Second Chance

BY TIMOTHY KORPELA, P.E.

In a "do-over" renovation project, an old Des Moines warehouse becomes an innovative new office space with a structural steel-supported nerve center.

RESTORATION OF EXISTING WAREHOUSE FACILITIES INTO MODERN OFFICE SPACES HAS BECOME A RECURRING THEME IN REVITALIZED URBAN AREAS. An exceptional example of this trend is found in the increasingly vibrant East Village neighborhood of Des Moines, Iowa.

Positioned near the foot of the Iowa State Capitol, the tired and neglected General Motors Parts Warehouse received an "extreme makeover" to become the new offices of Two Rivers Marketing Group. But this project was actually the second incarnation of the company's new headquarters.

The project's owner, design team, and contractor were originally brought together in 2003 and completed a stunning restoration and remodeling of the Ramsey Pontiac building in downtown Des Moines that would serve as Two Rivers' headquarters. However, fire struck the primarily wood-framed building in December 2004, two weeks before the owner was going to occupy the space. The building was a complete loss, and rebuilding on that site was not a viable option.

Faced with a desperate need for new space, the owner immediately acquired the steel-framed General Motors warehouse and commissioned the design team and contractor to complete the project in this building.

A Floating Command Center

And complete it they did. Shiffler Associates, the project's architect, has crafted a workplace that is particularly well-suited to Two Rivers. The raw and open space reflects a genuine solidarity with the company's industrial-based clients, while at the same time establishes an atmosphere that lends itself to open creativity for its young and growing staff.

Built in 1935, this 40,000-sq.-ft steel-framed warehouse has a near-football-field-sized footprint of 140 ft by 275 ft. With column bays of roughly 28 ft, 6 in. in both directions, this cavernous shape presented the challenge of establishing an environment of connectivity and flow for the new open office. The answer came in the form a new steel-framed mezzanine that seems to hover in the middle of the space, below a naturally lit central clerestory, and brings it all together. Acting as a "central hub," this 3,000-sq.-ft mezzanine contains the executive offices and a conference area, providing easy access for both management and staff.

A former steel-framed General Motors warehouse provided the structural shell for this renovation.

Structural steel framing was the logical choice for the mezzanine, due to the requirement of maintaining a 12-in. maximum structural floor depth, the 28-ft, 6-in. main spans, and the awkward relative positioning of the existing steel columns to the mezzanine layout. For the mezzanine's floor system, the design team chose 8-in. steel beams and a 4-in. lightweight concrete with a 1½-in. composite steel deck. The mezzanine is comprised of two independent long and narrow platforms, each of which are pierced down the long axis by the existing steel columns. The platforms are linked together by two open-grate catwalk elements, creating an overall mezzanine footprint that is central and proportional to the primary building.

The original architecture of the clerestory area included a continuous line of windows offset roughly 7 ft north and south of the two respective center column lines, creating a more expansive central core. The mezzanine platforms were positioned to take advantage of this offset and further presented a unique opportunity for connecting to the existing columns and beams. Two W8×24 girders are connected to and straddle each side of the existing steel columns. They are further supported on one end by a 3-in. square HSS strut (up to the existing beam), and on the other by a 3-in. square battered HSS column (down to the main floor). Due to the roughly centered position of the existing columns, the greater portion of the mezzanine load is transferred directly to that point, allowing the struts and columns to be lightly framed. As a result, the platform appears to float.

Vibration Concerns

Vibration was a concern for the mezzanine due to the relatively thin structure depth-to-span ratio of the space. The 3-in. square HSS columns and struts, while not carrying the majority of the load, tend to act as dampening stabilizers. The proof is in the pudding, as the overall vibration performance is satisfactory—unless you count the vibration due to the daily cargo trains, which pass within 20 ft of the building.

Prep Work

The existing structural steel framing was recorded, input, and analyzed, along with the new steel framing, using RISA 3D software. The 3D computer modeling rendered accurate analysis of the existing steel framing capacities, as well as deflection criteria.

In addition, soil borings were taken to determine the subterranean conditions of the building and to verify the additional loads to the existing footings. It was discovered that the main-level slab rested on 15 ft of existing fill materials, and that the existing footings were placed on the natural soils below. Steel helical anchors were chosen to support the new battered steel columns and were also extended to the natural soils.

New Life

While a devastating fire can certainly prove catastrophic to any construction project, in the case of Two Rivers, the owner and design professionals responded to the challenge with a unique, inspiring design that creates an open, well-lit workspace and breathes new life into a vintage building. MSC

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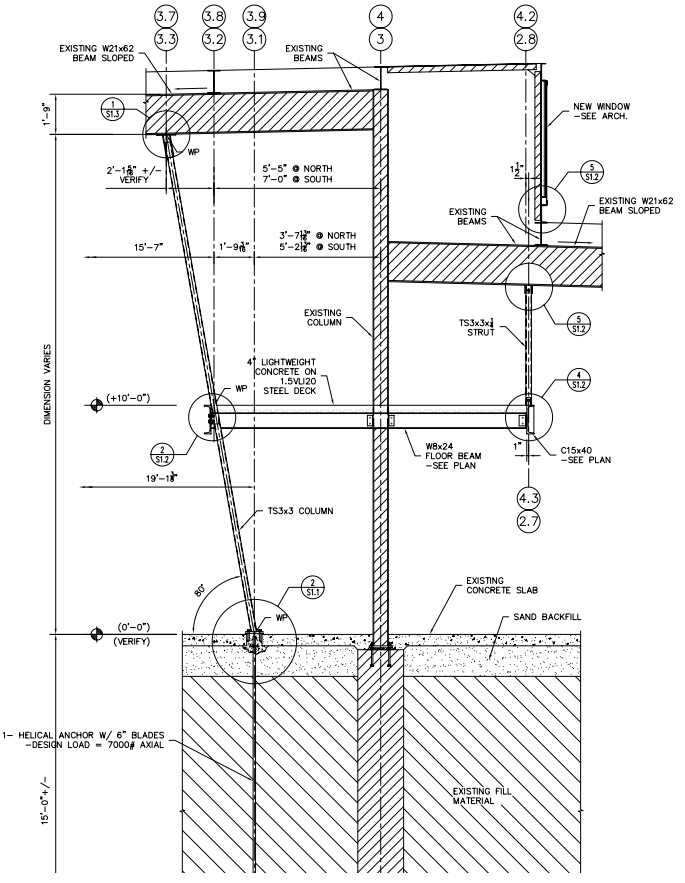

Battered 3-in. square HSS members help support the "floating" mezzanine.