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Reconfiguring History

A state-of-the-art radiant heating comfort system breathes a new standard of living into a famed Washington, D.C., school-building-turned-residential-development, thanks to the cooperative and innovative efforts of its professional construction team.

BY JOHN O'REILLY

WASHINGTON, D.C. — Transforming a 125-year-old school building into seven, million-dollar condominiums requires extraordinary skill and patience. Add to the mix that the structure, located in the heart of Washington's popular Georgetown neighborhood, is listed on the National Register of Historic Places, and the task becomes all the more complicated.

Yet a team of dedicated construction industry professionals with a track record of successful projects — builder and developer Encore Development; mechanical contractor Foley Mechanical, Inc.; and architect Cunningham|Quill — overcame these and other hurdles to transform the dilapidated old Wormley School into the new Wormley Row, a much-sought-after property in the nation's capitol.

Built in 1885, the school was named for James Wormley (1819–1884), "a nationally renowned Washington entrepreneur who was a passionate advocate for the education of the city's African-American children," according to the development's web site. (See: http://www.wormleyrow.com/about/)

Among the many noteworthy aspects of this recently completed development is a state-of-the-art radiant floor heating system, consisting of more than 15,000 feet of linear PEX (crosslinked polyethylene tubing) that Foley Mechanical's crew managed to install in only two days to accommodate the demanding work schedules of this challenging project.

"Our charge from the builder was to deliver a best-of-the-best heating and cooling system to meet its vision for the project," explains Foley Mechanical president Dan Foley. "With ceiling heights of nine to 14 feet and 6-foot to 8-foot-high windows, 'best of the best' meant a radiant floor heating system."

While radiant heat provides interior comfort and efficiency, a radiant snow melt system — also made with PEX tubing manufactured by Uponor Inc. of Apple Valley, Minn. — provides safe travel on the outside parking ramp and public walkways.

SYSTEM REDUNDANCY

Rehabbing a historic building in a busy urban neighborhood requires intense preparation. Encore Development owners Steve Kay and Gary Kirstein involved Foley while plans for the project were still on paper.

"Bringing all the players together early in the process saved a lot of potential headaches down the road," explains Foley. "Multiple meetings between the architect, builder, engineer and our staff resulted in a system designed to provide all the modern amenities in a historic building."

Foley worked closely with Summit Engineering on system design. "Because the interior of the building was completely gutted — I stood in the basement, looked up and saw the sky — we had system design freedom," says Foley.

An expert in radiant heating installations with more than 15 years of experience, Foley Mechnical has developed its preferred method for installing

its jobs, including the types of controls, PEX piping configurations, etc. Because the Wormley Row was the first radiant heating project for Summit, a partnership developed between the two firms.

"We worked as a team, rather than fall into the more typical adversarial relationship that can exist between the engineer and contractor," says Foley. "I'm not an engineer; I can't stamp plans. But our office brings a lot of practical knowledge to the table."

The combination of practical experience and engineering expertise married well. Working with Abe Stallcup of Monterey Energy Group and using Uponor's radiant heat calculator, Foley submitted mechnical drawings for the radiant heating system to Summit for approval. The radiant system design called for:

- 15,500 feet PF ½" Wirsbo hePex™ plus tubing
- 14 TruFLOW™ Manifolds
- Three proMIX™ 101 mixing controls with motorized three-way valves to accurately control supply water temperature
- 3,000 feet of ¾" Wirsbo hePex™ plus tubing for the snow melt system
- 2" copper manifolds with integral isolation and loop balance valves
- 5/8" and ¾" Multi-layer Composite Tubing (PEX-AL-PEX) to connect the remote manifolds to the boiler room. These supply/return mains were insulated to prevent heat loss.
- Thermal actuators
- Two Lochinvar Knight KBN-500 500,000 Btu/hour condensing gas boilers with thermal efficiencies above 90%

Compromise came when the engineer specified a forced-air system. He wanted a backup system because of the ceiling height in the living spaces. "We designed and installed a totally redundant system where we have hot

decks in every air handler," explains Foley. "Either system can carry 100% of the heating load.

"To our way of thinking the dual heating plan offers residents a two-stage system, with the radiant floor heat as the primary," he continues. "If the temperature in the space drops three degrees from the set temperature, the fan coil comes on and blows hot air into the room."

INSTALLATION OVERLOAD

Compromise was also required on the job site. Confined spaces made for tight working conditions and even tighter work schedules. Encore couldn't afford to shut down the site for a week while Foley's customary three- or four-man crew laid all the PEX tubing for the radiant heating. Necessity being the mother of invention, Foley increased the number of crew members to 12 and reduced the number of days to do the job to two — Friday and Saturday.

"We were rocking and rolling, trying not to trip over each other, to get all the tubing down in only two days," he says. "It worked."

To ensure that, despite the speed, all the tubing was installed in its proper configuration according to plan, Foley's team used spray paint to detail the tubing layout. The floor sets up as follows: structural steel deck, 4" concrete layer, 2" extruded polystyrene and finally a 4" capping slab that houses the radiant tubing.

That deck is another example of compromise and innovation on the part of Encore, Summit and Foley. Foley's usual approach to installing radiant heating tubing is to tie the PEX loops to the rebar that sits on the corrugated steel. Foley would then enclose the tubing by pouring four- or five-inch structural slab over the rebar and corrugated steel deck.

However, the structural engineer worried that the tubing penetrations through the slab might undermine its structural integrity. "After setting the corrugated steel deck, we sleeved all of our penetrations," says Foley,

describing the compromise. "Then we put down two inches of foam and the 4" capping slab. This solution cost Encore a bit extra, but Summit's concerns were met. Fortunately, the 14-foot ceilings meant we had the space to do it."

REDUCING INSTALLATION COST

To lay 15,000 feet of PEX tubing in two days took more than precise scheduling and a clear picture of the pipe layout. "The physical toll on the hands of my crew would have been major with that much tubing installed in so small a time frame," explains Foley.

The solution: a special new tool, originally designed to tie rebar, that wraps the PEX, ties it off and cuts the wire in half a second. Foley first saw the tool at ISH in Frankfurt, Germany, in 2007 and immediately purchased three. He subsequently had them modified with an adjustable tension.

"The tools costs a lot, but my labor costs more," he says. "These devices saved money for our clients in the form of reduced installation time. More importantly, they also saved wear and tear on my crews."

Uponor Corporation is a leading supplier of plumbing, fire safety and radiant heating and cooling systems for the residential and commercial building markets across North America and Europe, and a market leader in municipal infrastructure pipe systems in the Nordic countries. Uponor Corporation employs 3,800 people in 27 countries and is listed on the NASDAQ OMX Helsinki Ltd., Finland.

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Hi-res versions of a photograph to accompany this release are available for immediate download in .tif format by using this link: http://uponor.oreilly-depalma.com/casestudies/wormley-case-study.shtml

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