Creating HOME

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The Oaknoll Spring Street expansion provides a growing Iowa City senior community with an alternative to traditional nursing homes and assisted-living facilities.

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AS ONE OF IOWA'S largest life-care communities, Oaknoll Retirement Residence has served retired citizens in Iowa City, Iowa, since 1966. Providing independent and assisted living, as well as health-care options, the Oaknoll community has experienced tremendous growth in recent years.

As a testament to its evolution, Oaknoll has completed two large expansion projects in the last decade, including the recent Oaknoll Spring Street expansion. Providing independent housing for 100 active seniors, the $46 million, six-floor, 69-unit addition is Oaknoll's largest project to date, adding 236,000 sq. ft of usable space. A glass skywalk provides residents with safe and easy year-round access the amenities in the existing main building—including a movie theater, game rooms, a library, a coffee shop and an internet café—while also enjoying a sports pub, restaurant, art studio and exhibition area in the new facility.

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◄ ▲ ► Oaknoll Retirement Residence in Iowa City recently completed a $46 million, six-floor, 69-unit, 236,000-sq.-ft addition that includes a sports pub, restaurant, art studio and exhibition area. A glass skywalk (above) provides residents with safe and easy year-round access the amenities (such as the rooftop deck at right) in the existing main building and the new one.

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The new building uses 515 tons of structural steel, which helped solve several jobsite challenges including the accommodation of 100-ft (and longer) spans, winter construction timelines and a skywalk with floor-to-ceiling walls of glass. It also provided more control over the building's design by using hollow structural sections (HSS) for support beams to reduce beam depths as compared to traditional W-shapes.

Connectivity

Oaknoll residents expressed a strong preference for feeling connected to the outdoors while inside. This was accomplished through extensive use of large windows and public areas, including a $1 million, glass-enclosed pedestrian skywalk between the existing Oaknoll facility and the new addition. Situated in a residential neighborhood with houses on all sides, the goal was to complete the skywalk with minimal disruption to pedestrian and vehicular traffic—especially before and after school. Steel was delivered to the site in manageable packages and was picked directly from the trucks via a tower crane, minimizing street closures.

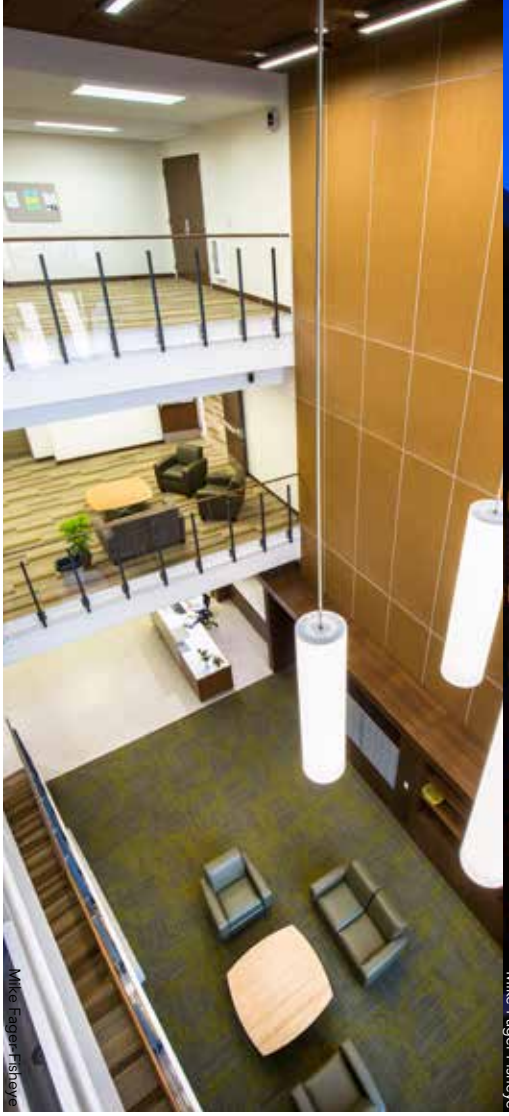
The steel framing for the 112-ft-long skywalk facilitated a 7-ft horizontal bend and a 2-ft elevation change between the existing facility and the new addition. The 60-ton skywalk is hung from an upper girder, which supports the 75-ton floor of the structure plus the 100-lb-per-sq.-ft live load on the walkway. Steel also provided flexibility in connection types by using 1-in.-diameter stainless steel hanger rods hanging the floor structure from the roof primary steel girders. The designers wanted clean lines and an all-glass enclosure for the skywalk, and concealing connections was a key part of accommodating this vision. Overall stability of the skywalk walk was achieved by using beam-to-beam moment connections (see Figure 2).

Oaknoll Spring Street features large, open communal gathering spaces for residents and guests, made possible by steel framing that includes long-span joists. Perimeter columns are concealed in the exterior walls, further opening up the interior. Structural steel beams and long-span joists lend themselves to creating 62-ft by 62-ft column-free meeting rooms on the fifth level that minimized interior columns. In addition, perimeter columns were concealed within the exterior walls, which also helped open the interior spaces.

The tight construction timeline required that construction continue regardless of the weather. But building through all four seasons in eastern Iowa means dealing with large temperature swings (potentially -20 °F to over 100 °F) on building materials that were not yet enclosed. Connections were detailed to allow the steel beams to expand and contract with the seasons while still providing integrity to the not-yet-complete structure. (One example of the thermally unrestrained connection is the steel beam bearing on a masonry wall detail in Figure 1.)

Placing Plank

Although structural steel was the star of the project, the Oaknoll Spring Street building used precast concrete plank for the upper four floors above the two levels of cast-in-place parking area. The



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➤ Large, open communal gathering spaces are made possible by steel framing that includes long-span joists.

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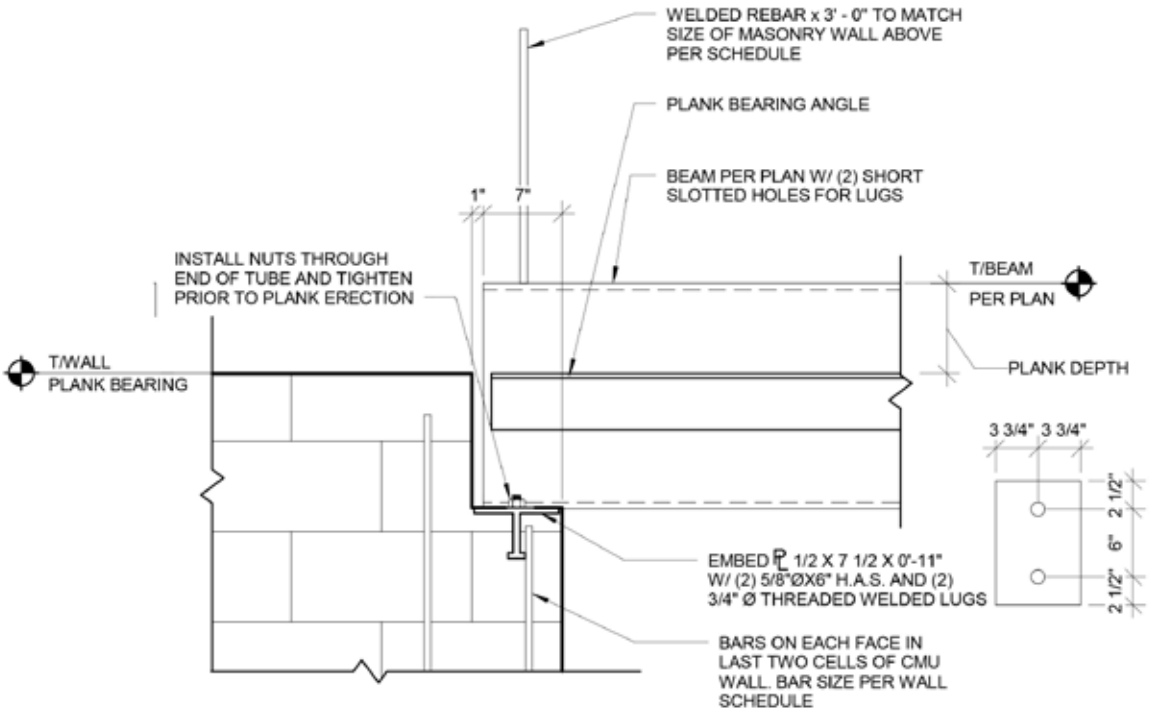
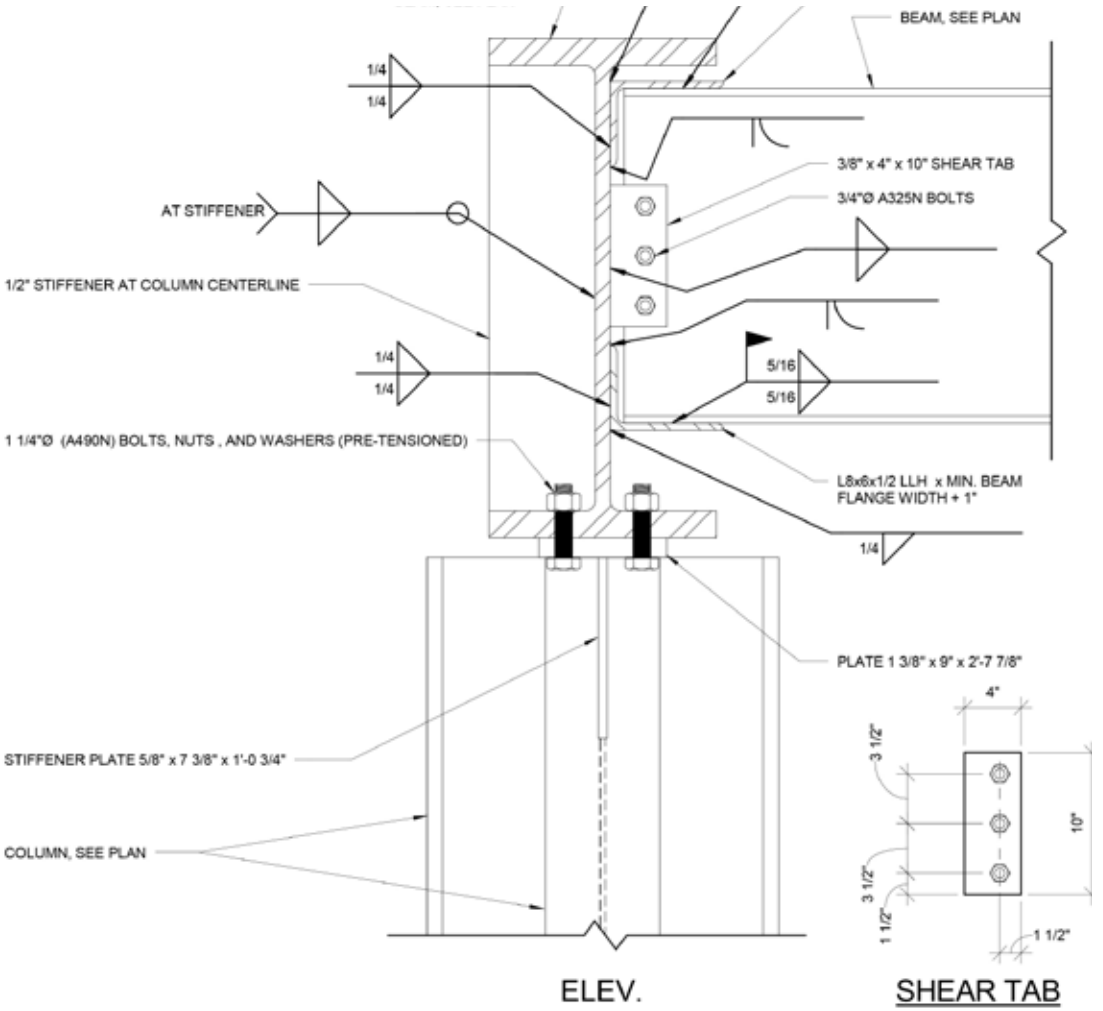


Figure 1. A detail of a beam bearing on a CMU.

Figure 2. A beam-to-beam moment connection detail.



team learned valuable lessons about erection stability when combining the two materials.

For example, beams and girders are designed to support precast plank installed on both sides—a balanced condition. But if erection isn't complete—e.g., if erection must be stopped at a certain point before it's finished—the beam or girder needs to be braced for potential rotational issues when the plank load is only on one side.

However, the erection sequence drawings required that some of the girders be loaded on one side at various times—even though they're designed to be braced with precast on both sides. To accommodate this in the erection sequence, temporary solutions vertical support columns were used for interim stability and stiffness until all structural elements were assembled. The team worked closely with the contractor to minimize rotational issues associated with one-sided girder loading.

In-Depth Solution

The 13-ft floor-to-floor height and the 9-ft floor-to-ceiling height limitations presented a challenge in finding a structural system shallow enough to create two levels of parking and four levels of occupied space, all while keeping the building under 70 ft tall—including any elevator overruns—as the overall building height was limited due to City of Iowa City zoning and the U.S. Federal Aviation Administration (FAA) regulations on building height.

The system needed to allow the beam to be placed *within* the depth of the floor structure rather than *below* it. Using precast planks, the plank would typically be placed on top of the W-section, but that couldn't be done in this situation. The team also wanted to steer clear of placing a precast plank on the bottom flange or putting an angle in the web of a W-section, which would render the system un-erectable. Instead, 100 16-in.-deep and larger HSS were used, with bearing angles on each side.

As Iowa City's senior population continues to grow, the Oaknoll Spring Street addition offers a unique alternative to traditional nursing homes and assisted-living facilities, and this addition provided a structural template for potential future expansion to the facility should the need arise. ■

Owner
Oaknoll Retirement Residence, Iowa City, Iowa

General Contractor
McComas-Lacina Construction, Iowa City

Architect and Structural Engineer
Shive-Hattery, Iowa City

▼ The new building uses 515 tons of structural steel.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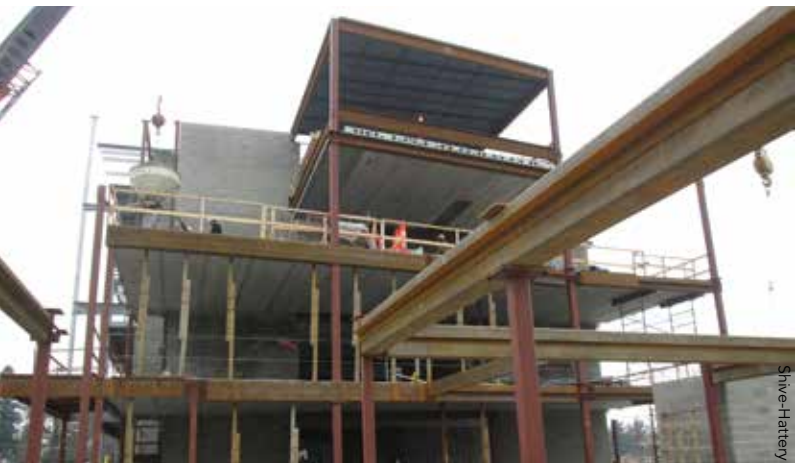
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