Wink, Incorporated Turns to Bentley® AutoPLANT® to Design World's Largest District Heating and Cooling System

Bentley AutoPLANT proved to be the most precise, reliable and cost-effective design tool on a fixed bid, 32,000-ton cooling plant project for the New Orleans Medical Complex that left no margin for error.

New Orleans has enjoyed a decade of explosive growth in the biomedical and healthcare industries. To build on this momentum and to attract additional research and development investment, the New Orleans Medical Complex (NOrMC) was established to coordinate the efforts of member institutions and assist them in promoting their collective excellence in healthcare delivery, education, research and economic development.

NOrMC encompasses more than 40 city blocks, with more than 100 buildings and six million square feet of office space. More than 1.5 million patients visit NOrMC medical institutions each year, and 12,000 doctors have graduated from NOrMC institutions, along with thousands of nurses and allied health professionals. The healthcare industry has accounted for one-third of all job growth over the past 12 years in New Orleans with a residual job impact of 2.5 hospitality jobs for every one healthcare job.

Designing for Future Growth

Wink, Incorporated was hired to provide overall project design and coordination for the construction of a 32,000-ton cooling plant – with thermal energy storage – known as District Energy for NOrMC. By comparison, the Louisiana Superdome has a cooling capacity of 4,500 tons. The new plant was the city's first district energy facility, part of the $50 million expansion project undertaken to tie together the numerous medical, university, research and office buildings in the area. District Energy was built to provide NOrMC with reliable thermal energy and replace several individual systems that were over 25 years old. Not only would this project provide cleaner, more efficient energy production, it was also designed for future expansion as more institutional, medical and corporate office space came online.

District Energy systems provide steam and chilled water throughout the NOrMC area by a complex distribution piping system. The chilled

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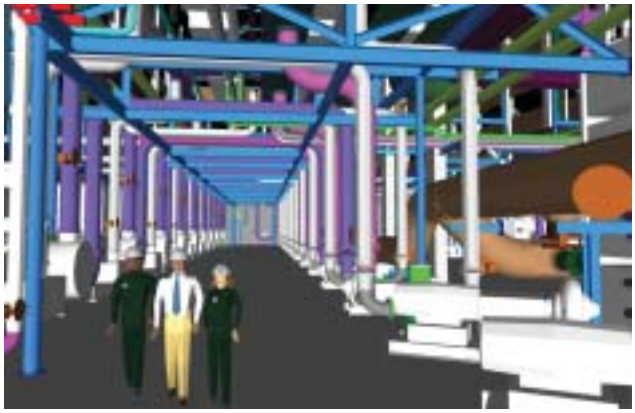
water is used to cool the buildings and a thermal energy storage system is used to make ice during off-peak hours. That ice is then used to help chill water during business hours when labs, medical buildings, office and other services are at full capacity. Steam is used for heating during the winter.

With experienced professionals in all areas of engineering, architecture and land surveying, Wink is a single-source provider of comprehensive architectural and engineering design services. Wink's team provided mechanical, structural and electrical engineering for NOrMC's thermal facility and managed other aspects of the city's expansion project, including the design of a parking garage, distribution facilities and the rerouting of existing utilities.



No Room for Error

With a project of this scope, Wink's industry-recognized and award-winning designers were faced with several unique challenges. To begin with, the bid for the project was fixed. This left no room for error. Otherwise, Wink would endure considerable financial losses on the project. This made it imperative for Wink to use the most precise, reliable and cost-effective design tools, to be certain that design flaws wouldn't emerge during construction that would require costly, time-consuming delays.

The 3D Solution

This led Wink to 3D design software. Other participants in the project were skeptical of 3D design because of past experiences. However, Wink understood the inherent benefits of the software and had complete confidence in Bentley AutoPLANT.

"We proved our ability right out of the gate when we delivered an AutoPLANT-designed 3D model of the proposed plant ahead of schedule," says Larry Miller, senior lead designer at Wink. "The challenge was delivering a new piping distribution network around the three levels of existing equipment. This included defining all the-major conduits, the cement and wood piles, and emergency backup tanks below ground before the foundation could be laid down."

By the time the project was completed, the plant was installed exactly as it had been modeled in the 3D environment. Wink designed the entire facility in the virtual AutoPLANT environment, putting in equipment and piping that would represent future growth. While doing so, Wink had to meet clearance requirements so forklifts and trucks could install the future equipment without interference. Also included were N1 redundancy and 100-year flood specifications, and three 20,000-gallon diesel emergency backup tanks capable of keeping the facility running for 96 hours on its own power.

For this project, four Wink designers worked simultaneously using the AutoPLANT platform's various applications to produce 60 piping drawings totaling 300 runs (equaling 15,000 linear feet) in one month. An additional 90 drawings were generated using AutoPLANT Structural and electrical applications, easily accommodating the five-month design window. For the very large and custom designed chilled-water facility, Wink relied heavily on the flexibility behind Bentley's AutoPIPE application to create the refrigeration system, showing all of the piping, equipment, pipe supports and structural steel. Unique to this project was designing the piping system that consisted of complex flow dynamics in the refrigeration system. With piping ranging from four to 48 inches, the challenge was keeping a consistent flow of water coming in and out of the plant to prevent overloading any one section of the system.

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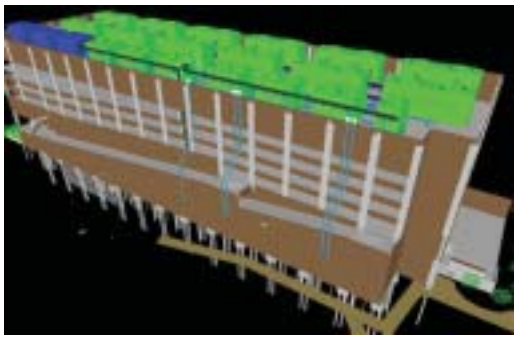
—Michael Herzog, senior project manager, Wink, Incorporated

The chilling facility required 24-inch piping to handle an ice storage capacity of 52,000 ton-hours. "When we pulled out all the books, the largest specifications we could find for refrigeration was six-inch piping and cooling conditions for 42 degrees Fahrenheit," says Michael Herzog, senior project manager at Wink. "This is where Bentley technology really proved its flexibility. We were able to take a virtual walk through the system. We designed the tanks, heater cores, the necessary piping – both carbon steel and PVC – to check for interference, and meet the minimum clearance requirements and specifications."

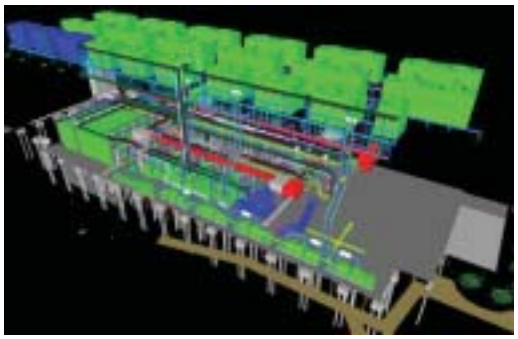


Nine Engineers, 8,000 Design Hours Saved and a $60,000 Bonus Gained

Within the 3D Bentley AutoPLANT environment, the overall project can be viewed while thoroughly checking for interferences by rotating and viewing it throughout the design process. AutoPLANT® AutoISOGEN™ program allowed Wink designers to automatically generate fabrication, system and erection isometrics from the 3D model. This proved to be vital to the design team, as many of the dimensions required irregular and unusual sloping, which was a major design challenge. The key to Wink's success on this project was using Bentley software to dramatically reduce the time needed to create isometric drawings and implement design changes "on the fly."

"When it comes to getting design approval, there's not a faster, more accurate way than by deploying AutoPLANT Explorer," says Herzog. "Whether it was getting sign off on the fiber optic network at the thermal facility, or the placement of heat exchanges or PLCs on the network, AutoPLANT Explorer's accurate color-coding, standards-based 3D images made it simple. On interference checking alone, we saved over 1,000 hours."

By deploying AutoPLANT technology, Wink only used nine team members on the entire project, something that would typically take 13-15 engineers, and saved over 8,000 hours of design time. Additionally, Wink didn't incur any losses on the fixed bid for the project. Instead, it received a $60,000 bonus at the time of completion. The bonus was based on rework that came out to be less than one-half of one-percent, saving considerable time on the construction side due to the detailed accuracy of the AutoPLANT models and the expertise of Wink engineers and designers.



The Benefits of a Standards-Based Environment

One of the largest benefits realized by Wink designers was working in the standards-based AutoPLANT environment. "We had people with significantly different levels of experience working together on this project," says Miller. "A couple of our designers have been working on the AutoCAD® platform for many years, while some of our newer designers have only been in the field for a year or two. Bentley's cutting-edge, intuitive technology allowed them all to easily leverage their existing AutoCAD knowledge to useAutoPLANT. It only took two days of training and we were onto modeling the project."

Meeting Aesthetic Requirements

Another unique challenge on the project was designing for the aesthetic requirements that were expected by the healthcare and biomedical complex. To the untrained eye, it would appear that the first level of the new 600-vehicle parking garage is taller than the rest. That's because within that space rests District Energy's control room and the bulk of the cooling systems. On the roof, the storage and chillers are surrounded by the structure's natural siding. Additionally, Wink designers placed a park, complete with landscaping, foliage and benches for workers and students to add to the overall aesthetics of the complex.

Saving Time and Increasing Accuracy

While the isometrics were being extracted from the 3D model to create drawings, AutoPLANT AutoISOGEN also generated the Bill of Materials (BOM) for the piping, equipment and electrical components like the cable trays. This allows for design approval and procurement functions to run in parallel. Besides the time savings realized, the accuracy of the AutoPIPE model allowed procurement personnel to minimize the excess materials that accompany many large projects. This resulted in substantial cost savings and increased overall project safety.

NOrMC Today

The New Orleans Medical Complex, Inc., has run District Energy with zero downtime since the completion of the project. The $50 million plant complex serves Charity Hospital and its satellite buildings, LSU Medical School, Delgado School of Nursing, and several other NOrMC

institutions. It includes a new 600-vehicle parking garage, as well as offices. NOrMC officials say the environmental improvements achieved by the new system is equivalent to removing 1,500 vehicles from the streets of New Orleans.

Winning Awards and Setting the Standard with Bentley AutoPLANT

From the District Energy project alone, Wink has received several awards in construction, concrete projects, and design and engineering. Additionally, Wink has won new contracts and is expanding on the district energy piping distribution system to include other areas of the city. Going forward, AutoPLANT will continue to be the standard at Wink.

"Bentley technology made the project work," says Miller. "We were able to start designing sooner, finish quicker and the value of 3D modeling was proved by an astonishingly minimal amount of rework on a project of this size, customization and complexity."

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