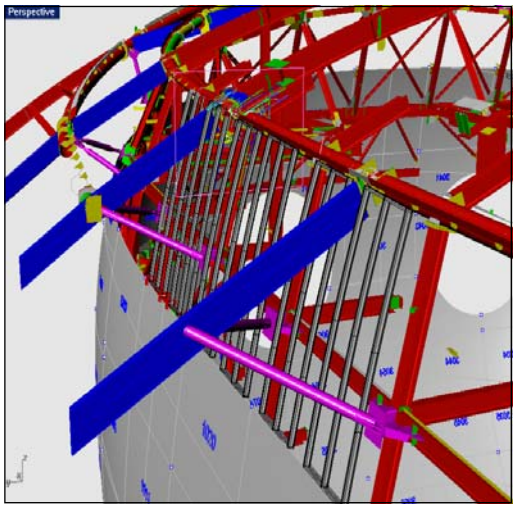
EASTERN EXTERIOR WALL SYSTEMS INC.

EEWS Technical Notes Series
-Focus on Engineering-

By Wayne Martin

Frequently, the best engineering comes from the biggest challenges. **The Curtis R. Priem Experimental Media and Performing Arts Center (EMPAC) at Rensselaer Polytechnic Institute** is an excellent example of this and provided a wonderful opportunity for Ken Loush, Chief Engineer at EEWS, to demonstrate our engineering skills.



At EEWS, we are always driven to design the best solutions where our engineering integrates structural elements with cladding materials and air/vapor barriers to achieve high performance exterior walls. The EMPAC project was an excellent example of this. In fact, at groundbreaking**,** Rensselaer President Shirley Jackson stated, *"With EMPAC, our aim is to create an intellectual community that did not before exist, and a cultural change at Rensselaer that will reverberate globally."* A key component of Rensselaer's campus plan, EMPAC was designed to serve as a platform for pioneering discovery in the arts and science, and as a home to an emerging, collaborative community of artists, engineers, scientists and designers.

To say the least, expectations were high and there were some impressive players in the mix.

Nicholas Grimshaw & Partners' (London and New York) was chosen as the architectural firm after winning an international competition. Davis Brody Bond Aedas was the architect of record and the international engineering firm of Buro Happold's New York office provided structural and mechanical systems design.

The dramatic centerpiece of this facility is the wood clad hull enclosing the theater within the glass exterior building envelope. The shape of the hull created an engineering challenge because it was a highly complex series of varying curves clad uniquely with 4" cedar planks.

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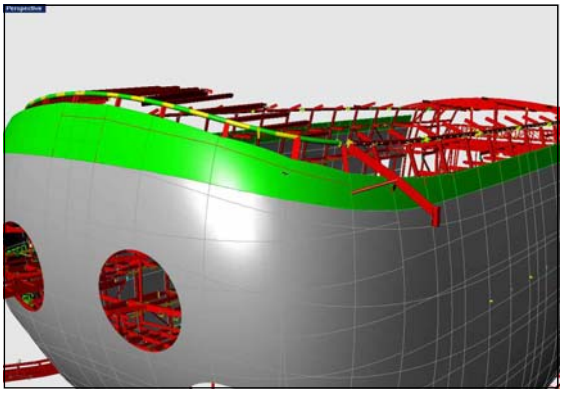
Having worked together on the Kimmel Center for the Performing Arts and the Boston Convention Center, EEWS and Architectural Woodworking Industries (AWI) were well poised for the EMPAC project. Working collaboratively with AWI, project designers and the construction manager, EEWS set out early in the project's development to engineer and fabricate the primary hull frame for this world-class facility.



Solving complex engineering challenges is routine business for EEWS. We pride ourselves on understanding the practical necessities of designing walls that can be built efficiently in the field. Our deep experience with cold rolled framing enables us to visualize how a system must be engineered so it can be fabricated then installed. EMPAC's curved walls created two major design considerations. First, getting the complex shape of the studs and track correct and second, locating the proper anchorages for the wood cladding and attachment to the primary structure. The team analyzed the limitations of the wood cladding and conceptualized the prefabricated sections for optimized field constructability.

The project required the use of Building Information Modeling (BIM) technology and is one of the technology's early success stories. EEWS engineers shared in the utilization of the 3D model to analyze, design and fabricate the hull frame. 3D technology facilitates good coordination among the team including EEWS' fabrication facilities and key vendors because seeing detail problems such as wall curvature and connections virtually makes the path to good solutions much easier and faster.

Connecting the hull's frame to the structure was accomplished by designing light gage shapes, which were welded to ¼" steel plate strongbacks shaped to the curvature of the wall. Our engineering of the light gage attachment shapes successfully accounted for the tolerance in the building frame and panel fabrication while accurately coordinating with the strongbacks.

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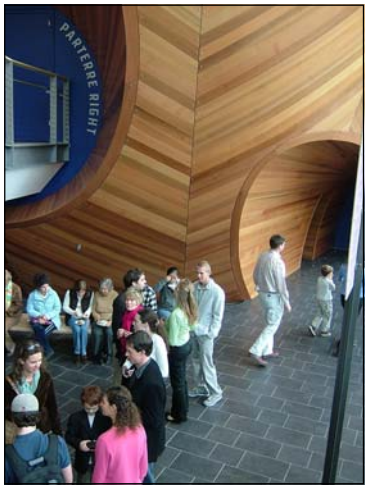
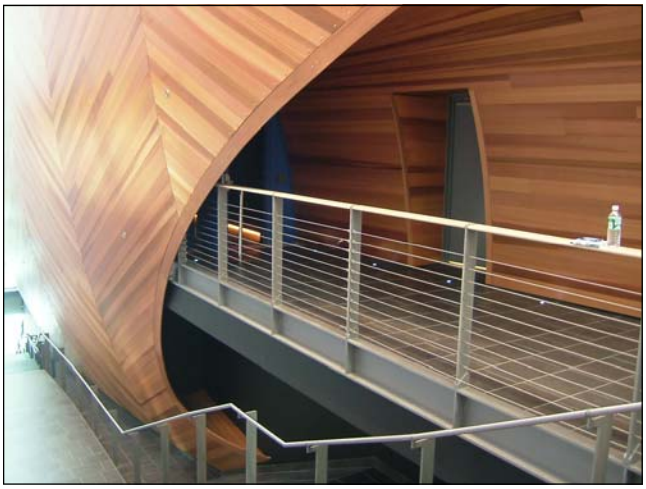


Precise engineering and teamwork enabled the complex system to fit like a glove.

EEWS's engineering doesn't stop with a design on paper (CAD files these days). With EMPAC as in all cases, we test it to be sure it works. Our workflow process includes a proof of design milestone prior to the start of production. The design was mocked-up in our shop and tested to confirm that the design concept was sound and that the required curvature could be achieved using contoured stud and track frames with 18-gage galvanized plate covering. The discipline in our engineering was carefully translated to coincide with labeling of the many system components, which was vital for effective procurement, shop assembly, shipping, and assembly at the site in Troy, NY.



The end result is a unique, state-of-the-art building providing space for collaboration between art and engineering. It is no coincidence that the structure was built employing state-of-the-art construction techniques that depended on collaboration between architect, engineer and contractors.

We at EEWS are proud to have played such a prominent role in the EMPAC project and salute our engineering group that made it work.

To learn more about EEWS's prefabricated exterior wall solutions, please contact us or visit our website at **www.eews.com**.

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