



SHARPENING THE COMPETITIVE EDGE WITH NVIDIA QUADRO

NEENAN COMPANY
CASE STUDY

Environmentally friendly – “green” – building practices are a must-have in today’s commercial building environment. Green practices have evolved from a small niche category into a thriving market. To gain a significant competitive advantage, construction firms are utilizing high-end design and visualization tools to drive their efforts to exceed accreditation standards set forth by the Leadership in Energy and Environmental Design (LEED).

But complying with LEED certification requirements, and proving compliance, is challenging and time-consuming. In the past, builders incurred numerous change orders and faced added costs and time over-runs because LEED standards could not be measured until after construction was completed. Today however, high-end design, simulation, and visualization capabilities enable construction companies to determine the necessary materials, quickly adjust dimensions, and integrate other factors to achieve the green standards. The result: saving valuable time and money.

The Neenan Company, a Colorado-based design-build firm, regularly incorporates sustainable features in its projects and is a leader when it comes to achieving LEED certification.



Neenan relies on sophisticated software tools – including Autodesk’s Revit, 3ds max, Navisworks, and AutoCAD – all powered by NVIDIA Quadro professional graphics solutions to support its highly collaborative “Archistruction®” design-build approach.

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“Being able to design collaboratively in 3D, especially with team members at various job sites, speeds our entire design-build process. NVIDIA Quadro graphics helps us stay on time and on budget, giving us a leg up on our competitors,” says Fred Roberts, a designer at Neenan. “Our 3D tools let us quickly view all parts of a building from multiple vantage points, so we can identify difficult elements and focus our attention on finding the best solutions – including those that will score the highest number of LEED points.”

Neenan utilizes a range of Quadro GPUs to drive its nearly 40 desktside workstations. In addition, Neenan takes advantage of NVIDIA Quadro mobile solutions so everyone involved in a project can work collaboratively both in the office and on the job site.

Seeing before building

Recently, Neenan was hired to build two publicly funded elementary schools and achieve LEED Gold certification. To intensify Neenan’s challenge, the schools were located in one of the most severe climates in the U.S., so every aspect of the design had to account for extremely cold conditions.

To receive its LEED certification and keep the project at or below budget, Neenan called on its entire arsenal of Quadro-driven 3D design and visualization tools.

Neenan's engineers used Revit building information management (BIM) software to create structural drawings for the schools, while a variety of subcontractors delivered their drawings as 3D AutoCAD files. The individual construction drawings were seamlessly integrated in Navisworks, where Neenan's designers performed real-time edits and interference checks, such as making sure heating ducts, lighting fixtures, or structural beams did not occupy the same space.

The owners could see exactly what their finished buildings would look like, before actual construction began.

From there, Neenan imported the Revit models of all the school rooms into 3ds max which allowed the designers to easily create walk-throughs and fly-throughs of all the schools' rooms. Working effortlessly together, Quadro and 3ds max produced the accurate, high-end real-time simulations needed by both Neenan's staff and the owners of the school buildings.

"The Quadro technology let us visualize all aspects of the design very quickly, proceed smoothly through animated simulations, make changes on the fly, and do everything in real time," says Fred Roberts, a designer at Neenan. "In the past, our old graphics cards couldn't handle real-time fly-throughs, getting hung up, or causing great confusion by jumping suddenly from one room to another, without a logical transition."

By seeing structures in three dimensions and making changes in real time, Neenan team members worked together efficiently to tweak the school design with an eye toward earning maximum LEED points, correcting elements as needed while still in the design stage. Just as importantly, the owners could see exactly what their finished buildings would look like, before actual construction began.

Seeing the light with Quadro

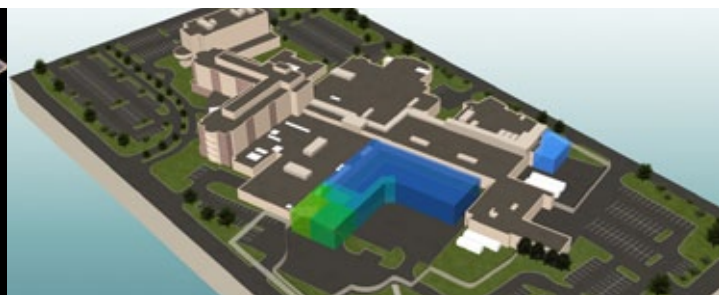
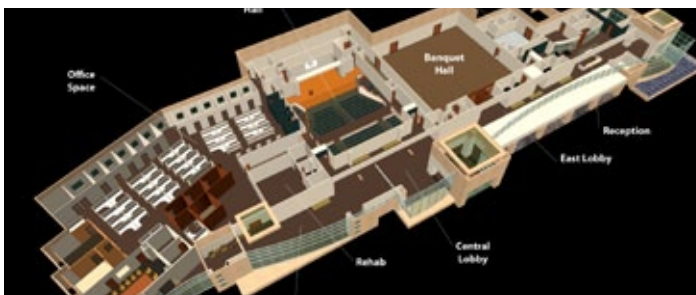
One category for Neenan's LEED Gold certification was sufficient daylighting in each room of the school, measured in foot-candles of light. Constraints of budget and extremely cold weather meant Neenan couldn't simply put huge windows everywhere to let in more light. Instead, they had to ensure all materials used within the building provided enough luminosity and reflectivity to yield the right amount of daylighting.

Using 3ds max, Neenan specified sizes and thickness of window glass and assigned materials to all the surfaces inside the spaces: ceiling tiles, walls, flooring, type and color of paint, etc. A special function in the software calculates daylighting, and driven by Quadro GPUs, Neenan quickly adjusted parameters until the spaces achieved the daylighting levels required for LEED Gold – while simultaneously balancing considerations such as window size vs. heating cost.

"The simulation of all those light photons moving around the space is very computationally-intensive, and Quadro really speeds up the process," says Roberts. "Because all the building systems relate to each another, when you change one thing, it has an impact on everything else. Running on NVIDIA Quadro GPUs allowed us to see the result of each change in real time. It was crucial in our process."

Before implementing its 3D visualization capabilities, Neenan previously had to estimate how the various parameters would interrelate, build the building, and put a meter in the finished room to check daylighting figures. Then, if the estimates were wrong, correcting them would have meant ripping something out and replacing it – rechecking for daylighting values – and repeating as necessary until the standards were met. In the end, it cost dearly in both time and budget over-runs. Being able to do the calculations and see the final results before construction begins saves immeasurable time and money, and sharpens Neenan's competitive edge.

With Quadro-powered Autodesk software, Neenan can more quickly and efficiently achieve its design and LEED ratings goals, collaborating more effectively internally and helping building owners make better decisions. It all translates into green: both the environmental kind and the cash kind.



To learn more about NVIDIA Quadro, go to www.nvidia.com/quadro