### **KLH Engineers**

**Customer Success Story** 

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Early on, we recognized that the BIM approach could benefit our firm, our clients, and our industry. Our strategic commitment to BIM and Revit MEP helps give us a more lasting competitive advantage.

Jeff Millard
Principal
KLH Engineers

# **BIM-Enabled MEP Design**

Autodesk BIM solutions help KLH Engineers design an energy-efficient library environment.



Photograph of the renovated Klau Library at Hebrew Union College. Image courtesy of KLH Engineers. Photo by J.Miles Wolf.

#### The Firm

Kohrs Lonnemann Heil Engineers (KLH Engineers) provides mechanical, electrical, and plumbing (MEP) design services for new and existing buildings. The firm also offers communication and information technology design, commissioning, lighting design, and energy solution services. Founded in 1955, KLH has a proven record of delivering accurate documents, meeting aggressive schedules, and achieving sustainability goals for its health care, civic, retail, education, and commercial clients. Based in Kentucky and Ohio, KLH Engineers employs around 90 highly trained engineers and support staff dedicated to helping clients meet their goals.

In keeping with the firm's innovative culture, KLH Engineers was an early adopter of building information modeling (BIM), implementing Autodesk® Revit® MEP software in 2006. Since then, the firm has used Autodesk BIM solutions on more than 35 projects at a total construction value of nearly \$400 million. KLH has become a strong advocate for BIM as a means to help transform building design and delivery practices and improve building performance. In recognition of its industry leadership, the firm received the Autodesk BIM Experience Award in 2010.

#### The Challenge

One of KLH's first BIM projects was the \$12.5 million renovation of the Hebrew Union College Klau Library in Cincinnati, Ohio. The library is home to the second-largest Hebraic text collection outside of Jerusalem with a vast collection of rare books, some more than a thousand years old. The project entailed the renovation of the existing five-story library and the construction of a new addition with stacks and a viewing area for the collection, as well as conference and office spaces.

To return the books to a permanent location as quickly as possible, the project had an aggressive construction schedule. "The oldest books were temporarily stored in a separate building that would eventually be demolished," explains Jeff Millard, principal at KLH. "We had to carefully plan and phase the project to ensure that this building, and the rest of the campus, stayed online during construction. Furthermore, our design had to provide precise humidity and temperature control for the library and meet the college's requirement for energy efficiency."

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# With help from BIM, time spent planning and coordinating system pathways was cut in half.

#### **The Solution**

The extended project team, including the structural engineer THP Limited and architect SHP Leading Design (another Autodesk BIM Experience Award winner), used software based on the Autodesk<sup>®</sup> Revit<sup>®</sup> platform to share and coordinate their designs. "Our BIM approach was critical for helping to minimize RFIs and construction delays," says Stephen Federle, KLH electrical engineer. "Moreover, we used the information in our collective design models to estimate, order, and accelerate the submittal process—helping to expedite the project schedule to get the books back into circulation."

#### **Coordinate Designs**

"All the new mechanical systems needed to fit within the existing structure of the old library," explains Millard. "On a daily basis we integrated the design models of the extended project team, helping us to identify, track, update, and react to design changes."

"For example, the new library included very tall book stacks," says Federle. "We had to coordinate those stacks with the existing structure, and then figure out how to fit the new duct work, lights, and technology systems in the remaining few feet above the stacks." With assistance from an integrated design model, KLH more quickly and accurately routed its systems through those very tight spaces and avoided clashes that might have led to costly on-site schedule delays.

#### **Integrate Energy Analysis**

KLH used the intelligent information in the Revit MEP model to conduct energy analyses and develop a design that satisfied the preservation needs of the books and delivered optimal building performance. "We did not have to lose valuable time recreating model data for analysis and instead focused on designing more efficient building systems," remarks Millard.

Building their expertise through experience, KLH now uses Autodesk<sup>®</sup> 3ds Max<sup>®</sup> Design software for daylighting analysis, collaborating with architects to help influence early design decisions with a systems approach to projects. In addition, KLH is implementing Autodesk<sup>®</sup> Green Building Studio<sup>®</sup> web service to help support its sustainable design and energy analysis services.

#### The Result

The Klau Library reopened in 2009 and features a geothermal system that will reduce energy and operating costs by an estimated 40 percent. "Revit MEP helped us visualize how the existing structure, the new construction, and the building systems all fit together—enabling us to make faster, more informed decisions," says Federle. "This was our first Revit MEP project, and with the help of our Autodesk Subscription and Autodesk's technical support, it was a resounding success. We now rely on Autodesk BIM solutions for the majority of our MEP projects."



Rendering of the lighting design for the new stacks. Image courtesy of KLH Engineers.

"Early on, we recognized how the BIM approach could benefit our firm, our clients, and our industry," adds Millard. "Our strategic commitment to BIM and Revit MEP helped give us a more lasting competitive advantage."

For more information, visit **www.autodesk.com/ mep** and **www.autodesk.com/bim**.

Rendering of duct work in the upper level of the library's new addition. Image courtesy of KLH Engineers.



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–Stephen Federle Electrical Engineer KLH Engineers

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