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Going by the Book

Copper in Architecture Handbook Keeps Pace with Technology

Copper in Architecture Design Handbook.

It's still called a handbook, although some in the building community might refer to it as "the Bible." And it's still available in printed form—should anyone still want to order it that way.

But over the past two decades, the *Copper in Architecture Design Handbook* has transformed itself time and again according to the technology of its day. Along with format changes to keep pace with the advent of computers, the content has also seen numerous updates to keep pace with construction and design practices.

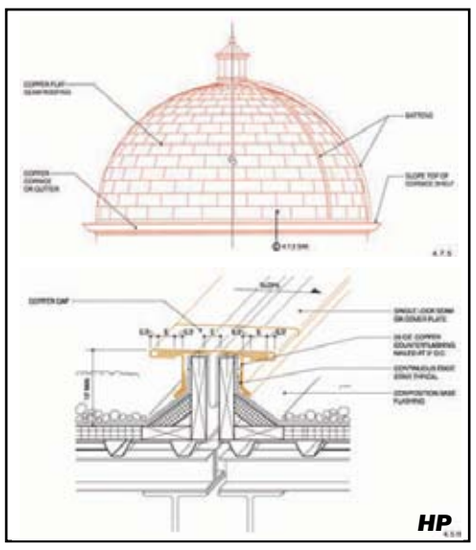
This comprehensive architectural guide to installing all manner of copper building materials remains an industry standard, a dependable and familiar desktop companion for architects, builders, installers and other construction practitioners. Today, however, "desktop" has an entirely new meaning.

Conceived by the Copper Development Association (CDA), the engineering and market development arm of the copper and brass industry in the United States, in cooperation with the Canadian Copper & Brass Development Association (CCBDA), the handbook was initially printed in 1991. The print version included a set of diskettes containing computer-aided design, or CAD, detail drawings used by architects, engineers and draftsmen. As time and technology advanced, the entire handbook—digital illustrations and all—was transferred to a single CD-ROM for even greater convenience.

Recently, the complete contents were made available on the CDA website, www.copper.org, as digital PDF or "portable document format" pages for the ultimate in user convenience —and user savings (the easy-to-download PDF version is available at no cost). The detail drawings can also be downloaded from the CDA website as DWG files for use with CAD programs.

"It has been an evolution," says Wayne Seale, a CDA regional manager who coordinates the organization's national architectural support program from his home base in Seattle, Washington. "If you make it easy for architects and others to specify and detail materials, they are more likely to use them, and *Copper in Architecture* is very useful. Architects need it. Installation contractors need it. We get calls for it all the time."

Until the changeover to the online version, CDA published and distributed some 3,000 copies in one format or another. For more information about CDA publications, or to order your copy, visit the website or call CDA in New York at 212-251-7200. **HP**



CAD-compatible details, such as these, are found in the Handbook and downloadable at www.copper.org

Copper's Design Potential Highlights Architectural Seminars

Long lifespan, structural integrity and superior recyclability are all attributes that make copper products so useful in the architecture and construction arenas. Add inherent natural beauty to the list and it's easy to see why copper is so highly regarded in interior design, as well.

Once used primarily as a weather barrier on building projects, copper evolved into an exterior design element and eventually moved indoors to change the way commercial and residential interiors are outfitted and decorated.

"Originally, architects were specifying copper applications on roofing and for exterior wall cladding," says Craig Thompson, Midwest regional manager for the Copper Development Association (CDA). "Then they realized it could be both useful and decorative for interior applications in any room."

To promote the idea that copper building materials are virtually unlimited in their design potential, and at the same time show the practical side of this metal as an architectural element, CDA offers architects and interior designers educational seminars. The program is designed to introduce practitioners to the many uses and applications of copper products.

As licensed professionals, architects and interior designers are required to complete a number of accreditation units annually. Seminar attendees earn continuing education credits, which also enables them to maintain membership in organizations such as the American Institute of Architects (AIA) and International Interior Design Association (IIDA).

"At our seminars, we show how copper products are produced, and we explain the different copper alloys and finishes in which they are available," Thompson says. "We also want to educate building and design professionals about the proper use of copper in construction and make them aware of the many applications that can influence their own use of the material."

The seminars—referred to as "lunch and learn" sessions because CDA provides box lunches for all attendees—are presented throughout the USA by four regional managers. On average, each manager hosts seven, one-hour seminars per month. Each session is designed to fit into a typical lunch hour so it doesn't disrupt the architect's work.

"The number of attendees varies depending on the size of the firm," Thompson says. "We go to the office so attendees don't have to use any travel time, and we do it at no cost to the company or to the attendees."

CDA began offering seminars in 1993. Since then, the use of copper in architecture has grown tremendously. From 1990 to 2000, the amount of copper sold for architectural applications doubled—a goal CDA had set for itself to gauge the effectiveness of the seminar series—and its use continues to grow.

Thompson and the other regional managers say they enjoy the interaction with architects at the seminars because it keeps them up-to-date on what is going on in the building and construction industry.

"We get to learn about the different architectural firms and the types of projects they work on," he adds. "It's an education for us as well."

For information about these and other educational seminars offered by CDA, visit www.copper.org, or call 212-251-7200. **HP**

Greening Fire Sprinkler Systems with Copper

In today's construction environment, architects, engineers and builders have a new mantra: *Make it efficient. Make it sustainable. Make it green.*

This imperative extends throughout the building envelope to materials and building practices, and also to mechanical systems such as heating, air conditioning and water supply systems, including fire sprinkler systems—a critical component of commercial and, increasingly, residential structures.

While various piping materials can be used for sprinkler systems, copper is often recommended, especially in systems or applications where the delivery of clean water from the system is desired to minimize permanent staining and damage to the building contents.

Copper can also claim to be the "greenest" of all metals used in buildings in general and sprinkler system design in particular. Copper's recyclability and long lifespan are key attributes that can help a structure achieve green building certification.

There are many other reasons why copper tube and fittings are ideal for fire sprinkler systems:

Fire Resistance – Unlike some piping materials, copper does not burn, support combustion or emit toxic fumes when exposed to flame. It will not transport fire through floors, walls and ceilings, and it maintains constant water pressure when heated. Although fire temperatures can easily reach 1,500°F, copper has a melting point of nearly 2,000°F, making it impervious to even extreme heat.

Superior Flow – Preventing capacity loss is critical to maximizing a system's effectiveness. Thin-wall copper tubing offers superior flow rates compared to other, similar-size pipe materials. The oxide film that forms on the inner surface of copper tubing acts as a protective barrier against fire and does not flake off, reducing the potential that a system will clog.

Ease of Installation – From initial delivery to installation of the last sprinkler head, lightweight copper tubing helps get jobs done quickly. Copper is also easy to transport, store and handle, unlike competing materials such as heavy steel pipe and fragile plastic system components. With small-diameter copper tubing, installations typically require less labor and result in less damage to building interiors. And when repairs or retrofits are needed, these attributes help expedite work while minimizing occupant downtime.

Sustainability and Cost – While initial installation costs may be higher, the longevity, durability and dependability of copper systems make them competitive and even lower in cost over the long run.. Copper is also 100 percent recyclable, so additional cost can be recovered when a building is demolished or the system is removed.

In today's green building environment, copper offers many advantages, not least of which is that virtually all copper tubing contains pre- and post-consumer content, a requirement of green building guidelines. While copper may be considered a "red" metal by those in the industry, it is truly the greenest of materials. **HP**

Activated copper sprinkler system delivers clean water.

Return to Glory

Copper Adds Crowning Touch to Plaza Hotel Restoration

When it was announced that New York City's famed Plaza Hotel would close its doors forever, travelers from around the globe mourned the passing of an era.

Built in 1907 and situated like a cornerstone at the southeast tip of Central Park, facing the posh boutiques along Fifth Avenue, the Plaza had been the hotel destination of choice for dignitaries, celebrities and well-heeled visitors for close to 100 years.

But a century of weather and wear had taken its toll. To preserve the building's landmark status, and A-list reputation, new owners decided to fund a top-to-bottom restoration and reopen the Plaza as a luxury apartment complex. The three-year project, costing nearly $400 million, will be completed by the end of this year. It includes new retail shops on the ground floor and 182 apartments and condominiums overlooking Central Park, including 14 penthouses nestled into the reconstructed roofline.

Some parts of the building were beyond restoration and needed replacement. Even the hand-wrought copper that crowned the building's French chateau-style roof had succumbed to the accelerating effects of acid rain, pigeon droppings and vehicle air pollution in heavily trafficked mid-town Manhattan.

"In the condition that the roof was in, you could see daylight through the metal," says Cameron Forbes, vice president of Heather and Little, a Canadian company subcontracted to handle the ornamental copper fabrication. This part of the restoration alone cost $2 million. The work began in 2004 and was completed earlier this year.

Nicholson and Galloway, a Glen Head, New York, firm that specializes in sheet metal restoration, did the actual copper installation. The project involved restoring and building new dormers, as well as fashioning continuous roll ridges, hip caps, flashings, finials, ornamental band work and wall cladding. Copper flat and standing seam portions of the roof also had to be reconstructed. A custom-order green clay ceramic Ludowici tile, installed by Eagle One Roofing of Manhattan, was used for the new primary roof covering. Eagle One also did copper work for this project.

Six full-size mock-ups of the copper roof elements were constructed to ensure the designs would be both waterproof and structurally sound before production began. Components that could not be fabricated onsite were made in Canada by Heather and Little.

According to Forbes, a combination of 20- and 24-ounce sheet copper, provided by Revere Copper Products of Rome, New York, was used to rebuild the roof components and the dormers, which stand about 12 feet high and weigh close to 1,000 pounds apiece. Once completed, the dormers were shipped in sections, then reassembled in place on the roof's east, south and west elevations.

"We had some of the original ornamental pieces shipped to our shop so that we could replicate them," Forbes explains. "When they were done, they appeared exactly as the original ones. It's really interesting to see how well-done the craftsmanship was 100 years ago, especially with them not having the modern equipment we have today."

While Heather and Little has restored many landmark copper structures, the Plaza project was special because of its iconic place in history, Forbes says. "Just for the simple fact that the 'who's who' of movies and celebrities have been through there. It's a beautiful building. The architecture is just great." **HP**

A new copper dormer being fabricated for the Plaza Hotel in New York.

What Would Al Gore Choose?

Nobel Environmentalist Goes Geothermal at Home

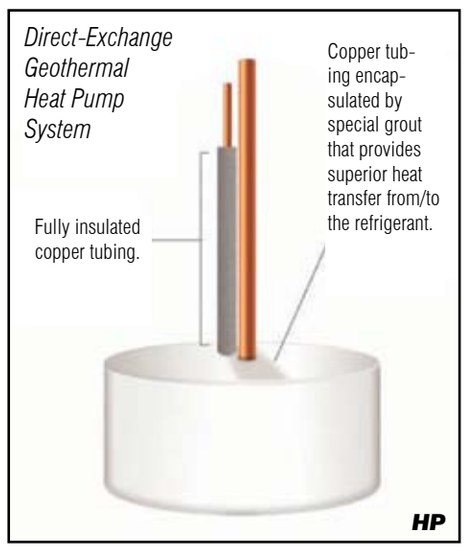
Competing products all make great claims and seek endorsements that will, they hope, attract consumers. And in today's era of increasing environmental consciousness, being known as a "green" product is quickly becoming the highest accolade of all.

Recently, one high-efficiency home heating and cooling system earned an endorsement of sorts from perhaps the best-known environmentalist on the planet—Al Gore. Although the former U.S. vice president, a co-recipient of the Nobel Prize for his environmental activism, has not publicly lauded his new HVAC equipment, he voted his approval of an innovative ground-source heat pump system by installing one in his own Nashville home and office headquarters.

According to an assistant, Kalee Kreider, Gore was intent on a geothermal system from the start, and a number of options were researched. "He made the final decision on this heat pump technology," Kreider says. "He lives there with Mrs. Gore (Tipper), and he works out of the house."

The new HVAC equipment, manufactured by Earth To Air Systems of nearby Franklin, Tennessee, replaced an older heating and cooling system that had a federal Energy Star rating for efficient operation, Kreider says. "But when you look at overall energy use, this new system is far more efficient."

Installation of the Earth To Air unit included drilling seven small-diameter, 300-foot-deep wells on the Gore property to tap into the earth's constant underground temperatures. Continuous loops of copper tubing were placed in the wells, which were then sealed with a special grout to create a permanent in-ground "radiator" that circulates a liquid heat-exchanging refrigerant.



Ground-source heat pumps work by boosting below-ground temperatures, which average 50 to 60 degrees year-round, to a higher level adequate for home heating. The systems also cool homes during warm weather by returning ambient indoor heat to the ground.

In general, ground-source heat pumps are more efficient than systems that depend on above-ground air temperatures, which vary widely, as their heating source. During very cold weather, air-source systems struggle to close the gap between their thermal starting point and the desired indoor-air temperature. Direct exchange ground-source systems that use copper tubing, like the Gore unit, are also more efficient and considered superior to systems that circulate water through plastic in-ground tubing.

Company vice president David Wiggs says Earth To Air is the first heat pump system engineered to operate with the new, environmentally compatible R-410A refrigerant as a heat-exchange medium. Other systems rely on ozone-depleting R-22 (Freon) refrigerant, which is being phased out and will be banned by the EPA from new installations after 2010.

Andy Kireta Jr., national building construction manager for the Copper Development Association (CDA), consulted on the project to explain the environmental benefits of in-ground copper tubing systems. "Once people see the advantages of copper direct-exchange systems, like this one, they usually go for them," Kireta says. "We're just thrilled that Al Gore wanted one for his own home." **HP**