

Hoffmann Architects

Quarterly



Reconstruction Requires Ingenuity

The repair of existing structures, whether a day or a millenium old, is a vastly different prospect from planning and building new ones. Rule-book procedures are useless, mathematical analyses have limited application, and structures may defy all logic by standing resolutely long after standard engineering calculations say they should have collapsed.

Reconstructing existing structures, experts say, requires patience in determining their nature and imaginative improvisation in dealing with them. "Mathematical methods and codes of practice are perhaps as much of a hindrance as a help," said Edmund Happold, a professor at the University of Bath, England. "Practical experience is needed."

Happold spoke before more than 300 engineers last week at a conference on the strengthening of structures, held in Venice by the International Association for Bridge and Structural Engineering (IABSE). Appropriately, the conference was held at the Fondazione Cini, a reconstructed Benedictine monastery

on the Island of San Giorgio Maggiore, across the St. Mark's Basin from Venice's renowned Piazza San Marco.

Because Venice depends on the constant restoration of historic structures, the city was an ideal location. "Here we can observe over 1,000 years of history and culture, not in a museum but in a living city," said IABSE President Bruno Thuerlimann.

Although Britain's Happold says standards for repair are pointless in dealing with unique structures, he does feel that developing methods is useful. Happold was a member of a committee of Britain's Institution of Structural Engineers that, in 1980, produced a flow-chart-like procedure for analyzing old structures. The inspection procedure produces the detailed evidence necessary to understand a structure.

Inspecting a structure exhaustively and thinking carefully can prevent an engineer from jumping to incorrect conclusions. "You must be careful not to simply cure the symptoms and

ignore the causes," said Fritz Wenzel, a professor at Germany's University of Karlsruhe. "In most cases the hidden causes are dangerous, not the symptoms."

Wenzel agreed that standards make no sense when applied to old buildings. "The question has often been raised whether the practical experience and the results of scientific work on securing old buildings could be embodied in standards so that a wider circle of experts could have free access to them," he said. "The answer can only be: for heaven's sake no. Every old building and each defect is a special case."

Standards and regulations have degraded so many of our engineer colleagues to "bookkeepers of reinforcement," Wenzel said.

The preceding article was reprinted from Engineering News-Record, October 6, 1983, copyright McGraw-Hill, Inc. All rights reserved. We added the italics for emphasis and to show that our philosophy towards rehabilitation is echoed worldwide.

deferred maintenance

Leaking Metal Roof

Problem

Leaking in an older standing seam metal roof. Have to avoid removing and replacing entire deck due to necessity of uninterrupted use of building.

Cause

Loosening of fasteners allowed movement in the joints. As they opened, they allowed water to enter the building and corrode the steel.

Solution

After patching larger holes in the



photo courtesy of the Urethane Foam Contractors Association

deck, treating rusted areas, tightening loose fasteners and adding new ones as necessary, spray apply a silicone coated polyurethane foam roofing system over the existing deck. The foam not only bridges small gaps, but also stiffens the roof

assembly while increasing the R-value of the roof. By thermally isolating the deck, movement due to differential temperatures is avoided. Leaks are stopped by the new system and use of the building is on-going during application.

Resealing Window Mullions

Problem

The sealant at the mullion covers of a steel window system had failed due to old age and needed to be replaced. Due to the way the windows were made, the gap needing resealing was too narrow ($\frac{1}{8}$ ") for the traditional bond breakers-tape or foam rod.

Solution

A unique solution was required – a material that was flexible, strong and narrow which would not deteriorate easily. The answer? Acrylic knitting yarn! Excerpts from the actual specification follow:

2.04 BACKER YARN

- A. Backer yarn for use at mullion frame to cover joints shall be "Orlon" acrylic knitting yarn as produced by BRUNSWICK. Minimum thickness shall be 4-ply, 100% Wintuk knitting worsted weight, maximum thickness shall be "Quick-Knit, Bulky".

- 1. Color shall be optional with the Contractor. More than one color may be used in the Work.

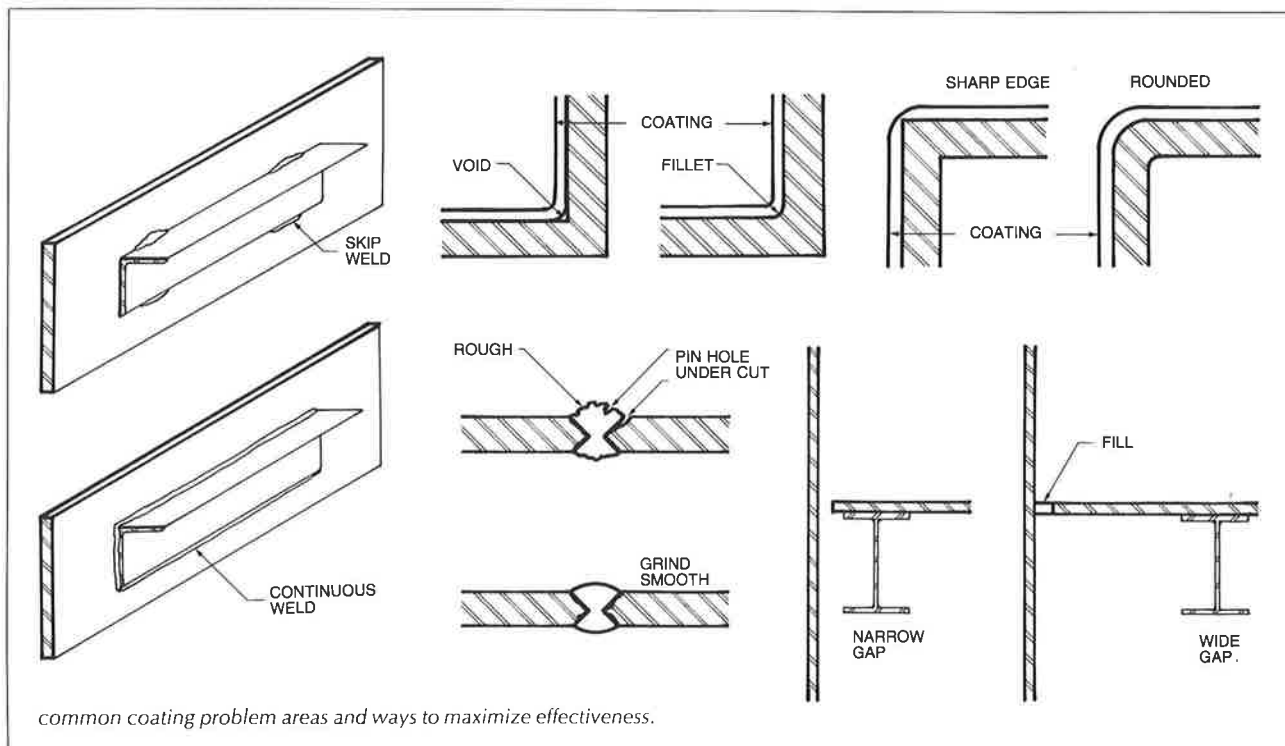
3.04 JOINTS BETWEEN MULLION COVER AND FRAME

- A. Remove existing sealant to a depth of 3/16-inch and prepare surfaces as specified above.

- 1. Do not remove spacers from joint.

- B. Install backer yarn with a broad bladed putty knife.

- C. Apply new sealant to joint, and tool smoothly.



Maximizing Coatings Effectiveness

All metals, when exposed to the elements, tend to revert back to one or another of the forms in which they were found in nature. Although coatings technology has made great advances in the fight against this corrosion, even the best coating will not be effective if it does not adequately cover the metal.

If the coating is applied over a sharp edge, it will flow back from the edge

during curing, usually resulting in less than half the required dry film thickness necessary for protection. Cracks, crevices, small holes and gaps present problems since coatings have difficulty flowing into the narrow openings and therefore leave voids in the protective shield. Thus, for optimum protection, these situations should be eliminated.

Some suggestions are:

- remove sharp surface contours from steel sections
- avoid using back-to-back angles or channels
- use continuous welded joints rather than skip or tack welded.
- weld both edges of a lap joint, or better still, use a butt joint welded on both faces

- grind porous welds down to a smooth pinhole free surface and remove weld slag, spatter and smoke.
- always repair damaged areas and recoat promptly.
- avoid using easily flexed metal from which a coating may delaminate.

By observing the above principles, a coating should last longer, minimizing the need for frequent costly recoatings.

Taken from Themec Topics, volume 3, number 1, published by the Themec Company, Inc. Kansas City, MO.

staff and technical notes

Construction Information

The construction industry encompasses a wide range of disciplines, materials and methods, all of which change with increasing frequency. As technology advances, it becomes ever more imperative to have at hand the resources needed to find the required information.

To keep abreast of technological advances, procedural revisions, and other changes in the construction industry, Hoffmann Architects maintains a resource list of trade groups and manufacturers' associations. These organizations are valuable sources of generic information on construction related issues.

Our alphabetical listing, maintained on a computer diskette and updated as changes occur, includes the association name, address and phone as well as the acronym by which it is known.

If you would like to receive a copy of Hoffmann Architects' resource list, please let us know at either the Hamden or Atlanta office.

We welcome contributions to Hoffmann Architects/Quarterly from our clients and friends. Please send news and technical information to either John J. Hoffmann, AIA, Hoffmann Architects, 3074 Whitney Avenue, Hamden, CT 06518 or Karen Warseck, Hoffmann Architects 1925 Century Boulevard, Suite 4, Atlanta, GA 30345 or call (203) 281-4440.

Airport Alert

Can an airport be hazardous to a pilot's health? According to Mr. Leonard E. Mudd, Director of the Office of Airport Standards of the Federal Aviation Administration, the answer could very well be yes!

In a recent reply to an inquiry by our firm, Mr. Mudd stated that the use of mirrored glass curtain walls on buildings in or adjacent to airports "can adversely affect the operation of airport communication and navigation equipment. The thin metallic coating used in mirrored glass has the same effect as a solid metal wall, reflecting electronic signals radiating from communications and navigation facilities, thereby causing inaccuracies and deficiencies in signal

reception." Since, during times of poor visibility, the pilot relies on electronic instrumentation and radio communication to safely land the plane, any interruption or distortion of service can be hazardous indeed!

But even on sunny days the reflective surface can cause problems. According to Mr. Mudd, "There is an additional concern that mirrored buildings can cause undesirable light reflections and glare, affecting the vision of aircraft operators."

For these reasons, the FAA is "discouraging construction of airport buildings with mirrored exterior walls."

Staff News

John J. Hoffmann, AIA has been elected Vice President and President-Elect of the Connecticut Society of Architects, a chapter of the American Institute of Architects. He has also been elected treasurer of the Southern Connecticut chapter of BOMA (Building Owners and Managers Association).

Karen L. Warseck is heading up the Atlanta, Georgia office of Hoffmann Architects. The office is located at 1925 Century Boulevard, NE, Suite 4. (404) 633-7817.

She recently spoke to the Atlanta chapter of the National Association of Corporate Real Estate Executives (NACORE) on the importance of investigating the condition of a building prior to purchase.