



# Building & Architecture News

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## Keeping History Fresh

*Heather & Little Ltd. Continues Its Excellence with Architectural Restorations*



Cameron Forbes celebrating the completion of the Lady Freedom project.

Dangling in the air, dozens of stories on top of the Georgia State Capitol Building to airlift an iconic statue for renovation can be nerve-wracking for the craziest of thrill-seekers. But for Cameron Forbes, it's just another day in the office.

Forbes serves as the vice president of Heather & Little Ltd., a premier producer of custom ornamental sheet metal in Ontario, Canada, and is best known for their historic renovations — like the restoration job done on the Georgia State Capitol domed roof

and its Lady Freedom statue.

Heather & Little has worked with the Copper Development Association (CDA) in the past, as a preeminent authority in copper architectural systems design and installation.

"Generally [CDA] will contact us for technical information on difficult installation or restoration issues if they come across any project that is unusual," Forbes said. "Many times they'll check to see if we have any projects in the works."

Heather & Little received recognition in the North American Copper in Architecture Awards (NACIA) from the Copper Development Association (CDA) and the Canadian Copper & Brass Development Association (CCBDA) for the second straight year for their outstanding work in the following projects: Onondaga County Courthouse, New Brunswick Legislative Assembly Building, Wovoka residential project and the St. Patrick's Basilica.

"Generally, the biggest part of our work is in restoration with architectural metal, but we do immense copper roofing in Canada and high profile projects in the U.S.," Forbes said.

Last year, the premiere restoration company was honored for its one-of-a-kind craftsmanship in the historic Plaza Hotel renovations in Manhattan and the Library of Parliament building in Ottawa, Canada.

While their work is nearly always breathtaking for the general public to gawk at, Heather & Little has been doing great work since it first opened its doors in 1925. Depending on the work-load, there are as many as 70 or as few as 15 highly-skilled metalsmiths on staff. Mostly, the tradesmen are hired from within

from their five-year apprenticeship program.

"Many who serve in the apprenticeship program have worked here all their lives," Forbes said. "The last six or seven people who retired have been here for about 50 years."

A lot of the restorations they complete display amazing detail with different types of metal. Specifically, they utilize copper in many of their building projects.

"Copper is probably one of the most user-friendly materials out there," Forbes said. "It can be heated, stretched, bent and formed into just about anything. Considering that and its longevity, it's probably one of the best metals you can use."

Aside from the NACIA awards, Heather & Little also received a Gold Circle Award, which recognizes outstanding contributions to the roofing industry, for the work they've done on the Library of Congress in Washington, DC, and the Roofing in Canada Award for their work on the Library in Ottawa.

Currently, you can see them hone their craft as they are in the midst of restoring the Montreal City Hall building, which Forbes describes as "phenomenal ornamental copper work."

They will also be starting the next phase of the restoration process for the New Brunswick Legislative Building and St. Patrick's Basilica.

But when asked which project was one of the most memorable, Forbes still recalls the airlift job in Georgia.

"We felt it was necessary to airlift the statue to our shop to get the results we were looking for," Forbes said. "When people come to us, they want something to look exactly how it was originally crafted, but with better workmanship and technique." **HPN**

## Copper is at Center of HVAC Design Renaissance

*Researchers Look toward Copper and Brass to Reduce HVAC Odors and Make Units More Efficient*



A technician installs a copper HVAC unit in the military barracks at Fort Jackson in Columbia, S.C.

Many of us couldn't imagine life without air-conditioning. It's everywhere we go. Usually we don't even notice when it's not there. Enormous heating, ventilation and air-conditioning (HVAC) plants cool our classrooms and offices, smaller central air conditioning systems and window units chill our homes and even more compact systems create a comfortable climate in our vehicles.

Not surprisingly, there is intense pressure on HVAC designers to develop more efficient equipment. Researchers are discovering new ways to increase the efficiency of the heat exchangers while also eliminating something we can all do without, namely, foul odors.

### Get the Smell Out

The choice of HVAC materials can affect the odors that emanate from the system. Dark, moist environments breed bacteria and fungi that are widely recognized causes of foul odors and reduced efficiency of HVAC systems.

Copper and its alloys like brass and bronze may offer a decided advantage compared to other HVAC materials because of their outstanding antimicrobial properties. Especially in components being replaced with copper are those in which microbial contaminants tend to thrive—cooling coils, heat exchange fins and drip pans. Antimicrobial copper mitigates the growth of these organisms.

To study this effect, the U.S. Department of Defense is funding HVAC research in the military barracks at Fort Jackson in Columbia, South Carolina. The aim of this real-world research is to better understand how copper can improve HVAC function, because the microbes are not only the source of foul odors, but they also build up on heat transfer surfaces and compromise the thermal effi-

ciency of the unit.

Charles Feigley, Ph.D., Professor of Environmental Health Sciences at the University of South Carolina is the principal investigator for the study. He explains, "Improvements in building and construction methods have generally led to increased energy efficiency, but at the same time, these 'tighter' building envelopes tend to trap bacteria, leading to odors. The results of this real-world trial should encourage advancements in the design of HVAC systems."

Besides the real-world field trial at Fort Jackson, a controlled laboratory study is underway at the University of South Carolina in the Arnold School of Public Health. Here, the HVAC system is being broken down into clear distinct components to determine where the use of copper alloys will have the most cost-beneficial effects on thermal efficiency and odor control improvements. In addition to the trials, the Copper Development Association is pursuing U.S. Environmental Protection Agency (EPA) registration of copper alloys for use in protecting HVAC components.

### A Design Renaissance

Change is not new to HVAC designers. In the past, key refrigerants have been banned because of their high ozone depleting potential (ODP) and even today some are being phased out because of their global warming potential (GWP).

The evolution continues. The shape of the next generation of heat exchangers is a topic of great excitement in the design community. Although the exact designs, cooling fluids and end-uses are still works in progress, one thing is certain: Copper alloys are at the center of a renaissance in the design of HVAC systems. **HPN**

## Antimicrobial Copper: Everything Old is New Again

If the song lyric, "everything old is new again," has become a cliché, it is because the saying rings true. Good ideas from the past — and even a few bad ones — are reintroduced and updated by every generation to suit their specific needs. It is true in fashion, see: leg warmers; in music, see: Jay-Z's rendition of the Sinatra classic, "Empire State of Mind;" and it's true in technology, see: antimicrobial copper.

Antimicrobial copper may not be as recognizable a reintroduction as the others, but it has been part of our history for much longer. According to ancient texts, the Egyptians used copper to clean wounds as early as 2400 B.C.; two millennia later the Greek doctor Hippocrates also recommended using copper to treat wounds; in the eighteenth century the British Navy began sheathing the hulls of their ships in copper to prevent the build up of algae and barnacles;

and the copper solution that was first used to protect grapes from fungus in nineteenth century France is still being used today. Using copper for its pathogen-fighting abilities is nothing new, but now, in the 21st century, copper's antimicrobial property has been confirmed by modern science.

Laboratory testing has shown that copper and its alloys, brass and bronze, kill more than 99.9 percent of bacteria\*, such as the superbug Methicillin-resistant Staphylococcus aureus, or MRSA, within two hours. What this means in the real world is that high-traffic touch surfaces in schools, hospitals, and public facilities of all kinds, can be made inherently antimicrobial (as long as they are cleaned regularly of dirt or residue that can prevent contact with the surface).

Cross-contamination of bacteria and viruses is

how 80 percent of illnesses are spread. When someone with a cold or the flu sneezes or coughs into his hand and then opens a door, the next person to touch that doorknob runs the risk of becoming infected. Frequent hand washing is important to reducing the risk of transmitting germs; another tool is to make the surface antimicrobial. Door handles, push plates, countertops and other frequently touched fixtures are commonly made of stainless steel, aluminum or plastic — materials that can harbor pathogens for days, even weeks, until they are disinfected, usually with harsh chemicals. Surfaces made of uncoated copper, brass or bronze, however, begin neutralizing bacteria\* immediately, killing more than 99.9% within two hours. The use of copper products in public facilities is opening a new line of defense against the unbridled growth of infectious organisms. **HPN**

\*The Environmental Protection Agency has registered copper, brass and bronze as antimicrobial and is allowing public health claims to be made about their effectiveness against Staphylococcus aureus, MRSA, E. coli O157:H7, Enterobacter aerogenes and Pseudomonas aeruginosa. Copper alloys are a supplement to existing infection control practices and are not a replacement for good hygiene and surface disinfection. Copper alloy surfaces have been shown to reduce microbial contamination, but they do not necessarily prevent cross-contamination.

## CDA Supports Tomorrow's Tradesmen through Education and Skills Competition

*CDA provides funding, copper materials and judging for various skilled competitions*



An apprentice competes in the copper portion of the UA International Apprenticeship Competition.

States and Canada (UA).

The Instructor Training Program (ITP) draws close to 2,000 of the top craftsmen in their field and is held annually in conjunction with the International Apprenticeship Competition, a contest in which apprentices from all over the United States and Canada vie for first place in the five different disciplines — HVAC, pipe fitting, plumbing, sprinkler fitting and welding.

To actively support trade-related continuing education initiatives and a little healthy competition between colleagues, with member companies donating copper tubes and fittings and project managers judging copper-related sections of competitions, CDA sponsors many teaching and skills programs year-round including:

- The SkillsUSA Championships: Each summer, the nation's best career and technical students compete at the Championships in more than 91 different trade, technical, and leadership categories. Contests begin locally and continue through the state and national levels. Since 1996, CDA has provided copper materials and served as a judge in the plumbing division for both state and national levels.
- The Plumbing Apprentice Contest: Held in conjunction with the Plumbing-Heating-Cooling Contractors Association (PHCC) annual convention, CDA has underwritten the competition, sponsored the apprenticeship dinner for competitors and their families and donated all the copper and copper alloy materials for the event since 1997.
- The Associated Builders & Contractors National

Craft Championships: Since 2001, CDA has sponsored, supplied copper materials and served as a judge for this intense two-day event where young men and women compete in one of 14 competitions, representing 13 trades.

Dale Powell, a master plumber and project manager for CDA, has been involved with all of the competitions over the years, and continues to teach courses during the ITP, which he began working on in 1990.

"If we can get apprentices acquainted with our materials early on and effectively demonstrate that it installs easily and comfortably, they'll feel much better using copper, a quality product, over a lesser alternative," Powell said. "If they know there's a group of knowledgeable professionals who can provide them with technical service and assist them with their plumbing needs, it's a win-win situation for the copper industry."

This year at ITP, CDA introduced a 20-hour course, Copper Piping Systems, Advanced Installations, Specialized Design and Safe Operation. The program offers training for properly installing copper systems for water distribution, HVAC and refrigeration, medical gas, fuel gas, sanitary drainage, fire protection and many other applications.

"UA instructors share the valuable information learned in class with the apprentices back at their local unions," Powell said. "We want to ensure that tomorrow's workforce remains current in all the latest technologies, techniques and products in order to be successful in their trade."

For more information about CDA, please visit [www.copper.org](http://www.copper.org). **HPN**

## Copper Wiring Standard Meets the Need for Speed in Commercial Building Applications

*Copper Offers Key Advantages for Local Networks*

Commercial-building designers and architects continue to use copper in local networks because copper delivers on performance. The latest generation of copper communications wiring for office environments is Augmented Category 6 copper wiring, commonly referred to as "Cat-6a."

Cat-6a copper satisfies data-transfer requirements in the majority of horizontal office-environment applications as well as many network "backbone" applications. It operates at frequencies up to 500 MHz, which is twice that of Cat 6. It was defined in February 2008 in ANSI/TIA/EIA-568-B.2-10.

Cat-6a is ideal for installing multiple applications through the network simultaneously. It allows large-file transfers and bundled cable implementations for channels up to 100 meters. It can support high-end security applications and the distribution of digital audio and video.

### Bigger Wires, Tighter Twists

Cat-6a cable is designed to avoid crosstalk interference between cables, a technical hurdle that had to be overcome in achieving 10G data rates, explains David Brender, National Program Manager at the Copper Development Association (CDA).

"It uses larger-diameter conductors, lower packing density and tighter twists," he says. "In some cable designs, foil shields are utilized to achieve the necessary performance. The result is less loss of signal strength at high frequencies,

significantly better crosstalk isolation between cables and improved heat dissipation."

### Why Copper?

In local networks, copper is preferred over fiber-optic cable because total network costs are less expensive using copper. Another advantage is that copper can carry low levels of power, enough to power security cameras, card readers or other devices.

"Fiber optics has its uses in large networks but copper remains the preferred physical medium for cabling to the desktop. Cat-6a is expected to extend the dominance of copper cable for datacom applications for many years to come," says Brender.

Wireless data transmission is equally problematic. "A wireless channel with 50 megabits per second might suit a single user in a home office," says Brender, "but it is inadequate in a busy office environment where capacity is shared. On the other hand, a 10GE copper cabling network could support 10 one-gigabit data rates for each user simultaneously. That's exactly the solution that IT managers are seeking."

For more information about copper communications wiring, visit [www.copper.org](http://www.copper.org). The Copper Development Association is the information, education, market and technical development arm of the copper, brass and bronze industries in the USA. **HPN**