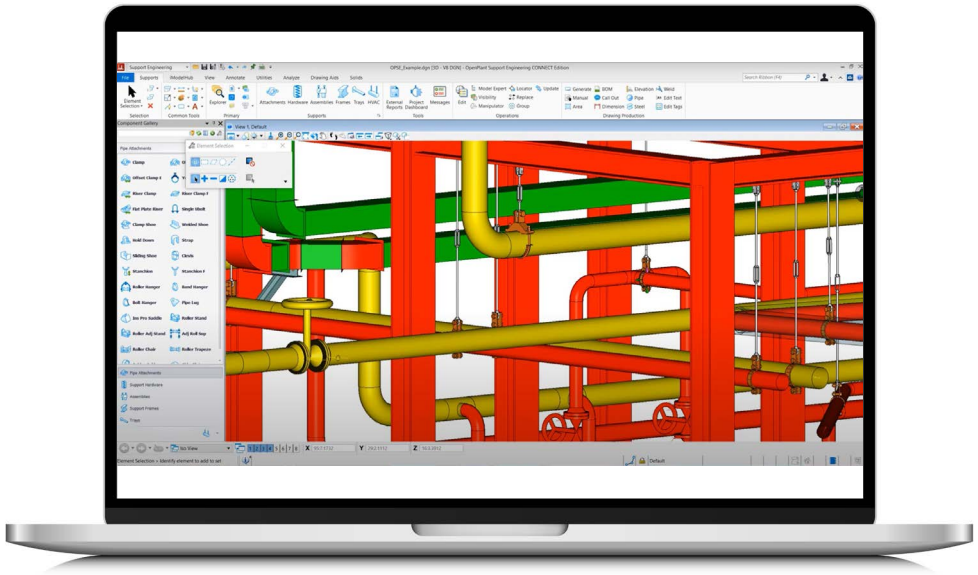


OpenPlant Support Engineering: Quickly and Accurately Model Detailed Supports

OpenPlant Support Engineering provides a comprehensive solution for designing supports that integrate smoothly with 3D models, ensuring optimal structural design.

Key features:

- **Quickly design engineered supports:** Speed up the design process by creating accurate supports from a catalog of pre-built vendor supports, reducing time spent on modeling both basic and complex support assemblies, and accelerating overall project design.
- **Identify support requirements:** Minimize design time with fast, accurate placement of supports for piping, electrical raceway, and HVAC, including automated placement of support locators.
- **iTwin-supported and fully interoperable:** Streamline design by importing piping stress and structural analysis results using iModels or PlantSight-based workflows and reduce errors through seamless interoperability with data from other OpenPlant applications.

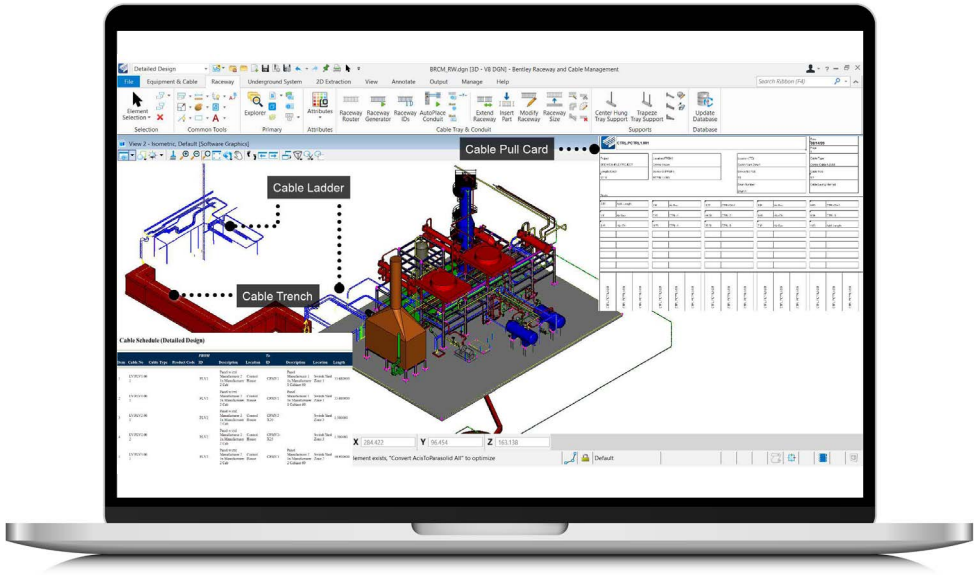


Bentley Raceway and Cable Management: Conquer Complexity with Unified Design

Bentley Raceway and Cable Management offers an advanced platform for designing, managing, and maintaining raceway and cable systems, optimizing 3D connectivity and operational efficiency throughout the system lifecycle.

Key features:

- **Streamline design processes:** Save time and reduce costs with an all-in-one solution for raceway system layout, cable routing, and material estimating.
- **Integrated 3D modeling:** Design and model complex raceway systems with comprehensive 3D cable routing capabilities in a single application.
- **Simplified workflows:** Eliminate the need for multiple applications by combining layout, routing, and material estimation into one integrated system.
- **End-to-end accuracy:** Create precise raceway models for all project phases, from concept design to detailed layouts and construction.
- **Comprehensive raceway modeling:** Model cable trays, ladders, baskets, and underground systems, including trenches and duct banks, within a single platform.
- **Efficient cable management:** Import cable lists, define equipment locations, and optimize cable routing for seamless integration.
- **Enhanced design visualization:** Visualize 3D cables in raceway systems to support thorough and robust design reviews.



Where OpenPlant Is Making an Impact

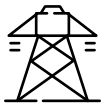
OpenPlant is trusted by industries worldwide to deliver high-quality plant design solutions.
It is widely used in:

Water treatment

Supporting sustainable water purification and distribution infrastructure through intelligent design solutions.

Mining and metals

Optimizing material handling, smelting, and processing facilities with advanced 3D plant modeling.



Power generation

Enhancing efficiency in thermal, nuclear, and renewable energy plants through smart plant design and data integration.

Chemical and petrochemical

Ensuring safety and precision in complex chemical processing plants.

Oil and gas

Streamlining offshore and onshore plant designs while optimizing refinery layouts.

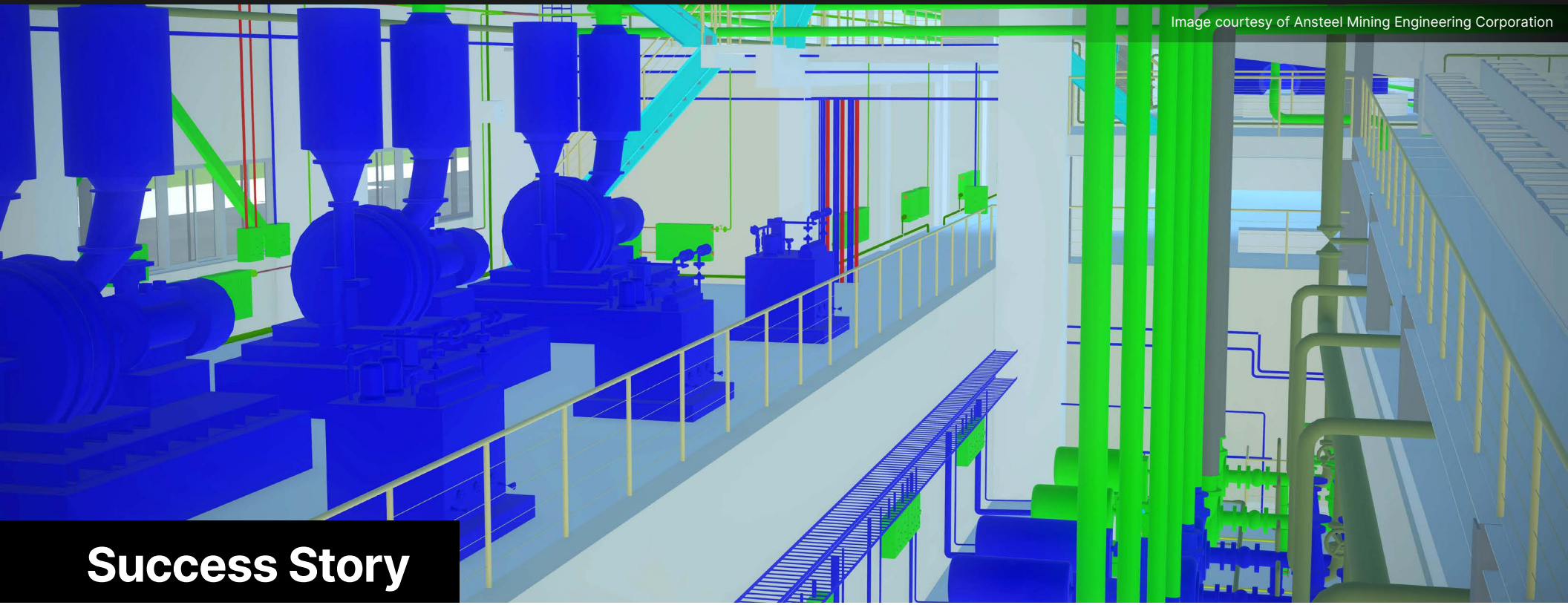


Image courtesy of Ansteel Mining Engineering Corporation

Success Story

Dongshao Plant Upgrading Project

Ansteel Mining Engineering Corporation I Anshan, Liaoning, China

Dongshao Plant is a refractory ore magnetic processing facility undergoing an equipment and systems upgrade, including reconstructing the central griding magnetic plant and supporting facilities. Upon completion, the modernized facility will reduce annual energy consumption by 57% and carbon emissions by 61.2%. To optimize project delivery on this complex project, the project team needed to establish a connected data environment for collaborative 3D modeling and construction simulation.

They selected ProjectWise and Bentley Open applications to implement collaborative design workflows and generate a coordinated 3D design model. Using OpenRoads accelerated earthworks calculations, improving design efficiency by 20%, while OpenPlant allowed them to extract construction drawings directly from the 3D model, saving 80% in drawing and calculation time. Linking the 3D model to the construction schedule using SYNCHRO optimized construction, eliminating unforeseeable on-site issues. Working in a connected digital environment facilitated real-time communication and comparison between site and planned progress to help avoid project delays.

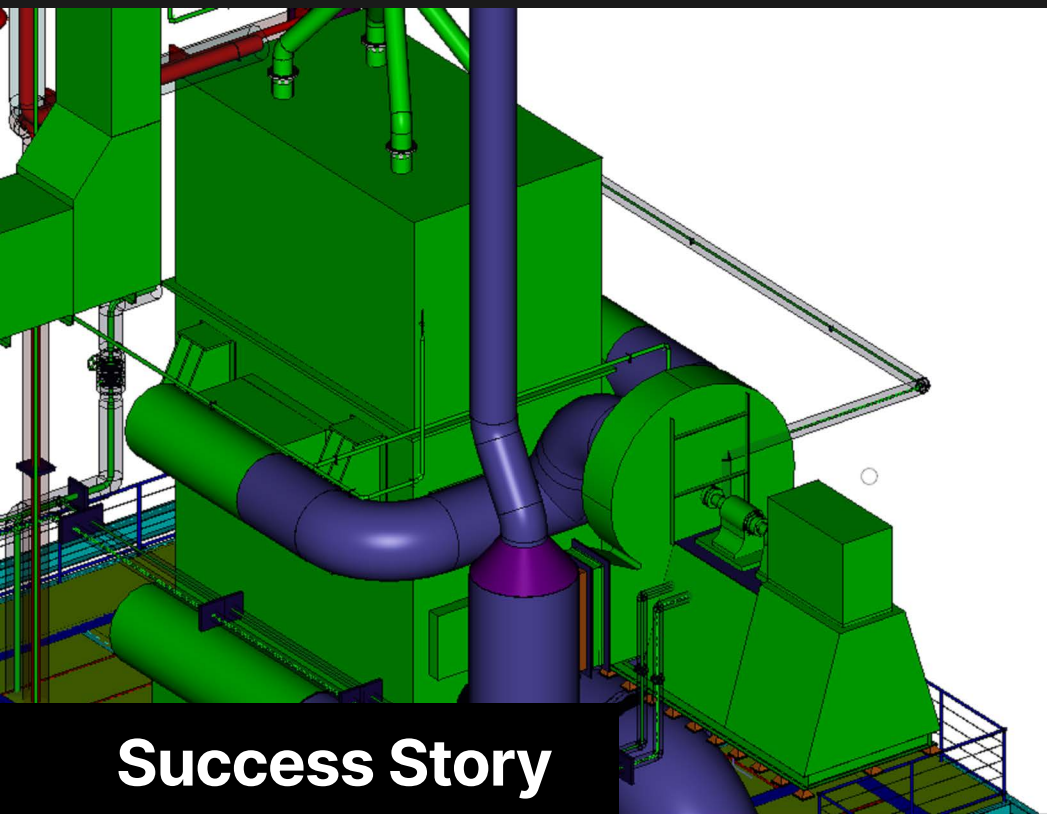
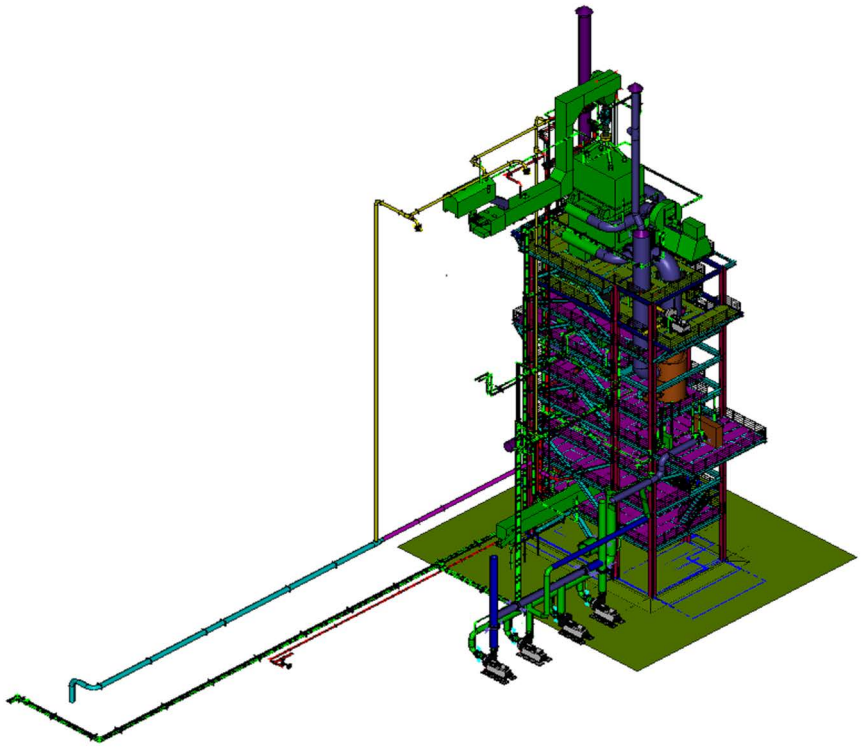


Image courtesy of Handan Iron and Steel Group Design Institute Co., Ltd.



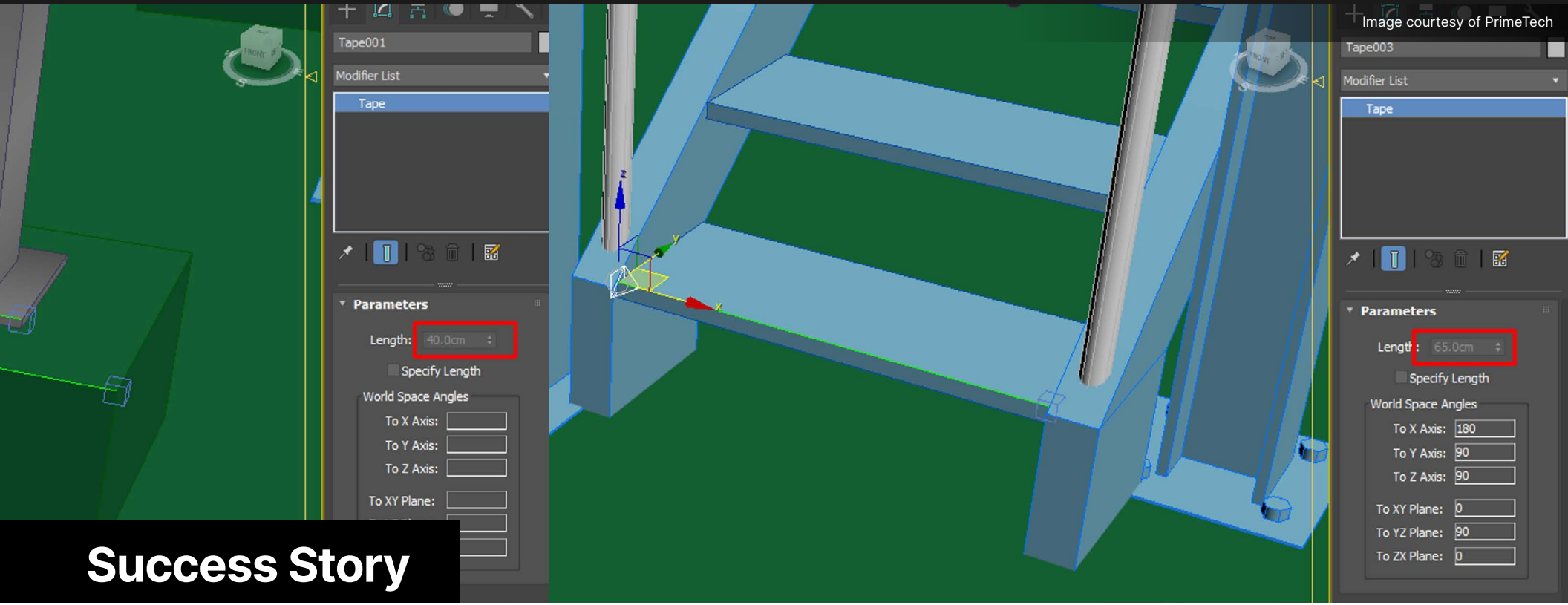
Success Story

Qiangang Pelletizing Plant Series 2 CSCR No. 2 Stripper Tower New Construction Project

Handan Iron and Steel Group Design Institute Co., Ltd. | Ouro and Capinzal, Santa Catarina, Brazil

To address the stripper tower issues at Qiangang Ironmaking Department's pelletizing plant, a second tower is being built and added to the facility. Upon completion, the new tower will reduce the plant's energy consumption by 20% to 25% and lower smoke emissions, protecting the regional environment. To optimize design and delivery, the civil engineering project team wanted to implement collaborative BIM workflows and needed integrated modeling and analysis software.

They selected AutoPIPE®, OpenBuildings®, and OpenPlant to establish a connected data environment and 3D models. Working in an integrated digital BIM platform improved collaboration by 50%, reduced rework by 30%, and accelerated the project schedule by 10%. Using the 3D models enabled accurate material quantities extraction, optimizing costs and minimizing waste. Through 3D visualization, the team identified potential errors, ensuring accurate construction methods that reduced the construction period by nearly 30 days. The 3D data and models will be provided to the owner to facilitate digital operations and maintenance workflows.



Success Story

3D Model Construction of Test Facility in N3 Testing Complex

PrimeTech | Daejeon, Chungcheong, South Korea

This project involved creating a blueprint of the Electric Power Research Institute's test facility for additional renovations. Originally built in 1994, and renovated several times, the as-built drawings do not reflect the current state of the plant. To assist with additional renovations, the team wanted to create a 3D blueprint using reverse engineering. PrimeTech initially considered laser scanning to achieve their 3D deliverables; however, this method would have been costly and time consuming. They realized that they needed integrated 3D modeling and plant design and analysis technology.

They selected iTwin® Capture Modeler to process 8,358 photographs of the site and generate a 3D reality mesh, which was then edited and modified using OpenPlant to generate an accurate 3D blueprint of the entire facility. Compared to laser scanning, Bentley's integrated digital solution reduced model process time by 25% and costs by 33%.

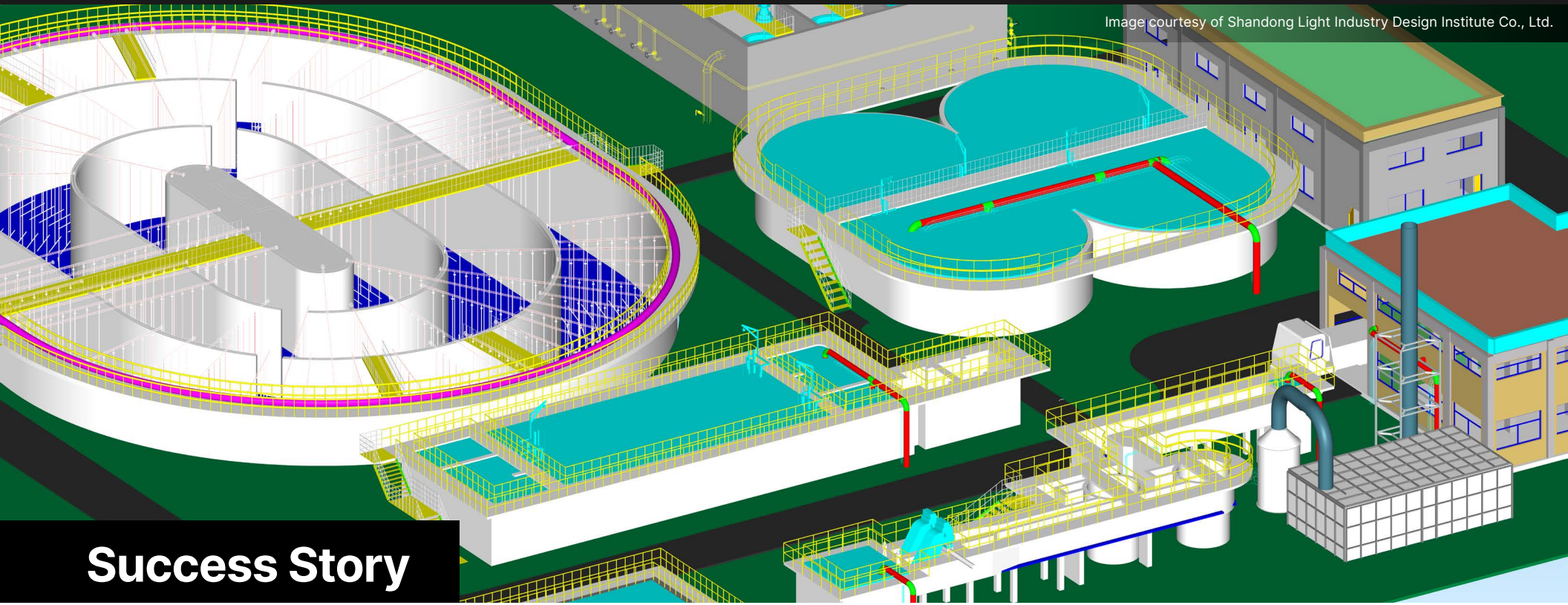


Image courtesy of Shandong Light Industry Design Institute Co., Ltd.

Success Story

Upgrading and Reconstruction Project of Changyang County Urban Sewage Treatment Plant

Shandong Light Industry Design Institute Co., Ltd. I Yichang, Hubei, China

Changyang Puhua Water Service is upgrading and reconstructing its existing sewage treatment plant in Yichang's Changyang County to increase treatment capacity to 18,000 milliliters per day and reduce moisture content to less than 80%. The project involved multiple engineering disciplines needing to design and integrate new and existing structures without access to the original design drawings for the current infrastructure. Shandong Light Industry Design Institute needed integrated modeling and analysis technology to digitally replicate the original facilities and design a newly renovated plant.

Leveraging AutoPIPE and OpenPlant, the team modeled the existing and new infrastructure, creating detailed models from point cloud data and performing coordinated detailed design analysis, which reduced errors and rework. Working in a connected digital environment, they resolved more than 173 collisions and eliminated more than 40 quality and safety hazards to save CNY 580,000. Using Bentley Open applications optimized progress management, which helped shorten the construction schedule by 25 days and reduce material waste. The digital solution resulted in significant benefits in energy conservation and environmental protection.


Image courtesy of Suez Water Technologies & Solutions

Success Story

9000 KLD Pretreatment RO and Zero Liquid Discharge System

Suez Water Technologies & Solutions | Nagda, Madhya Pradesh, India

This project involved developing the world's first zero liquid discharge plant for the viscose fiber industry, reducing water consumption and achieving maximum reverse osmosis recovery and sustainable operation. Suez Water Technologies proposed a saltwater treatment and recycle solution, but faced collaboration and technical challenges on this pioneer project. To optimize space utilization and streamline workflows to meet the project schedule, they needed an integrated technology solution for modeling visualizing, and analyzing civil, structural, and piping design options.

Leveraging OpenPlant, STAAD®, and AutoPIPE, Suez optimized pipe routing and extracted accurate material quantities, avoiding rework on site to save the client USD 26,800. Integrating ProjectWise with Bentley's open BIM applications saved 40% in modeling and design time and 50 days executing civil, structural, and piping works, or 20% of the project duration. The Bentley-based digital solution helped minimize operating costs and optimize the project footprint while achieving a total water recovery rate of 96%.

The Future of Plant Design Starts with OpenPlant

OpenPlant provides a scalable, intelligent, and interoperable plant design solution that addresses the biggest challenges in modern engineering. By adopting OpenPlant, firms can drive efficiency, enhance collaboration, and ensure compliance—all while reducing costs and project risks.

Get started with OpenPlant today!

Discover how OpenPlant can transform your plant design projects.

Contact us now