AN **INSIDE** JOB

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When Briese Iron Works, a small steel fabricator and former Quonset Hut manufacturer in Rochester, Minnesota, needed to expand its administrative and drafting capacity, it chose to create a space not only serviceable for its needs, but also as a showcase for its own high-quality work.

Briese Iron Works, in partnership with Rochester-based General Contractor Alvin E. Benike and HGA Architects & Engineers, developed a program that would add some 4,000 square feet of office space to Briese's headquarters while celebrating the company's steel fabrication skills.

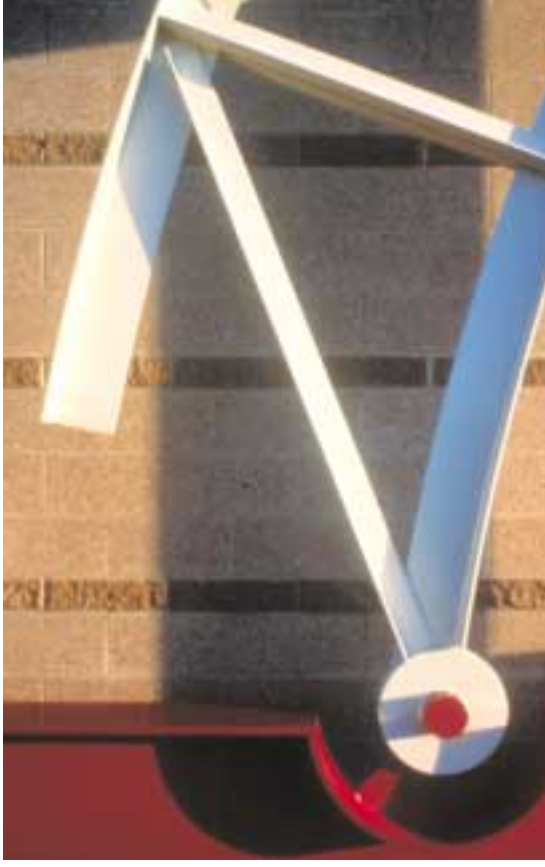
By incorporating forms, shapes and materials commonly found in the steel industry, the design fashions a new headquarters that includes a light-filled reception area, administrative and executive offices, drafting department, and a pair of stacked (one open, one closed) conference rooms. A seamless collaboration between architect, contractor and client as artisan resulted in a structure that belies the behind-the-scenes coordination that went into the project.

Fabricating the building materials right on site, Briese's craftspeople had daily interaction with the designers and developed a close working relationship. "Collaboration was the key to this project," says John Briese, president, whose grandfather founded the company in 1948. "To begin with, we had some ideas of our own, but HGA worked with us to ensure they were realized."

Using the basic Quonset hut half-vaulted shape as a reference for the roofline, the building is enclosed in a utilitarian masonry box carved away at strategic locations to reveal the assemblies inside. This interior is composed of paired pavilions spanned with Warren and Vierendeel trusses. These are joined together by the C-shaped "bowstring" channels that define the central vaulted ceiling containing the stacked conference rooms. Exposed and painted white, these C-channels are cut and finished at random lengths to add visual interest.

Steel fabrication and assembly often inherently includes pairs, symmetries, back-to-back conditions and on-center relationships. Briese's new addition in-

The upper conference room is supported on either side by the bottom chords of Vierendeel trusses made of HSS.



A curved, exposed steel truss on the exterior of the building is supported on one end by a pinned connection on top of a W36 steel beam on the ground.

corporates these same steel fabrication methods as design elements. For example, the two pavilions are supported on paired columns that are symmetrically sleeved into raised concrete pylons extending upwards from the footings.

While HGA was responsible for the overall program and was the engineer of record, we worked closely with the craftspeople at Briese to decide what type of exposed framing would best represent the capabilities of the fabricator. The framing had to provide an open feeling and column-free workspace. Framing for the Quonset-style roof was also a challenge, as the members would have to be bent to the radius of the roofline and have a light appearance. Input from the general contractor was also solicited during the design phase.

It was decided that the flat roof structure would be framed with oversized wide-flange purlins spaced equally across the roof. Because the roof was going to be at a high elevation in this large-volume space, deeper beam sections were used for a visual effect. W18x35 steel beams spaced at 5′-0″ on center were selected for the purlins. Acoustical galvanized steel roof deck was used to highlight the exposed structure and to help control the noise that could be generated from the open office environment.

The framing of the Quonset area of the roof was designed with back-to-back C8x11.5 steel channels bent to a radius of 23′-0″. The channels are spaced 6″ apart, the same width as the W18x35 roof purlins, to allow for the connection to the top flange of the roof purlins on the east end by welding. The west end of the channels are connected to HSS 6x4 stub columns, which were also used to frame clerestory windows allowing natural light to flood the upper conference room as well as the interior work area. Additional back-to-back channels were then attached inside the building for aesthetic purposes and create the appearance that they extend through the roof and into the workspace. The channels were cut off at random lengths similar to the way a break line on a drawing would appear. The roof deck in this area is $1^1/_2$″ wide rib galvanized steel deck, while the exterior finish is a galvanized steel deck with exposed fasteners enhancing the Quonset appearance.

The four steel trusses, spanning north-south in the building, provide support of the main roof purlins and stub columns. On the exterior walls, the trusses are a conventional Warren

An early evening view of Briese Iron Works shows the extensive use of exposed structural steel as a design element.

profile, designed with WT7x17 top and bottom chords and L3x3 web members. The two interior trusses are Vierendeel trusses designed with HSS 10x8 top and bottom chords and HSS 8x8 vertical members. The truss members and profile depths were based more on a visual aspect rather than most efficient member size. This approach appealed to the owner because the trusses would be at an elevation where smaller sizes may not look as prominent. The trusses were designed with a cantilever on both ends allowing the column supports to sit within the building where they could be exposed to view. The roof purlins are connected to the top of the trusses at the panel points by bolting the bottom flange of the purlins to the top chord of the trusses. Threaded studs were welded to the top of the Vierendeel trusses making this connection possible. This allows visitors in the upper conference room to sight down the steel roof beams as they bear on top of the trusses.

The trusses are supported by a paired column structure. These columns are spaced a distance apart equal to the width of the bottom chords of the trusses. The tops of the columns stop at the mid-height of the truss profiles. The truss bears on a wide flange beam that is placed between the columns to give the effect of a cradle type of connection. At their base, the columns bear on round concrete piers, which extend up to a height of three feet above the main floor. The piers are notched to accept the columns and bases plates. This configuration allows the base plate and bolts to be exposed.

The upper conference room floor framing is supported by the bottom chord of the Vierendeel trusses with end plates that are welded below the bottom chord. This allowed for the exposure of a bolted connection just above eye level on the main floor.

Other conference room aesthetic features include an area at the north end where a portion of the composite metal deck and welded wire fabric are left exposed to show a cut-away view of the floor construction. The conference room stair framing, designed by the owner, features an imaginative twisted and wrapped rebar handrail. The handrail and spindles were created by twisting a rebar around a solid bar then coating the handrail in a lacquer to give a more smooth and glossy finish.

Outside the building, an exposed, curved truss with a radius that matches the Quonset roofline is supported on one end by a pin connection on top of a W36 steel beam placed on the ground, and on the other end by a Vierendeel trusses that extend out from the exterior wall. The Vierendeel trusses appear to continue out from the inside of the building, but in fact are bearing on the exterior masonry wall.

Overall, the new facility provides an exceptional work environment for employees which was at the top of John Briese's list when he first considered the addition. Because steel fabrication is a tough job, Briese focused on creating a clean, comfortable, well-lit facility that would help attract and retain the best workers. "I wanted a workplace that would be a selling point for employment," says Briese. "We now have more room, more light and much greater comfort." Naturally, clients have also been impressed.

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