

COMPANY

DLB Associates

LOCATION

Eatontown, New Jersey

SOFTWARE

Autodesk® Building Design Suite Ultimate

Visual collaboration

DLB uses Autodesk BIM solutions to provide virtual design simulations for better project communication

BIM and project visualizations help us convey technical aspects of our engineering designs to our clients and help them better understand those designs. This visual collaboration enables us to translate their needs into optimal solutions.

— **Lee Kopsaftis**
 Director of AEC Services
 DLB Associates



Image courtesy of DLB Associates: Datacenter Interior Visualization.

The company

DLB Associates is a technology-focused engineering firm noted for solving clients' problems related to the planning, design, construction management, and commissioning of mechanically and electrically intensive projects. Since its founding in 1980, DLB has challenged and changed traditional notions of engineering. Some of its landmark projects include: Mecca's Grand Mosque (DLB designed a 36,000-ton central plant that essentially air-conditions an open-aired space the size of six football fields); and state-of-the-art Google data centers (DLB designed and managed the construction of eight Google data centers around the world, resulting in facilities that use 50% less energy than typical data centers).

The challenge

"Lingering economic uncertainties are putting owners under tremendous cost pressures," explains Lee Kopsaftis, DLB's director of AEC services. "Consequently, our clients are paying much more attention to their capital projects and investments, which is changing how we engage with them." As such, the New Jersey-based engineering firm places extraordinary emphasis on the importance of effective communication to ensure its clients are informed and educated, expectations are met, and surprises are avoided. But communicating complicated design strategies can be challenging, especially when dealing with non-technical project stakeholders.

The solution

DLB relies on Building Information Modeling (BIM) to provide virtual design simulations for project communication and collaboration. "BIM and project visualizations help us convey technical aspects of our engineering designs to our clients and help them better understand those designs," says Kopsaftis. "This visual collaboration enables us to translate their needs into optimal solutions." The backbone of the firm's virtual simulation capabilities is the Autodesk® Building Design Suite Ultimate Edition, including Autodesk® AutoCAD®, Autodesk® Navisworks® Manage, Autodesk® 3ds Max® Design, and Autodesk® Revit® software.

Use project visualizations to help convey complicated, technical designs to clients and project stakeholders

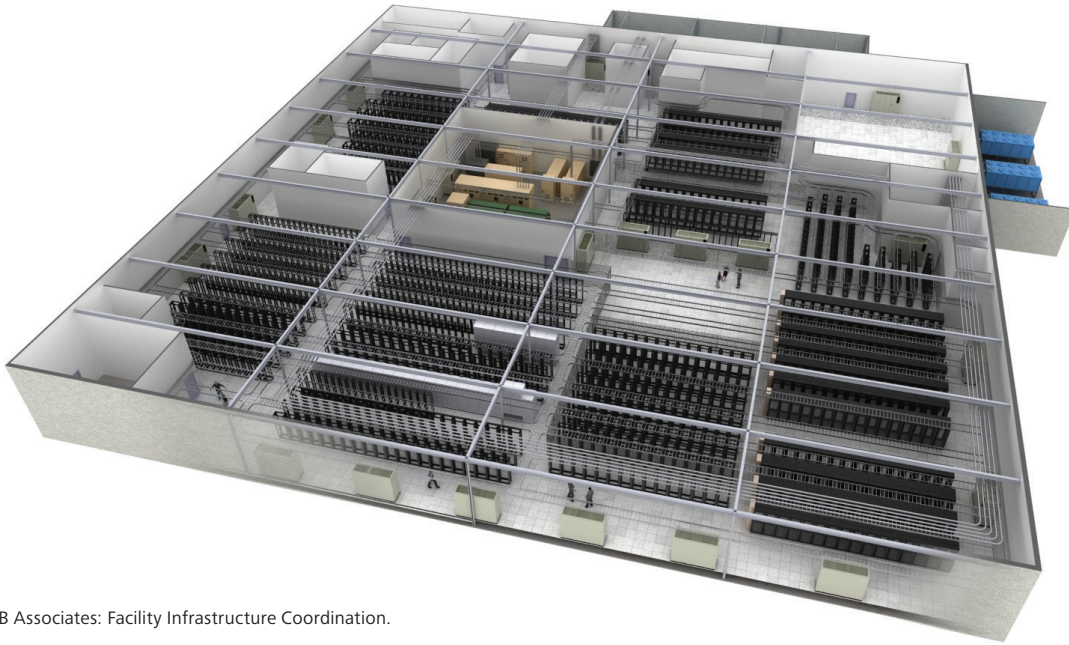


Image courtesy of DLB Associates: Facility Infrastructure Coordination.

Visual communication

Most companies cite project coordination and documentation efficiency as the major benefits of BIM. Befitting its status as an innovator, DLB takes a different view—putting project visualization at the top of the list. “We are a very graphically-oriented company,” says DLB’s BIM manager, Vadim Vlasov. “Our offices are packed with HD screens and monitors, and look more like TV stations than an engineering firm.” So in 2006, when the economy was faltering and many capital projects were put on hold, DLB took advantage of the down time to fast track the onboarding of BIM technology. “Instead of going dormant, we made a strategic decision to implement BIM,” explains Kopsaftis. “We knew it would improve our ability to collaborate with our clients and deliver projects that exceed their expectations—positioning us to outperform our competition when the economy rebounded.”

“We work hard to understand and crystalize the client’s needs by proposing a range of options early on in the predesign stage, often presented using the visualization capabilities of Autodesk BIM solutions,” explains DLB principal and vice president Dan Dyer. “This use of visualization so early in a project may be unusual, but it gives our

clients a better understanding of their projects and can immediately instill trust.” In addition, visualizations have improved the firm’s interactions with clients where language barriers can hamper verbal communication, helping the firm penetrate new international markets.

DLB produces a range of visualizations including near-photorealistic renderings, virtual walkthroughs, lighting analyses, and daylighting simulations. The firm uses Autodesk Revit software as its primary modeling environment, beginning from conceptual design through to detailed engineering and drawing production. Renderings and animations bring the virtual project to life for DLB’s clients, and also help the firm identify spatial constraints early on in the design—making downstream coordination easier. The firm then uses Revit for detailed project design, analyses, and documentation, and imports the Revit models to Navisworks Manage (for project coordination and construction planning) and 3ds Max (for near-photorealistic renderings, cinematic animations, and advanced lighting simulations).

Holistic design

DLB is known for its comprehensive, collaborative approach to projects, and its staff is trained to have a multi-discipline understanding of a project that helps inform design alternatives and decision-making. In that spirit, the firm takes full advantage of the comprehensive set of interoperable tools in the Building Design Suite for MEP, architectural, and structural design and documentation, visualization, simulation, and project collaboration.

For example, if the project architect does not provide a 3D design model, DLB often uses Revit to create an architectural model of the building before beginning its own design to facilitate spatial planning and minimize clashes. Moreover, multi-discipline design models are routinely combined in Navisworks Manage for whole-project simulation and coordination.

In addition, DLB uses the Building Design Suite to train its new engineers. “Utilizing a 3D design environment helps them understand how things fit together because they actually see the physical size of design elements—a valve or a duct or a structural column, for example,” says Kopsaftis. “Instead of looking at stick figure symbols, they are viewing a virtual representation of the emerging design in the context of the whole building, and can better understand how space needs to be planned and designs coordinated.”

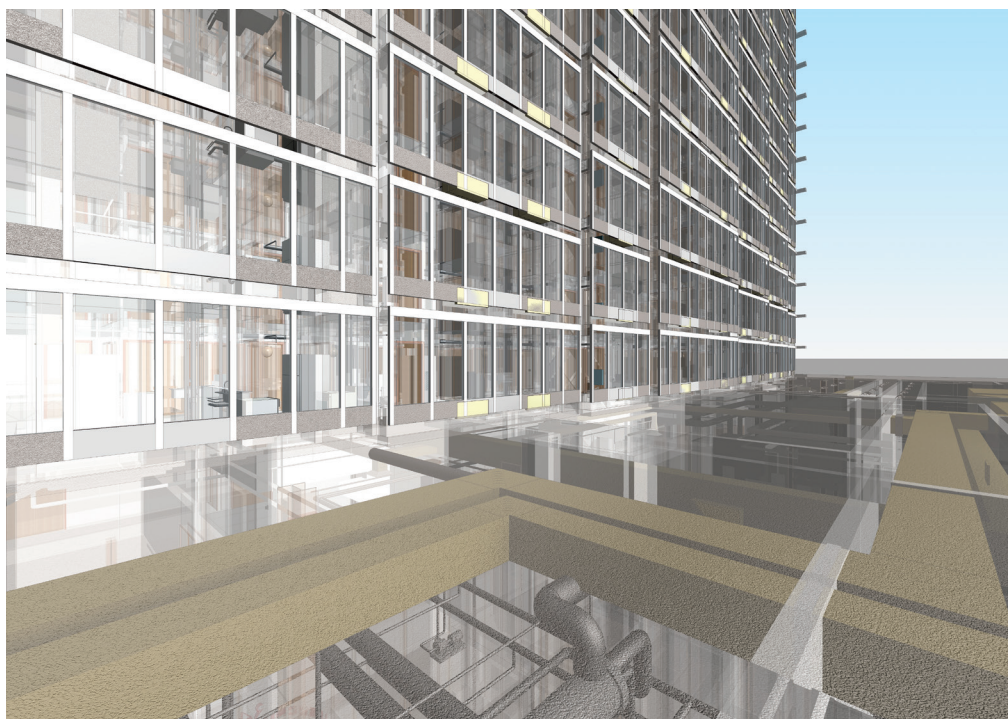


Image courtesy of DLB Associates: Mixed-Use High Rise Building (Residential and Commercial).

Fly over and walk through virtual designs

DLB uses animated walkthroughs and real-time navigation of integrated building models to bring its engineering designs to life. “Virtual walkthroughs and flyovers provide a first-person perspective of a project, giving our clients a better feel for the space and how it may suit their needs,” says Kopsaftis. “With traditional 2D design methods, the production of these visualizations would be cost-prohibitive. But with BIM, we can quickly and easily generate these visualizations to provide extra value to our clients.”

For example, the firm’s primary use of virtual walkthroughs is to review design options with extended project teams and clients. On a recent data center project, the client also wanted to review the exterior security features for the facility, so DLB quickly created a flyover animation of the building and the site, displaying the fences, gates, and other security barriers featured in the overall design. In addition, the firm performed a virtual walkthrough of the facility’s interior for the client’s operations and maintenance (O&M) staff to get feedback regarding space requirement for equipment servicing or replacement.

Real life renderings

DLB also produces many high fidelity, high impact renderings of its building models for more effective project presentation and review, and more detailed construction documentation. Similar to virtual walkthroughs, the use of the intelligent 3D models stemming from BIM processes makes the production of these visualizations quicker and more cost-effective. For example, DLB used Revit software to develop its engineering design for a large data center. During its design development, the firm imported the Revit model into 3ds Max Design to generate many near-photorealistic renderings of the design, helping stakeholders better understand, evaluate, and collaborate on the design of their data center.

Lighting analysis

DLB uses the lighting analysis tools within the Autodesk Building Design Suite to study the impact of lighting designs both quantitatively and qualitatively—analyzing whether the design satisfies the required lighting levels and visualizing the aesthetic impact of the lighting in the space and lit surfaces. For example, one of the firm’s clients has designed retractable lighting systems for operating rooms (allowing the rooms to be thoroughly sanitized between procedures and therefore reduce the spread of infection). “To help confirm that lighting levels of the

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— **Vadim Vlasov**
BIM Manager
DLB Associates

retractable features were adequate for the medical staff, we modeled the lighting system in 3ds Max to perform advanced photometric lighting simulations,” says Kopsaftis. “These visualizations helped the client to see what the actual light would look like in the operating room and how it would reflect off surfaces and equipment in the room to better inform the design process.”

Daylighting simulations

Effective daylighting is a key factor for a building’s performance, and therefore, daylighting calculations and simulations play an important role in DLB’s engineering designs. “Model-based design and the daylighting tools in Autodesk BIM solutions give us a better understanding of the sun’s impact on and inside a building,” says Vlasov. “For example, on a recent educational facility project, we used the daylighting tools in the Revit software to help the project team determine optimal building orientation, window locations, and roof overhangs to maximize energy-efficiency and save our client money through reduced energy bills.” The firm also uses daylighting simulations to assess the comfort level of people in the building (helping to avoid ‘hot spots’ where the sunlight makes a space uncomfortably hot and/or very expensive to cool) and to better validate calculated heating and cooling loads for rooms and spaces in the building.

Better documentation

Even when DLB used 2D drawing production, the company's documentation included a lot of hand-drawn or CAD-based isometrics and details, providing better graphical insight into the project from bidding to installation. "Now that we use BIM software for model-based design, it is much easier and faster to produce drawings with all sorts of elevations, cutaways, and sections—not to mention amazing renderings and animations that bring the virtual project to life for our clients and their contractors," says Vlasov. "BIM and model-based visualizations improve the communication of our design to the contractor, resulting in better constructability and less field rework."

Virtual as-built simulations

As the design matures, DLB uses the Revit model as a central database to facilitate project delivery and, in some cases, operations. "We're making a significant investment in this area, because we realize that BIM represents a virtualization of a client's as-designed and as-built facility," says Dyer. DLB also provides construction and operations support services for their clients. For these clients, O&M personnel can use a building model to virtually navigate and visualize an existing facility without leaving their office and retrieve mission-critical information with the click of a mouse. "BIM is already delivering optimized buildings," says Dyer. "We're positioning ourselves to lead the next wave—delivering optimized building operations."

The result

"There's definitely a 'wow' factor when clients (and prospective clients) see the renderings and walkthroughs we've created," says Kopsaftis. "But from our vantage, these visualizations are simply the best way to communicate a design and provide superior engineering design services." Dyer adds, "Autodesk BIM solutions and the visualization capabilities they offer help us deliver higher quality services, at the same or lower cost—helping provide value to clients from early predesign to handover and operations, and resulting in projects that truly meet the owner's needs."

For more information, visit www.autodesk.com/BIM

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—**Dan Dyer**
DLB Principal
DLB Associates



Image courtesy of DLB Associates: Commercial Building Exterior Visualization.

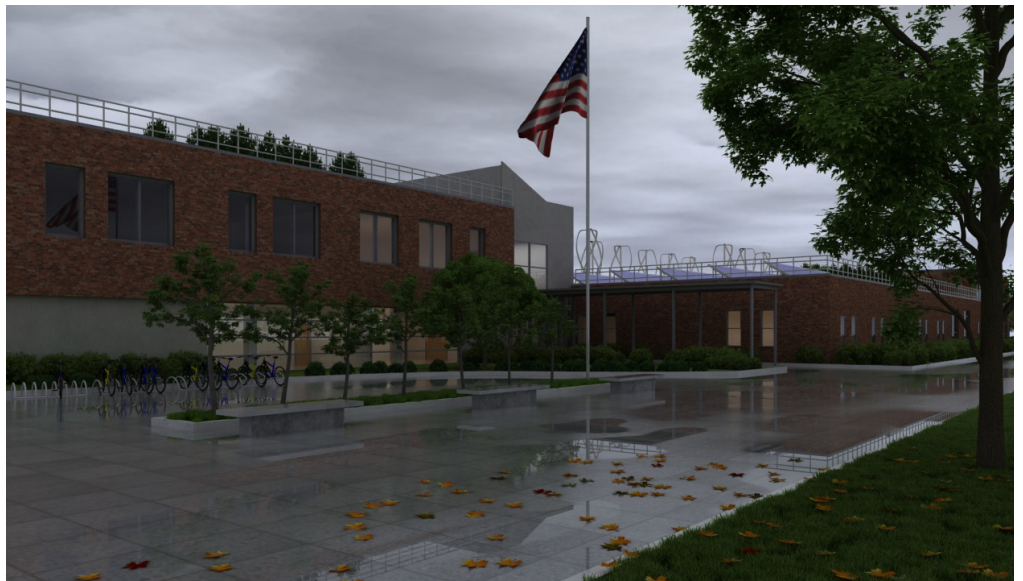


Image courtesy of DLB Associates: School Exterior Visualization with Rain.

*Autodesk Revit 2014 software is only available as part of the Autodesk® Building Design Suite 2014 Premium and Ultimate Editions and Autodesk® Infrastructure Design Suite 2014 Ultimate Edition.

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