Panelization Goes Modern

Those Lightweight Prefabbed Exterior Panels Provide Right Answers For Many of Today's Construction Buyers

Progress is sometimes a matter of degrees.

Contractors familiar with *panelization* would have to agree. It’s a technology ready to take its place in meeting the needs of owners and architects—the people who commission and design today’s buildings.

Panelization, here, is the use of lightweight prefabbed exterior panels, framed of welded steel studs, sheathed in exterior-grade gypsum and faced with any of a variety of decorative surfaces. These include conventional stucco, built-up synthetic plaster finishes, metal cladding, vitreous ceramics (such as brickplate, tile or mosaics), even porcelain.

Not that the idea is new. Versions
“Panelization comes in highly stain-and-fade-resistant colors. Most are virtually maintenance-free, requiring no painting, acid cleaning or renovation.”

of panelization have been with us for decades. Elements of the system were used in rebuilding post-War Europe, and appeared in a Los Angeles high-rise over thirty years ago.

What is new about panelization is that it has finally come of age in terms of materials, fabrication technology and necessity.

Latest F.W. Dodge statistics for non-residential construction confirm that exterior walls account for non-residential 11% of all building costs. By conservative estimates, that’s over $2.5 billion in the U.S. alone. Clearly, exteriors are a significant element in the construction picture.

At the same time, there’s new enthusiasm for distinctive, innovative exterior shapes and appearance. Architecture is in the throes of a revolution of sorts, as the so-called post-Modernist influence is seen more and more. And design for restoration and renovation is enjoying a boom, too, in spite of the fact that traditional methods and materials used in creating the original structures are becoming unavailable.

Even the popular glass, metal and pre-cast applications of the now-familiar curtainwall concept have their trade-offs. Curtainwall and other exterior building methods have presented owners and architects with only partial solutions to some specific problems of engineering, weight, permanence, time and cost, design flexibility, on-site control and tolerance. And in these energy-conscious times, who can afford not to take the conservation issue seriously?

**Panelization Can Help**

According to Ron Baker, Panelization Exterior Manager for the Seattle-area firm of Pacific Construction Systems, Inc., panelization technology is praiseworthy for providing a range...
of imaginative possibilities to help overcome many of these problems. At the same time, panelization offers architects, owners and contractors additional benefits in terms of specific cost savings, aesthetic flexibility and operating considerations.

"Take retrofit for example," Baker said, speaking of some work on a building of historical importance. "We are able to keep the total cost for this job—including installation—at a figure which is one-half to one-seventh of estimates for other comparable treatments. That kind of savings can make a difference."

But the bigger question is how panelization can help on new construction.

A Look At Engineering

The weight of an exterior wall is critical to the structure supporting it. That means reducing wall weight spells reduction in the size requirements of the building’s spandrel beams, columns and footings. Naturally, cutting the size of structural components can result in big savings in material and construction costs.

One rule of thumb is $1,000 saved for each ton of building mass reduced. That’s something building owners can easily relate to.

In general, the weight of a steel-framed, panelized exterior wall is considerably less than most other non-combustible wall systems. By comparison, typical weights are:

- Brick/block ................. 97 psf
- Solid Precast ............... 51 psf
- Brick/Studs .................. 48 psf
- Panelized .................... 7-18 psf

Since lightweight panelized exteriors weight about 80% less than brick or precast concrete, curtainwall loads can be reduced by hundreds of pounds, with savings to match. Comparing a typical lightweight panelized exterior with a 4" precast wall, weights on exterior beams would be cut by about

440 pounds per lineal foot.

Applying these numbers to a 10-story structure with 14 columns per floor, the owner-architect team could save about 930 tons in exterior footing weight, or about $1 million in structural costs.

Just as vital is the meaning of these weight savings to earthquake-prone areas like California and the Pacific Northwest. “Of course, bracing requirements are related to total building weight,” Baker pointed out. “You can build a sturdy light building just as easily as you can build a heavy one, but a whole lot cheaper and faster.”

The major advantage of a pre-fabrication operation is the economies available by manufacturing wall sections indoors under controlled factory operations in areas similar to Max Jensen’s Pacific Construction Systems.

Permanence is Important

But what about weathering and wear-and-tear? How does the panel-
Most panelized exteriors are competitive or lower in cost than glass or aluminum curtainwall, precast concrete, masonry and other controversial exterior treatments. But they also cost less in construction time on-site. It has to do with the way the panels are made. Panels are customarily fabricated under shelter, often in an assembly-line setting. By finishing and curing panels indoors, away from the actual construction site, fabricators can schedule for efficiency, avoid job-site clutter and maintain the highest standards of quality control.

This pays off in closer tolerances and consistent results, and bad weather very seldom holds up the job. The panels are erected easily by rooftop rigging or other lightweight lifting equipment. In most cases, costly scaffolding is not needed for exterior construction using panelization.

Instead of piecemeal assembly of hundreds of parts, the prefabricated panels are lifted into place and installed in minutes by welding or bolting. With their steel stud fabrication, panel cavities can be designed to provide a chase for faster work by electrical and mechanical subs. Industry analysts make the point that this aspect of panelized construction is more economical than masonry or wood construction, which must be drilled or furred to conceal piping and wire runs.

Panelized exteriors usually go up fast, and that means cost savings—
not to mention the added ease in scheduling and control on the jobsite. Construction time is directly related to cost, making time savings on the site direct cost savings, which helps reduce financing time and debt service for owners. Earlier completion and occupancy bring the possibility of earlier return on investment.

What About Design?

Panelization allows the architect great flexibility and aesthetic freedom to get just the “right” exterior. Distinctive sculptural effects, 3-D shapes and modern graphics can be created with accuracy. Possible surface treatments include an array of signage and I.D. elements: logos, trademarks, and corporate symbols can become a permanent part of the building.

Panelization fits so many places that applications really depend on the specs. The architect may choose panelization for non-bearing infills, self-supporting skins, fascia and soffits, spandrels, window walls, parapets and other special details. Panelized exterior systems can even be used on curved, angular or projecting walls.

The Energy Outlook

Operationally, energy consumption is one of the owner’s largest expenses. That’s one good reason for the increasing emphasis on building with energy-stingy technology.

According to the American Society of Heating And Air Conditioning Engineers, insulated panelized exteriors surpass other non-combustible construction in resistance to heat loss—the so-called: “R Value.” Assuming a day with a 50° difference between indoors and out, a 10,000 square foot panelized exterior saves almost 1.2 million BTU’s per 24-hours over comparable precast.

To achieve that kind of savings, panelized exteriors may be fabricated with insulating material located either inside of the panel cavity or between the gypsum and the impervious outer surface of the panel.

However the insulation is done, there are dramatic savings over com-
parable curtainwall for reduced fuel consumption and lower operating costs. And initial costs are reduced, too, because requirements for heating and air conditioning can be scaled down.

A New Bottom Line

As suggested at the beginning of this article, our challenge for growth in the '80s is to keep a practical eye on the needs of those who design and pay for the buildings we help build. One way we can aid them in bringing more projects to the construction stage is to provide the new technology which can result in better buildings, at controlled costs.

That’s progress, and panelization appears to be part of it. In a way, this step forward is much like others which have gone before—from skim-coat plaster to gypsum wallboard interiors, for example. The glass box yields to newer, more suitable exterior systems as needs change.

The trend is toward buildings designed from the start for panelized curtainwall exteriors. By supporting that move to meet the needs of the near future, we’re working to everybody’s benefit.