Suitability of Steel

The Critics Are Out There Against Light Gage Steel Framing—But The System Has Stood The Test of Time

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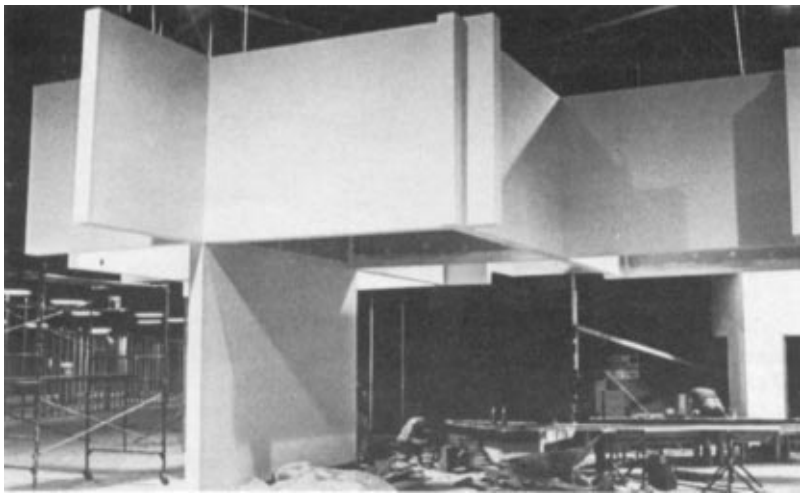

Dramatic effects with suspended panels for the Gatlinburg, Tn. Exhibit.

Both the Sunsphere (left foreground) and the US. Pavilion (background) have steel studs.

Recent attacks on the suitability of Light Gage Steel Framing have been multi-pronged. They are based on misinterpretations and half-truths. The subject has been approached, in many cases, in a manner suggesting that this new form of construction is untested by time.

To the contrary, I have a copy of a report published in 1942 which states that 90% of 50 buildings examined to determine the condition of light gage steel rated "good," 10% were "fair," and none were "poor." These buildings ranged in age from 5 to 33 years with the median being 17 years.

These jobs were built with roll-formed steel joists that were painted and had lasted many years. Today's product may be painted with a point that is far superior to that which was used many years ago or is produced from hot dipped galvanized steel.

Is galvanized better than painted? You bet it is! And to any who suggest that buildings will fall down because of uncoated edges or scratches and abrasions, the answer is, "Nonsense, you don't understand either the corrosion process or the protection provided by zinc."

Questions about the ability of a zinc coating to extend protection have come up with cyclic regularity for many years. My first experience dates back to 1959 when the questions related to galvanized metal lath. But they were the same—How long will the zinc continue to protect the steel? What about the slit edges that are bare? How much of the galvanizing is cracked or comes off during the form-

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ing operation? Most of these questions had to be answered on a comparative basis then and now.

There is no actual test that shows that a stud in a wall will last for a certain number of years. There are data which show that materials exposed to the weather will last for X number of years, and we can assume that those that last the longest will perform the best in a wall.

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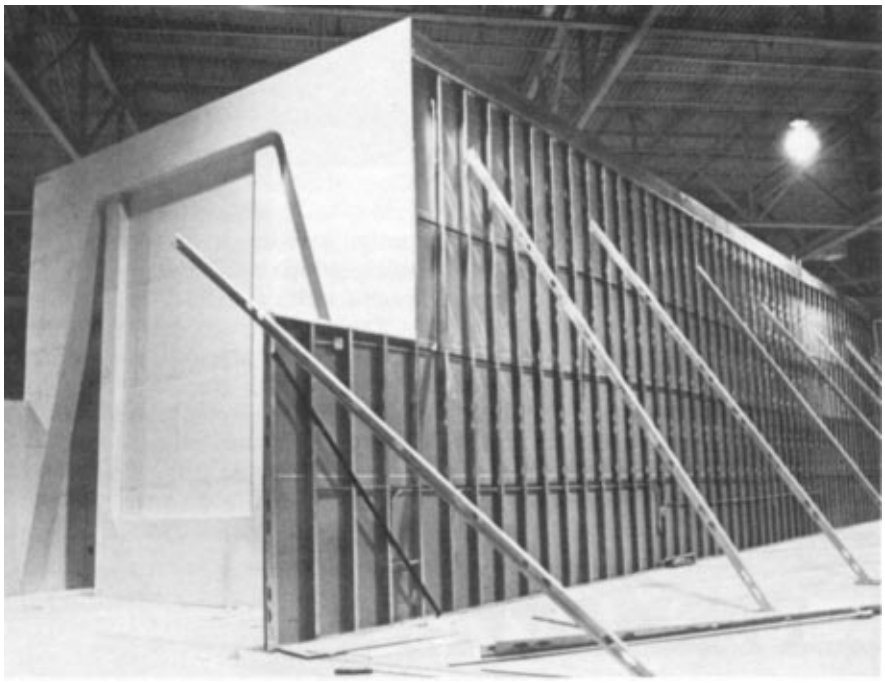
The earliest tests that I know which indicated the performance of exposed (cut) edges were a series of tests run at Underwriters’ Laboratories in 1933 which concluded that “when subjected to salt spray corrosion tests, the uncoated, sheared edges of the electro zinc-coated sheet steel corroded *simultaneously with or following* the appearance of iron rust on the zinc-coated surfaces.” For those who will choose to pick up on the statement relative to ‘electro zinc-coated steel,’ coating weights ranged from .062 to .265 oz. per square foot. Sheet thicknesses were from .015 to .068 inch. Thus, the results would be similar or better with today’s hot dipped galvanized steel.

The reason that bare edges and abrasions are so insignificant is clearly stated: “Since zinc is more active in galvanic couples than iron and steel, it provides steel with electrolytic protection against rust. This protection is so effective that even though there may be a small exposed area on the base metal, the attack of the elements will be directed to the zinc, and protection will continue as long as sufficient zinc remains.”

Examination of exposure test data shows that after exposure for 5 years to the severe marine atmosphere of



Studs, Joists and Channels surround the Church’s Presence in the U.S.

Korean Artifacts will be displayed on shelves and cases supported by L.G.S.F.

Kure Beach, N.C., the protection of various widths of bare metal was as follows:

Groove Width	1.25 oz. Coating (Actual—1.05)	2.0 oz. coating
1/32 inch	No rust or stain in grooves	No rust or stain in grooves
1/16 inch	Trace of rust stain in grooves	Trace of rust stain in grooves
1/8 inch	Moderate rust stain in grooves	Moderate rust stain in grooves
1/4 inch	50% red rust, 50% rust stain in grooves	50% red rust, 50% rust stain in grooves

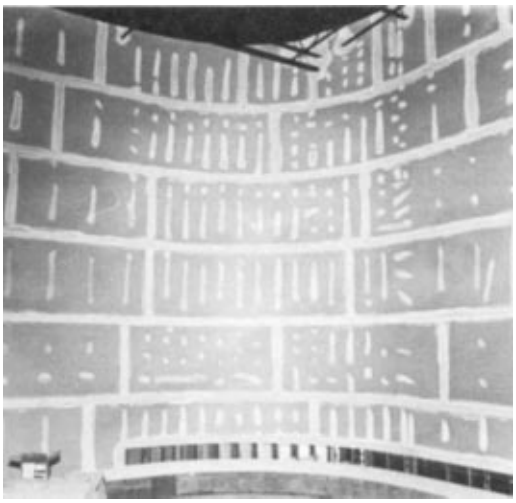
Since there was no difference in performance due to the difference in coating weights, it is a safe assumption that galvanized steel, minimum G-60 coating, will provide ample protection for edges less than 1/8" (.125") thick, which takes care of up to 12 gage (.105").

The next question that arises relates to aluminized steel. Since aluminum is right next to zinc on the galvanic table, it theoretically also is sacrificial to steel. However, the formation of a firmly adherent, self-healing oxide coat, under the initial corrosive attack, prevents action except under conditions that tend to remove this surface film. In other words, if aluminized steel is attacked by hydrochloric acid or most alkalies, the protective film is removed and the aluminum coating may protect the bare edges. Under normal atmospheric conditions, the

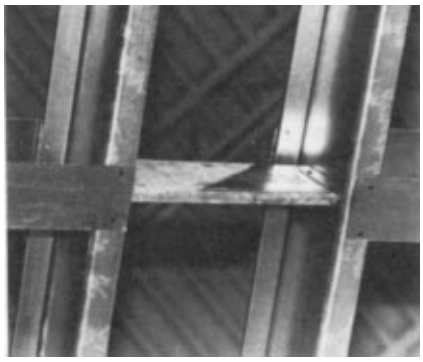
aluminum “seals itself’ and then does not protect the exposed steel.

So, for corrosion protection, think zinc!

At the 1964-65 New York World’s Fair, Metal Lath was the medium of expression. Many curves and unusual shapes helped form buildings, exhibits, and rides. That participation did not occur at the 1982 World’s Fair in Knoxville, TN, but Light Gage Steel Framing was there in force. Although most foreign exhibits are housed in basic “metal buildings,” many facades and most interiors were fashioned from steel studs and joists. Studs are suspended, cantilevered or seated on floors and foundations. They stand vertically, lay horizontally and create many angles, as in the Korean Pavilion (q.v.). Buildings with unusual shapes such as the U.S. Pavilion (shown) used steel studs and joists.



A tall backdrop of studs and board for a mockup of the Gulf of Mexico. Oil drilling rigs will follow.



Careful attention to bridging helps make a good joist job.

Conventional structures such as the remodeled L&N Railroad Station and the newly built Station-82 complex (a hotel, convention center and offices) also used much steel framing.

Components ranged from 1 5/8 inch drywall studs to 12 inch, 12 gage joists plus cold-rolled channels and plaster and drywall trims. Nearly a million feet of our galvanized framing was used.

Much of the materials used for the Fair will be removed after it is over, but some will remain in place. So, for over seventy years light gage steel framing has been making its own place in construction. It will continue to do so and, based on good designs and proper installations, will grow even more successfully.