Only a Cement Covering is Needed

The New W-Panel Space Frame Has Attracted International Attention For Ease, Effectiveness

A building construction panel tested successfully in Western states and so popular overseas that it’s now produced in five other countries is now available nationally in the United States and Canada.

Called a W-panel, it consists of a three-dimensional space frame of welded steel wire, with a polyurethane foam core for insulation. Once in place at the construction site, the panels are completed with a Portland cement covering that makes them suitable for wall or roof sections.

A product of CS&M, Inc. (Construction Systems and Materials), Chino, Calif., the unique panels are manufactured at the company’s plant there, with several more U.S. plants in the planning stages, to supply all areas of the country.

Says Robert W. Maxwell, the firm’s executive vice president: “The system has been thoroughly proved on the West Coast with nine years of residential, commercial and industrial installations, in climates from Southern California to Washington and Alaska.

“Similar structures have been built, in massive volume, in Saudi Arabia, Iran, Africa, Italy, Mexico, Venezuela, Guam and other countries, where they withstood desert, heat, humidity, typhoons and insects as well as earthquakes of significant intensity.”

The wire-foam-cement panel, a versatile and flexible system of construction, has been used in California residences ranging from the simple to the sophisticated (as at top). Bottom photo shows that even fine wood paneling can surmount the interior surfaces of walls built with the new technique.
According to Maxwell, the concept ranks among the more important construction materials developments of recent years. He claims that it allows architects and builders the same latitudes as wood construction, while also incorporating the desirable qualities of masonry and concrete.

Code-recognized and fire-rated, the standard W-panel, named for its original configuration and inventor, is 4 feet wide by 8 feet long, and weighs approximately 30 pounds, or less than one pound per square foot. The structural building component can also be produced in lengths from 6 to 14 feet. The panel uses 14-gage (.080" diameter), carbon steel wire meeting ASTM A-82 specifications, resistance welded to form a space frame with truss members for strength and stiffness.

The polyurethane core, applied in liquid form for permanent bonding to the steel wire is 1" deep in a 2"-thick panel and 2" deep in a 3"-thick panel. For columns and decorative effects, non-insulated panels are available.

At the job site, panels are erected and tied together either by 16-gage construction tie wire or by wire mesh and steel clips. Plumbing and shearing lines are conventionally installed, with electrical wiring put directly through the panels, between foam and wire.

A ½" scratch coat of Portland cement plaster (1,000 psi minimum compressive strength) is applied on front and back to fill the space between the foam core and the exterior of the steel wire frame. A second, brown coat is then applied to a ½" thickness. Application can be by plaster guns, wet and dry pneumatically-placed mortar, gunite and hand plastering. Any type of smooth or textured finish can surround the exterior and interior surfaces to complete the wall.

It is possible to finish the panel exterior in a central location, then place the panel in position and complete the inside surface by plastering in place. If panel redimensioning is required, to fit the architectural design, it is accomplished by conventional hand tools or standard hand-electric saw with abrasive blade.

The completed panel is a structural composite, combining the strength of steel wire reinforcement, the insulation and moisture barrier characteristics of plastic foam, and the strength and durability of Portland cement. A standard W-panel uses a half-pound of steel wire per square foot, approximately 0.15 pounds of urethane, and a minimum of one inch of Portland cement plaster on each side. The result is an allowable wind load of 40 pounds per square foot, and an axial load of 4,000 pounds per lineal foot.

A competitive, alternative material, the panel can be employed for exterior and interior bearing and non-bearing walls, partitions, roofs, security fencing and sound barriers. The wire/foam/cement unit provides insulation values (resistance to heat loss) of R11 for 1" of urethane in a 2" panel and R19 for a 2" foam

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core in a 3” panel. Values up to R30 are attainable with extra-thick core sections.

As a system, it is capable of supporting structures four stories high, but when installed as a curtain wall—with lightweight steel framing, structural steel, pre-stressed or poured-in-place concrete—it can be employed in multi-story construction of any height.

According to CS&M, the in-place cost of its material is approximately 20 percent less than conventional methods which use wood, concrete block and/or brick. In addition, the panels are already insulated and termite-proof. The composite construction, when plastered, is fire rated under the code as a one-hour and two-hour barrier by ASTM E-119 test.

The U.S. Government Department of Housing and Urban Development (HUD) Federal Housing Administration recognizes the panel in its structural engineering Bulletin No. 687. The International Conference of Building Officials Uniform Code does the same in Report No. 2440. ICBO has also given the standard W-panel a one-hour fire-resistive rating with one inch of plaster applied, and a two-hour fire rating with the addition of another half-inch of plaster as mentioned above.

In addition to a manufacturing plant at CS&M’s headquarters in Calif., licensee factories produce the W-panel in Mexico, Ireland, Italy, Iran, and Saudi Arabia. Additional plants are expected to be on stream shortly in Egypt, Venezuela, Singapore, and the Philippines.

Previous concentration was on foreign development. Demand from

Photo at top shows Portland cement plaster application—techniques can include hand plastering, standard gun plastering, wet or dry guniting. Center photo depicts a 10-story apartment project in San Cristobal, Venezuela, erected in 60 days when panels were used as curtain walls. Bottom shot illustrates panels’ use as an 18’-high sound attenuation wall, adjoining a railroad track in Placentia, Calif.
U.S. and Canadian markets promises greatly increased usage here. To cite a few of the already-completed U.S. projects, there have been 62 condominiums built in California, plants and warehouses in the state of Washington, insulated dairy barns in Idaho, a Volvo dealership and apartments in Honolulu, furniture store in Kansas City, and office building in Albuquerque.

Other California panel-using structures include a Holiday Inn in Los Banos, mini-warehouses in the San Fernando Valley, and an 18-foot-high sound attenuation wall in Placentia.

For further information, contact CS&M, Inc., Route 1, Chino Airport, Chino, California 91710.

Two-story condominiums (top) and mini-warehouses (below) are among the types of structures turning to this unique construction concept. In the latter case, the triple combination of steel wire, insulation core and cement covering—difficult to break through—has deterred thefts in the mini-warehouses which use it.