Modular Precast Wall System combines the best of precast and masonry

What's New

An opportunity lies between the two extremes of precast concrete customized for a particular project and standardized concrete masonry, one not overlooked by this month's featured inventors.

Howard M. Franklin and Erik Garfinkel of Palo Alto, Calif., recently received a patent on their new "Modular Precast Wall System." "To the inventors' knowledge, no building system employing preformed building units has been developed that provides versatility in design, can accommodate a variety of reinforcement designs for great structural strength, requires relatively small lifting equipment, allows for the rapid construction of buildings, and that does not suffer from the limitations of poured concrete systems," according to the patent.

The wall system, assigned to Megawall Corp. of Palo Alto, Calif., employs large precast, prestressed concrete wall units and a variety of spacer/tensioning, spacer, tensioning, and extension assemblies. The units stack onto threaded vertical wall bars extending from a poured concrete foundation. When stacked, the wall units' voids create vertical and horizontal cavities for grout. The system's web pattern provides both structural integrity and a substantial reduction in wall unit weight, the latter permitting the rapid erection of walls using relatively light-duty lifting equipment.

The spacer/tensioning assembly includes a spacer/tensioning bracket, a tensioning washer, and a tensioning nut. The assembly provides horizontal and vertical alignment during the stacking process and creates mortar joints. The tensioning assembly and the wall bars tension the wall units onto lower wall units and onto the foundation. The integrally formed spacer/tensioning bracket includes a bar-receiving aperture, two upper alignment fins, two lower alignment fins, and two spacer fins. In the preferred embodiment, and in applications using 20-centimeter (8-inch)-wide wall units, the spacer fins, which

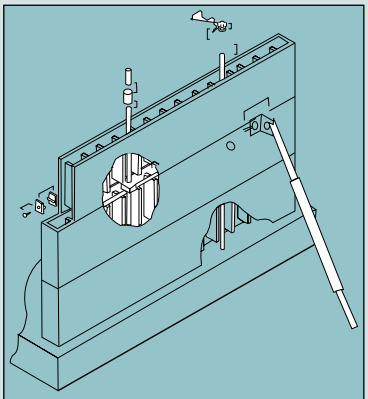

Figure 1. Cutaway view of the preferred embodiment of the invention.

create mortar joints, have a nominal thickness of 0.95 centimeter (0.38 inch).

This spacer-fin thickness is generally greater than 0.95 centimeter (0.38 inch) to ensure that the wall system meets the Uniform Building Code (UBC). The resulting mortar joint is of sufficient thickness to allow inclusion of wall unit face-shell thickness in overall wall unit thickness in structural engineering calculations, based on UBC requirements for masonry walls. According to the UBC, structural wall thickness calculations include only the width of the grout-filled cavities when walls employing concrete masonry units use mortar less than 0.64 centimeter (0.25 inch) thick or none at all.

Therefore, a mortar joint of UBC-compliant thickness allows use of narrower wall units than would otherwise be possible, reducing both wall-unit weight and construction costs. Moreover, the presence of mortar joints allows designers to use similar engineering calculations for the Modular Precast Wall System to ones they would use for a conventional CMU wall.

Since the spacer/tensioning assembly allows the wall system to meet structural requirements, use of a less labor-intensive non-mortar adhesive such as epoxy or similar glue may be allowable in lieu of mortar, although meeting minimum mortar-joint thickness is still necessary. These adhesives would form a watertight joint between wall units' top and bottom surfaces.

For thermal efficiency, the inventors have also designed the wall units' cavities for use with commercially available insulation cores.

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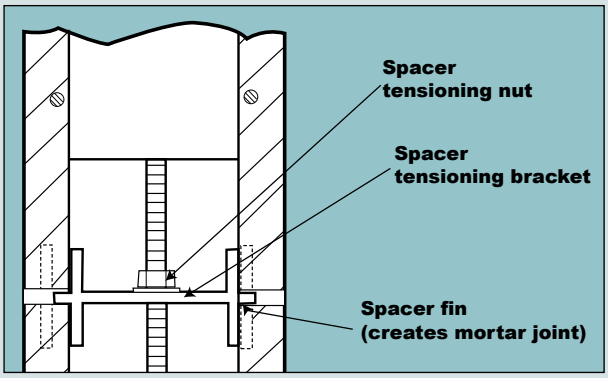

Figure 2. End cross-sectional view through the cavities of two stacked wall units incorporating the combination spacer/tensioning assembly.