

Gleaming “Waterfall” Refreshes Urban Campus

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Controversy and intense interest have surrounded The Peter B. Lewis Building of the Weatherhead School of Management at Case Western Reserve University ever since architect Frank Gehry unveiled his design. But many Cleveland area residents who shuddered when they first saw photographs of the model in the city's paper, *The Plain Dealer*, have been won over as they watched the shining sculptural curves of the roof take solid shape and form.

According to *Plain Dealer* architecture critic Steven Litt, the building depicts “Gehry's vision of a gleaming waterfall splashing over boulders in a mountain stream.” Sure enough, the stainless steel skin that slinks over and around the sensuous curves of the steel struc-

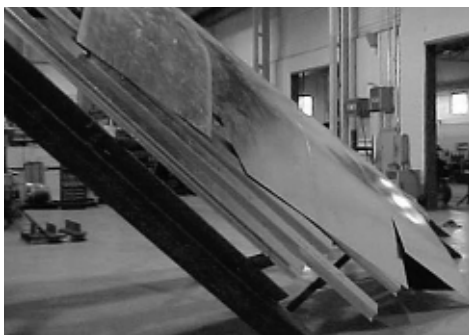


Figure 1.

ture glistens in the sun like so much rushing water. The sight, etched against a blue sky, can be breathtaking. What no longer shows is the meticulous planning, shop fabricating and field welding work that went into creat-



Figure 2.

ing the structural steel supports for that elegant silvery “gown” of shingles the \$61.7 million building now wears. When the project's lead contractor, Hunt Construction Group of Indianapolis, called for bids to fabricate and erect the structural steel, the response was apparently less than overwhelming. However, Mariani Metal Fabricators, Ltd., based across Lake Erie from Cleveland in Toronto, Ontario, answered the call.

Software Jumps Industries

Greg Kern, vice president of the 16-year-old firm, readily admits that the project was a challenge, not only to build, but to price. “This was one of the first uses of CATIA software in the steel construction industry,” he points out. CATIA, which was developed for automotive design and drafting applications, is employed by architect Frank Gehry. “Therefore, the geometry was there for us, because [Gehry] had worked out the models,” says Kern. After winning the \$6 million structural steel contract, Mariani Metal hired a drafting and software training company with automotive industry expertise to

produce project models and about 1,200 drawings using CATIA. Parallel CATIA software stations were established in the Mariani fabrication shop and at the construction site to provide design and fabrication adjustments in real-time, a step which prevented many potential disruptions in production.

Devising a Practical Approach


When considered in the light of traditional steel construction concepts, creating the three-dimensional negative and positive curves that comprise the roof structure posed practical problems both structurally and in terms of cost. After analyzing the complex geometry from a real-world erection standpoint, Mariani Metal proposed fabricating the structural framework in a series of ladders, infills, truss panels and support members, which would be shop-fabricated (Figure 1) and then assembled and field-welded on site. “It was basically a modular approach,” notes Kern.



Figure 3.

Another challenge was devising a method of bending the hundreds of pipes which form the “lines of ruling” (Figures 2 and 3). Almost every pipe utilized in the roof structure had a unique curvature and length. With the help of the CATIA software, Mariani Metal developed a system which permitted unique members to be created within a production line. This allowed stockpiling of pipe sections which could then efficiently feed the shop fabrication process.

Standard AWS D1.1 connection details were employed to weld the 700 tons of Grade 50 pipe and structural steel used to create the framework for the roof. Mariani Metals, which has a full-time workforce of thirty, employed eight welders on the job in the shop; field welding was done by a crew that averaged between eight and sixteen welders. The process most used was shielded metal arc, with semi-automatic flux cored arc welding in selected applications. “We kept the field welding operation as straight-forward as possible, doing the most complex welding in the shop,” says Kern. He proudly states that “the skin lies directly on our pipes, with the pipes themselves creating the geometry of the surface,” and adds that the whole process required the precision of “building a Swiss watch in full scale.” That kind of precision is apparently something the folks at Mariani thrive on; Kern maintains that they would hasten to work on additional Gehry projects.

Across the street from the construction site in Cleveland’s University Circle, the stone caryatids of Case Western Reserve’s gothic style Mather Memorial Building have silently watched a monument to 21st century architecture take dramatic form. When the 149,000 ft.² (13,843 m²) Peter B. Lewis Building is dedicated later this year, the city of Cleveland will have a new landmark. 



This soaring structural steel framework is now hidden by the outer skin and inner walls of the building.