

# Concrete joist provides floor support without obstruction

**M**ost everyone learns a lot in school. Some have the good fortune to learn things nobody knew about when the semester began. In fact, it is not uncommon for students, especially graduate students, to make discover-

"This reduced building height can result in significant economy in the cost of the building and in the mechanical and electrical systems installed therein. A further benefit of using joists with web openings is weight reduction. This weight

crete flooring (Figure 2). The walls in Figure 1, which may be precast or cast-in-place concrete, have indentations or notches to mate with the joists supporting the floor, ceiling, or roof.

The joist may have prestressing strand throughout its horizontal members for reinforcement. Additionally, steel reinforcement bars may extend vertically from the top member through the web and into the bottom member to provide added strength.

Preferably, the legs of the U-shaped ties extend into the top member of the joist along either side of the prestressing strands. The whole assembly locks together, making the floor less subject to vibrations typical of steel construction buildings.

There is no word at this time as to whether the university will license this technology to any third-party producer. However, the conveniences the joist provides both contractors and building owners make the invention a nice supplementary product for producers of hollowcore panels or double tees.

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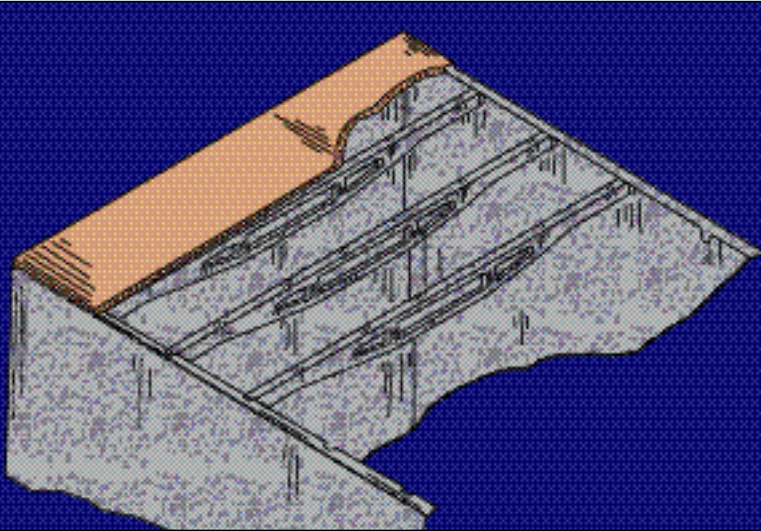


Figure 1. A new prestressed concrete joist has a web design that provides openings for installation of electrical and plumbing equipment.

ies and innovations that ultimately become important contributions to industry and society.

On March 14, 2000, a group of University of Nebraska students came up with just such a technology for a "Method for Manufacturing an Improved Prestressed Concrete Joist." The invention was assigned to the Board of Regents, University of Nebraska, Lincoln.

"Precast concrete double tee joists are one of the most popular precast concrete floor framing systems," reads the patent description. "However, compared with open steel joists, standard concrete joists are heavy and do not allow mechanical and electrical equipment (i.e., HVAC systems, electrical wiring, plumbing, and the like) to pass through them. Placing web openings in these joists to allow equipment to pass through them is a significant improvement, reducing the floor-to-floor height and overall building height.

reduction also results in reduced vertical gravity loads and horizontal seismic forces in the supporting beams, columns, and foundation."

The inventors contend that their new method is not only superior to steel in many respects, including corrosion resistance, but also easy to produce.

The precast, prestressed concrete joist has integral web openings through which mechanical and electrical equipment may pass. The joist consists of two horizontal concrete members; the top member is in compression, the bottom in tension. The horizontal members connect via two vertical concrete members, creating two horizontal, prismatic segments and a web design for equipment installation (Figure 1). The top surface of the joist has a flat upper face to support concrete slab flooring. Shear keys and U-shaped ties are cast into the top member to secure con-

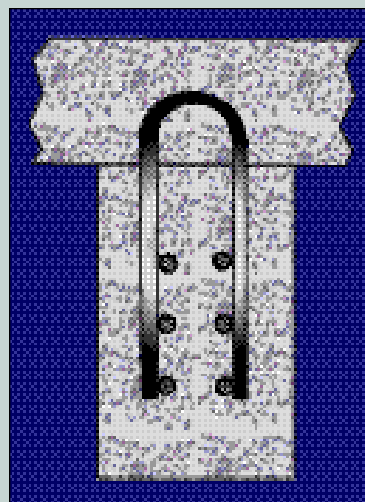


Figure 2. The joist has U-shaped ties for securing of concrete flooring.