

Building & Architecture News

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9/11 Memorial – A Look Inside



Copper tubing installation at the 9/11 Memorial – Credit Ronaldo Vega

Copper tubing plays pivotal role, gives Memorial a special “touch”

The National September 11 Memorial is a beacon of human compassion and a place of remembrance for those touched by the tragic events that occurred in lower Manhattan more than a decade ago.

In the footprints of where the twin towers once stood sit two rectangular, reflective pools. Measuring close to an acre each and 45 feet in depth, the pools serve as the base of North America’s largest manmade waterfalls. Every minute, 50,000 gallons of recycled water slowly surge over the lip of the waterfall ledge creating sheets of cascading water. A total of 152 connecting bronze panels engraved with the 2,983 names of the victims, including 11 unborn children, surround the two pools and their respective waterfalls.

The memorial is a modern marvel in its outward appearance, but it’s the infrastructure that gives this landmark its special “touch.” Physical contact with the memorial is encouraged. Millions of people are expected to visit each year to walk the grounds and pay their respects by tracing the names on the panels with their fingers. Most of these visitors won’t see the miles of copper pipes beneath the bronze surfaces, which warm the panels in the winter and cool them in the summer.

The system was designed by Jaros Baum & Boles (JB&B) of New York and KC Fabrications of Gardiner, NY. It consists of approximately 12,000 feet of copper brackets and 14,000 feet of copper piping. Christopher Powers, founder of KC Fabrications, worked with JB&B to design the system and ensure it would work with their bronze parapets. “We worked together to design and assemble a back-mounted tube system that could work within the parapets and nameplate system,” said Powers. “A network of copper pipes

circulates glycol behind the parapets to heat and cool the bronze panels.”

Half-inch diameter copper tubing makes this heating and cooling possible. Tubing is fastened behind each panel in a looping system down into the pedestal, thereby controlling the temperature of the touch surfaces. Keeping the panels between 40 and 70 degrees Fahrenheit is essential for the Memorial’s success. If the panels are too hot or too cold, the Memorial loses the ability for people to interact with it.

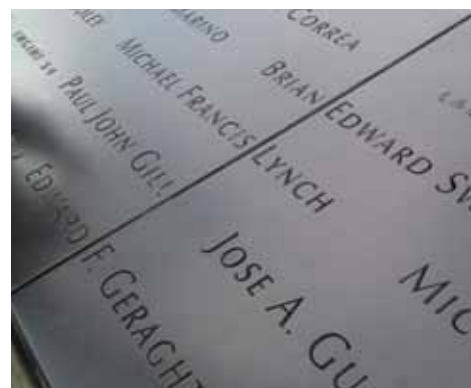
Because of its corrosion resistance, high levels of heat transfer, durability, workability and reliability, copper was the preferred material choice for this project.

Ronaldo Vega, New York native and the Memorial’s Director of Design and Construction, believes that human interaction with the Memorial is vital for every visitor’s experience.

“The bronze panels are the first thing people see, the first thing they touch, and their first contact with the Memorial,” said Vega. “We want people to be able to connect with it. The Memorial almost becomes like a baptismal set-



A look underneath the Memorial's panels – Photo Credit Amy Dreher



9/11 Memorial bronze panels – Photo Credit Ron Gumucio

ting. Here folks can dip their hand in the water beneath the panel and leave a hand print instead of a stone or rock.”

The project, which is Gold LEED certified, also uses recycled water for the waterfalls and to irrigate the nearly 400 trees that have been planted on site.

“The system is extremely efficient,” said Vega. “It was designed to minimize water and energy costs.”

Andy Kireta, Sr., president of the Copper Development Association (CDA), said he was impressed by the amount of copper used at the site, which visitors would be able to see firsthand. With about 91 tons of bronze in the panels and miles of brackets and tubing, copper and its alloys shine as the Memorial’s most vital performers.

“From the piping to the panels, copper plays a key role in making this Memorial truly unforgettable,” said Kireta, during a recent visit to the hallowed grounds. “To be here and to see it in person is a remarkable experience. Hopefully, this magnificent memorial can serve as a lasting tribute and help heal the families who were directly affected as well as our country.”

For more information about copper tubing applications, visit www.copper.org. **Cu**

A New Timepiece for Bradley U.

A 700-lb. copper dome tops Clock Tower

Bradley University, home of the Braves, in Peoria, IL, is going through a rebirth. Through the “Campaign for the Bradley Renaissance,” school officials have been able to raise more than \$150 million since 2008 for a campus-wide capital improvement project that includes the recent renovation and expansion of their second oldest structure, Westlake Hall.



The new copper dome atop Westlake Hall – Photo Credit Campbellsville Industries

The \$150 million campus-wide capital improvement project, dubbed the “Campaign for the Bradley Renaissance” started in 2008 and includes the recent renovation and expansion of their second oldest structure, Westlake Hall.

Constructed in 1897, Westlake Hall (formerly Horology Hall) was once the only school in the nation built specifically for horology, the science of measuring time and the art of making timepieces. So at the time, it was only fitting that the building was adorned with a six-story clock tower topped with a copper dome.

The university’s iconic clock tower was one of the first building projects to receive a facelift, and was part of the estimated \$22 million renovation of Westlake Hall.

“Westlake Hall is one of Bradley’s landmark buildings and a significant symbol of the University,” says Kath Conner, Bradley’s Senior Director of Public Relations. “The restoration of the clock tower with its shining new dome reflects our respect for our proud history.”

The renovated building will be the new home of the College of Education and Health Services and the Institute for Principled Leadership in Public Service.

When completed, the building size will have been expanded to 85,600 square feet, and include a four-floor addition, a 100-seat auditorium, smart classrooms with new technology and laboratories for science, math, reading, language arts and counseling.

For the copper work to the clock tower, Bradley University turned to Campbellsville Industries. Known in the business as “The Steeple People,” the Kentucky-based firm specializes in the reconstruction of early 1900’s era steeples and cupolas.

“We work directly with the architect to try to get as close to an exact replica as possible,” said David Manning, regional representative for Campbellsville. “This particular project called for about 700 pounds of copper including the cornice, dome and finial.”

A crew of 15 laborers carefully handcrafted the dome, which measures 11 feet across at its widest point. Many of the projects that Campbellsville works on involve copper. Manning said that they restore or renovate approximately 100 jobs a year featuring copper.

“People appreciate the aging process that copper goes through, starting out as shiny as a new penny,” says Manning, “then turning from a light to a dark bronze color, and finally, after many years, to a rich patina green color.”

The previous copper dome on the Westlake Hall clock tower had long turned a rich green patina color. With the renovation, comes the beginning of a new visual lifecycle for the copper-clad clock tower. In its current state, the copper dome shines for the whole campus to see, adding a new luster to Bradley’s educational facilities.

In addition, the university is replacing the clock face with one that features Roman numerals further imitating the original. The tower is only the start of Westlake Hall’s revival, but it shines brightly as a new beacon of hope for the Bradley Renaissance.

For more information about working with copper in architecture, please visit www.copper.org. **Cu**

Upgrade at Ronald McDonald House Keeps Families Connected

High-bandwidth copper wiring provides faster and more reliable service

At the Longfellow Park home, it’s not uncommon to see a family huddled around the computer taking turns typing away at the keyboard and smiling for the person on the other end.

For the sick or injured children staying at the Longfellow and Cherry Street facilities in Kansas City, MO, which are both owned and operated by the Ronald McDonald House Charities, the Internet represents a critical communications lifeline to their extended families back home.

No matter the time of day, you can always find a person logged onto one of the desktop computers in the communal living space, or connected to a laptop in their own bedroom of the house, said Holly Buckendahl, the CEO and executive director of the Ronald McDonald House Charities.

“Childhood illness presents unpredictable challenges, and it is imperative that families have access to computers and internet services to easily and quickly foster connectivity with family and friends,” said Buckendahl. “Families regularly check e-mail, view Skype, and post informa-

tion on their Caring Bridge and Facebook pages for support and to update others on the status of their child. The Internet is also a powerful tool for parents to research medical treatment information, as well as to access online support groups.”

This is why the upgrade to the wiring system at the Longfellow house was so very much appreciated by the staff and the resident guests, she added.

“High-bandwidth copper wiring (Category 5e or better) was chosen for the Longfellow house because it’s faster and more reliable than standard telephone cable and can handle multiple IP-phone lines and support high-speed internet access,” said Lindsay Allen, VP of Marketing for Superior Essex Communications LP, the company which manufactured the copper wiring. “It’s one of the best options to carry voice, data and other services from where they enter the house/building to every room.”

All Ronald McDonald Houses in the U.S. are equipped with Wi-Fi service, provided free of charge by AT&T. When they’re not chatting with friends and family, the children also use the Internet to keep up with their school work and receive online tutoring. This couldn’t have been possible without the home being wired for



Longfellow House – Photo Credit RMHC of Kansas City

Internet, allowing the children and their families to get online freely from virtually any point of the house.

There could be as many as 60 families staying at both facilities at any given time. On average, 125 people could be living in the homes temporarily while their loved ones receive medical care at Children’s Mercy Hospital for cancer, are on a wait list for an organ transplant or are strong enough to go home after a premature birth.

While the average stay is 5 to 9 days, some families will remain at the home for up to a month in one of the long-term suites. A smaller percentage, about 5- to 6-percent, may stay for several months including up to a year. A majority of the families are from Missouri or neighboring Kansas (2 to 3 hours away), but the Longfellow

house opened its doors to visitors from 25 different states last year, added Buckendahl.

Internet access points were installed in each bedroom as well as four Internet connection sites in the family room. Voice over Internet Protocol (VoIP) and Internet access were also added to the staff offices.

Teague Electric installed a hardware solution composed of 50,000 feet of CAT 5e and CAT 3 copper cabling and 62.5 Multimode Fiber Optics Cable manufactured by Superior Essex.

By installing this copper cabling system, the system is guaranteed to meet IEEE 802.3ab Bit Error Rate requirements, and guaranteed to support current and future applications designed for CAT 5e, including Voice over IP and Power over Ethernet.

For more information about copper cabling, visit www.copper.org. **Cu**

Dali Museum Wows with Immersive Art Experience

Tourists Drawn to Dali’s Art and Stunning Architecture

Salvador Felipe Jacinto Dali I Domenech, more commonly known as simply Dali, is considered one of the premier artists of the 20th century. His work pushed the boundaries of the possible into the “surreal” and changed the way people perceive art. The public’s continued fascination with Dali, and the Surrealist movement he helped inspire, can be seen in the success of the new Dali Museum in St. Petersburg, FL.

Since opening on January 11, 2011, nearly a half a million art enthusiasts have walked through the 66,400 square-foot building and exhibit floor. While visitors are certainly coming to view the renowned work of the Spanish painter, they are also getting a chance to admire the museum’s breathtaking architecture that was built specifically for the Morse Family collection of Dali art.

Taking its visual cues from Surrealist design, the geodesic dome structure that surrounds the building is referred to as the Enigma and consists of 1,062 unique, triangular glass panels. The design was inspired by Dali and Buckminster

Fuller’s work on the Teatro Museo in Figueres, Spain, which houses Dali’s personal collection, according to Kathy White, deputy director of the Dali Museum.

Of designing the Enigma, architect of the Dali Museum and HOK Tampa Director of Design Yann Weymouth said his team meant to show the influence of Surrealism, without being trite.

“We have elected to do this by taking a page from some of the principles of visual perception he (Dali) exploits,” Weymouth said. “The solid, Cartesian, rational rectangular volume of the museum is opposed, disrupted, by the glass Enigma.”

The impressive structure is designed to withstand up to a Category 5 hurricane, which is extremely important for a building in Florida which houses such valuable pieces. Precautions were also taken to protect the art from unforeseen hazards inside the building.

“The protection of the displays was a major concern and the design attempted to elimi-



The east view of the Salvador Dali Museum – Photo Credit Kathy White, The Dali Museum

nate a situation where any water piping would be installed above the art,” said Jim Stark, vice-president and senior project manager at Feddon Mechanical, the company which installed the plumbing system.

To ensure the artwork would be safeguarded, the museum chose a mechanical copper system, because of its reliability, proven performance and longevity.

Stark added that the major reason they chose to use the press-connect system, which can be used for most plumbing applications including cold and hot water distribution because its durable, versatile and easy to install, was the time needed to install all 1,500 feet of tubing.

“The project had a critical deadline (the opening was scheduled for 1/11/11) and this joining system can cut labor by 30 percent, allowing the same size crew to install much more pipe in a shorter period of time,” he added.

Besides solderless fittings saving time, the joints can be made with water in the tubing, making them ideal for emergency situations and repairs. Unlike soldered and brazed joints, solderless connections do not have to cool and can be pressure-tested immediately after the joint is fabricated. Because flame is not used, burn permits or a “fire watch” are not necessary during installation. More importantly, system modifications can be made without fear of discoloration or damage to nearby building finishes or components.

For more info on the use of solderless fittings for joining copper tube, visit www.copper.org. **Cu**