



Owner of Unique Structural Systems, LLC and inventor/developer of the Modular Housing System, Tim Siahatgar holds a frame member and patented C-clamp.



Top: Assembling the hospitality office of the developer at the San Diego Westfield Mall. Aluminum framing members can be designed in almost any rectangular configuration. Post and beam framing allows for larger interior spaces and more glass.

Bottom: The completed office offering literature and a scale model of the remaining development plans. The structure is bolted to wooden piers and sits on the pavement slab. It can be disassembled easily and relocated and reassembled or stored conveniently.

Modular Housing System Combines Aluminum Framing with SIP Panels for Unique Synergies

By Robert Mendel, *AB* Alumnus

IRVINE, CA – The Modular Housing System (MHS) developed by Tim Siahatgar of Unique Structural Systems, LLC, is a truly unique, truly modular building system offering so many benefits it's downright remarkable.

MHS is a pre-engineered system using a variety of aluminum extrusions for post-and-beam framing connected by a patented, concealed bolt-and-clamp component. This is supplemented by a bolt-in-place diagonal corner brace for multi-story structures which is usually concealed within wall panels. The sheathing system uses either Structural Insulated Panels (SIPs) or a combination of other panel materials which slide into the channels of the framing members.

While this is undoubtedly an interesting combination of building components the way in which they are integrated provides a varied and synergistic range of effects. The 10 MHS framing components have a channeled profile along their entire length which allows connection from another frame member at any point offering an 'infinite' number of combinations. The channels also readily accommodate modular

window panels or composite panel walls and can be framed to accommodate more conventional windows of any shape.

Roofing, supported by a simple roof truss and extruded profile solid web truss rafters, can be either conventional, SIPs or metal panel roofing. The flooring uses the same extruded solid web truss pieces as joists and can accommodate any conventional flooring material. Additionally the joists will also accommodate a suspended panel ceiling system. Foundation systems can be conventional curtain or slab foundations or piling foundations typical of many post and beam structures.

It all began when Siahatgar first arrived in the U.S. and saw the wood/stud framing system in use here and said to himself, "I don't believe in it and I don't want to work with it as an architect."

Thus began his search for a better building system. Owner of Unique Structural Systems, LLC and inventor and developer of the Modular Housing System, Siahatgar got his Masters degree in architectural engineering in 1976. In 1985

he first developed the system on a small scale for showcase assembly. Seeing the possibilities it offered he expanded the design and converted it into a building system in 1988. He has completed the IBC and ICC certifications in 2008.

Siahatgar says, "This is a truly modular building system. There are several variations of it in Europe developed for non-structural applications. This is the first building system in the U.S. to exploit this technology. To me modular means using the same element in different ways. Existing modular manufacturers could utilize this system to expand their market area, including overseas and export U.S. housing to the rest of the world."

Siahatgar points out another benefit in terms of expanding market area.

"Because it is a true component system, as opposed to modular boxes, transport is easier, faster, more flexible and less expensive. Storage is easy and inexpensive, too."

There are a number of synergies achieved by this system; for one, it offers all the benefits of SIP construction while eliminating the main weakness—the connection of the SIPs—because the SIP is always housed within the framing member's flanges. The system also distributes the panel shear strength across the entire aluminum frame. Further, because the frame corner members are always open utilities can be routed within them. The patented clamping system allows assembly of a structure within a matter of days. This along with non-destructive disassembly makes the structure relocatable in either the same configuration or in an entirely



The unique profile of the Modular Housing System aluminum framing extrusions provides channels which enclose the edges of SIP or other panels and allow connections with other members anywhere along their length.

different one. An MHS structure can be disassembled and reassembled as many as ten times with no damage to the integrity of the aluminum members.

Since only an impact wrench is needed to attach the clamping system a construction team can be trained in one day and time and materials are not wasted due to inaccuracies or errors in the construction phase. This makes the MHS ideal for emergency housing since the quick-connect one-tool assembly can provide quick relief for victims of natural disasters on site. The components can be easily transported to the site and removed and stored again for future use.

One local example built by USS is located in the San Diego Westfield Mall where the mall developer uses it as a hospitality structure to showcase the mall project and its future expansion plans (see photo). A MHS licensee, Kithaus, has created a model line of buildings designed for use as extra space modules meaning studios, cabins, kiosks and off-grid structures.

Siahatgar's current agenda is expansion into residential building with two and three-story homes exploiting the benefits of post-and-beam construction such as larger open spaces and more glass. But Siahatgar has another goal; the aluminum members provide a light weight frame and the use of SIP ceilings reduces load allowing the MHS building the promise of outstanding earthquake resistance. He is currently planning a schedule of shake testing to explore and authenticate this attribute of his system.

Siahatgar is committed to the growth of MHS nationwide through four kinds of licensing participation: 1. Marketing, 2. Marketing and authorized builder, 3. Fabricator license, 4. Manufacturing license.

Existing building designs can be converted by USS within 10 days and they will have a structural engineer design calculations for any size project. With its unique component characteristics, the MHS should prompt wide-ranging acceptance in the building sector.

For more information on the Modular Housing System from USS, circle Reader Service No. 57.

For licensing opportunities in marketing, marketing and authorized building, fabrication or manufacturing circle No. 58.

For more on Kithaus see the August 2008 edition of Automated Builder, pgs. 20-21, or circle No. 59.



Cutting the aluminum extrusions to order is simple and quick. Here the framing members are done at Penwal Industries, Rancho Cucamonga, CA, under contract to Kithaus, one of two MHS licensees in California.