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the NEWS

THE HVACR CONTRACTOR'S WEEKLY NEWSMAGAZINE SINCE 1926

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focus

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Contractors Address Hurricane Damage

By Joanna R. Turpin
Of *The NEWS* Staff

When Hurricane Sandy ripped across the Eastern Seaboard last October, it left a trail of destruction that residents are still struggling to clean up. Flooding and high winds resulted in several dozen deaths, as well as power outages for millions of customers, and severe damage to thousands of homes and businesses in and surrounding New Jersey and New York.

Recovery efforts began shortly after the storm hit and will continue for possibly years to come. Many businesses in the area were severely damaged, but that didn't stop contractors from immediately heading back out into the field to help customers in need.

The Eye of the Storm

Long Island, N.Y., was hit particularly hard by Sandy, with several thousand homes lost and tens of thousands more structures sustaining wind and water damage. The surge that struck Long Island brought high tides stretching 9-10 feet above normal levels, while 90-mph winds decimated trees and power lines, causing most in the area to lose electricity.

John Ottaviano, president, Air Ideal Inc., Mineola, (Long Island) N.Y., was in the middle of it all, and his business sustained extensive damage.

"We had half our roof ripped up from winds, lost one of our trucks to flooding, lost power for a week, and were without phones for two weeks," he said. "My partner, Tony Cutaia, had to drive 200 miles north to Springfield, Mass., to find generators in order to get our office operating temporarily. We lost a lot of business, but we are much better off than many. One of our employees lost everything, including his home, vehicle, tools, and all personal belongings."

Ottaviano and his crew got back to work as soon as they could and are still busy replacing the many HVAC systems that were flooded and destroyed during the storm.

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Study Reveals Top 10 States for HVAC Employment

By Cherie Preville
Of *The NEWS* Staff

HVACR contractors looking for plentiful job opportunities, high salaries, available training, and an abundance of service calls should head for the Golden Coast or the Buckeye State, according to a list of top states to work in HVACR, compiled by Emerson Climate Technologies, a business segment of Emerson.

The Top 10

Emerson's top 10 list draws on HVACR salary and employment data from the U.S. Department of Labor; trade school locations recognized by the Partnership for Air-Conditioning, Heating, Refrigeration Accreditation; heating and cooling degree days calculated at DegreeDays.net; residential home values from the U.S. Census; and certified North American Technician Excellence (NATE) contractors by state.

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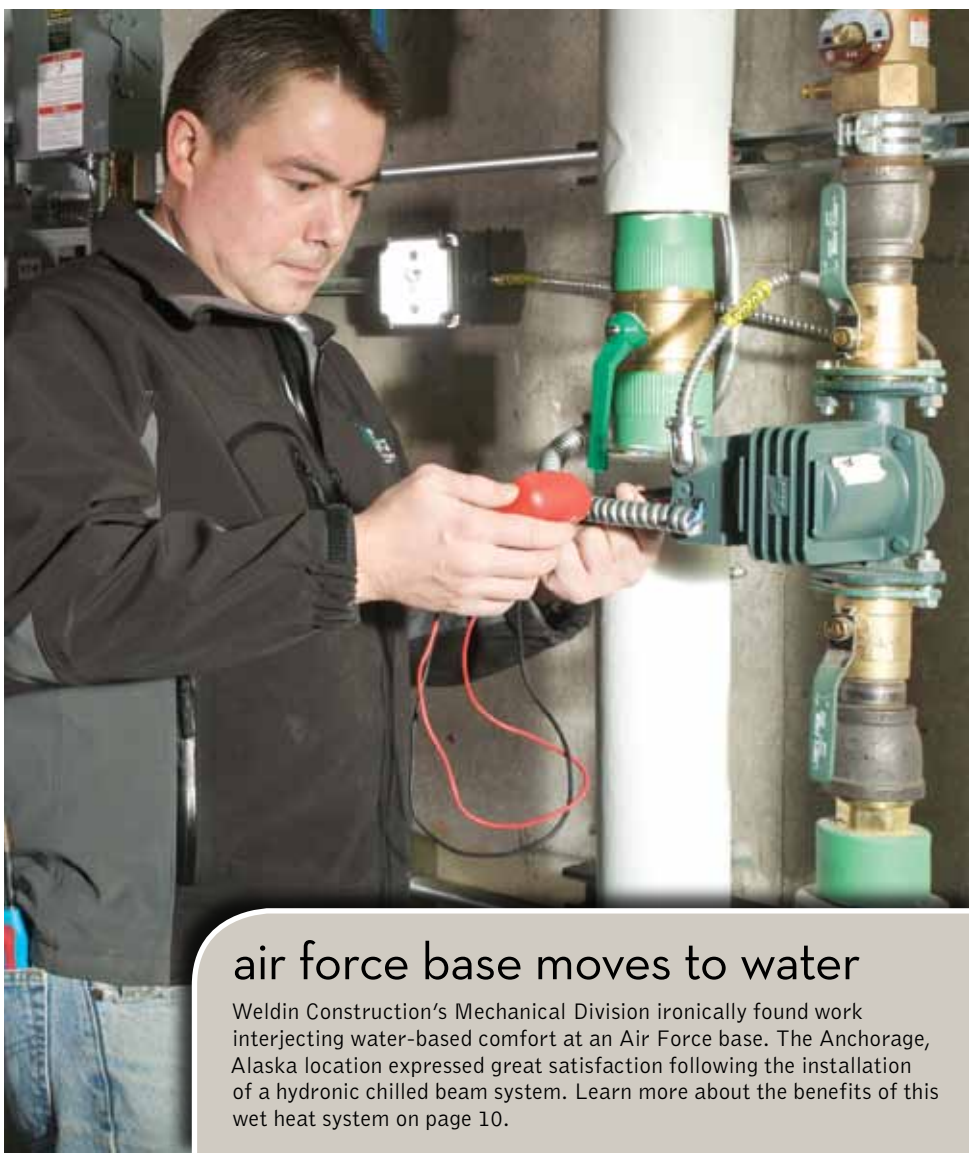

air force base moves to water

Weldin Construction's Mechanical Division ironically found work interjecting water-based comfort at an Air Force base. The Anchorage, Alaska location expressed great satisfaction following the installation of a hydronic chilled beam system. Learn more about the benefits of this wet heat system on page 10.

fyi hvac briefs

Price Increase

- **Johnson Controls** (Milwaukee) announced a 3 percent increase, effective March 4, on **Frick** (Waynesboro, Pa.) brand industrial refrigeration products due to increased material costs.

Residential Contractor

- **Phoenix Peach LLC** (Las Vegas) acquired the assets of **Goettl Air Conditioning and Rescue Rooter** (Phoenix) from **American Residential Services** (Memphis, Tenn.) in Arizona. The HVAC operations will be rebranded as **Goettl Good Guys Air Conditioning Repairmen** (Phoenix).
- **Appliance Fixx Air and Heat** (Grapevine, Texas) won Angie's List's Super Service award.

Commercial Contractor

- **Source Refrigeration & HVAC Inc.** (Anaheim, Calif.) celebrated the opening of its 12,000-square-foot technical training center at the company's headquarters.

inside this week

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correction

In the Feb. 18 issue, *The NEWS* incorrectly identified a photograph depicting NetBraze LLC's 15 MOD as a Nibco Inc. product. We regret this mistake.

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hvacr perspective

Just Add Water

What is wet heat technology? The simple answer is HVAC equipment and applications with the addition of water. The more complex answer reveals a vast sector of the industry which covers anything from radiant snow-melting systems to commercial boiler installs. Add to the mix a few hydronic applications and hot-water heaters, and technicians have plenty to keep them busy in the field of wet heat.

Trends in wet-heat technology show that smart components and circuitry are advancing the field. Additional training of technicians is being required and new applications are making their way from Europe to the U.S. Adding water causes things to grow, and the HVAC industry is no exception. Inside this edition, we explore how contractors are fostering that growth into a garden of wealth. Find out about more wet heat trends starting on page 9.

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Hydronics Trends: Whole-System Comfort

By Angela D. Harris
Of *The NEWS* Staff

The design and application of hydronic systems, like this one, is being enhanced by innovative smart technology.

The application of wet heat technology has expanded over the years and new technologies that improve control and efficiencies are pushing this industry sector further ahead. In light of this equipment and industry emphasis, new trends are developing in radiant and hydronics that are affecting many contractors.

Air Conditioning Contractors of America (ACCA) embraced this growing corner of the industry, devoting a complete radiant and hydronics learning track at its recently wrapped-up 2013 conference in Orlando. The learning track featured four educational labs led by industry professionals, including Bob "Hot Rod" Rohr, Dan Foley, John Barba, and Brian Stack. The conference track was the latest of several endeavors ACCA has used to embrace the growing "wet" side of the industry.

Whole-System Comfort

ACCA acknowledged the growing importance of wet heat technology in 2011 when it developed the Radiant and Hydronics Council. The decision was precipitated by a member survey where it was discovered that of its 4,000 members, 500 were involved in radiant and the wet side of the HVAC industry.

"After that survey, we realized that it was time to recognize that the wet side of the industry and the dry side of the industry must come together to provide solutions for the customers," said Paul Stalknecht, president and CEO of ACCA. "In the ultimate end of the game, the customers are king."

In September 2012, the Radiant and Hydronics Council hosted its inaugural roundtable event.

"The reason why this roundtable is significant is because it brings the leadership of our industry together," said Foley, after the first roundtable. "What the Radiant and Hydronics Council is looking to do is to not only promote radiant and hydronic heating, but it is also to bring in the other elements of the air side — IAQ, humidification, and more. We are looking at the whole comfort equation."

Add-On Issues

Another element in the whole comfort equation is the add-on components utilized within hydronic applications, and the challenges they pose for contractors.

Steve Scott is the owner of Comfort Technology, a small residential company in Dryden, N.Y. He said he enjoys the simplicity of moving heat via water, but said he was concerned about the challenges complex add-on components add to the overall hydronics system.

"With hydronic heat we hang pumps, aquastats, zone valves, circulator pumps, etc., in order to achieve maximum efficiency from an install," he explained. "These components are often made by several different manufacturers and keeping everything running optimally can be a challenge."

Despite the add ons, contractors like Russ Donnici, president of Mechanical Air Service Inc. in San Jose, Calif., have seen an increase in the sale of hydronic technology recently. According to Donnici, it is his customers' desire for improved comfort, as well as a desire to zone a home, that seems to be pushing this trend in his area.

"We are currently finishing up an 18,000-square-foot home with 32 radiant-heat zones," he noted. "We also have backup hydronic heat and we built five custom chillers to provide chilled water for cooling."

Smart Components

As in other HVAC equipment, hydronic equipment is becoming smarter. Manufacturers are beginning to equip their materials with microprocessors at an increasing rate. According to Rohr, there is eventually going to be smart everything from just about everybody — pumps, boilers, valves, etc.

"This trend is likely to push components out of the repair arena and into the replace arena," he said.

"We don't fix microprocessors. When a control goes out on a pump or on a boiler, I think we will see more pumps that just get replaced because the brains on them go bad."

Rohr acknowledged that smart components are helping to pave the way for better controls, and pushing for more efficient performance from hydronic equipment. This in turn is helping set up the wet heat market for smart metering, according to Rohr.

Innovation and Regulation

The need for smarter equipment and controls is pushing forward an innovative trend in the design and application of hydronic systems. Different components are being added to the hydronic mix and Radiant and Hydronics Council member John Siegenthaler P.E., thinks that ECM circulators will become the new normal in hydronics applications. The idea has been embraced and adopted as of Jan. 1, in Europe, said Siegenthaler.

He also agreed with Rohr about the development of Btu metering and Btu-metering stations.

"This is a big thing in Europe," said Siegenthaler. "In fact, the ASTM [American Society for Testing and Materials] is already working on a standard for the United States."

Other trends Siegenthaler sees developing is a switch to venting via polypropylene pipe and a move away from PVC; as well as a rise in the usage of radiant ceiling applications.

"Radiant ceilings have a higher coefficient and in the market are in a good position for growth," he said.

Regional Challenges and Training

Wet heat technology is not immune to regional difficulties, but according to Erik Knaak, vice president of operations for Isaac Heating and Air Conditioning Inc. in Rochester, N.Y., a contractor can never really be surprised where they will find a hydronic application.

"In some areas of the country hydronic technology is much more prevalent, such as in the Northeast and other pockets around the country," he explained. "We hired a technician from California once though, and most all of his experience was with hydronics. At the time he knew very little about air conditioning and I would never have guessed that."

Isaac Heating and Air Conditioning deals with a fair amount of wet heat equipment on a regular basis. The technicians install these systems every seven to 10 days during the heating season and work on them, and all their components, during daily service calls.

Knaak noted that training a technician to troubleshoot wet heat technology is more advanced than basic troubleshooting.

"The issues associated with hydronics are unique to these systems," he said. "Knowing how to bleed a system, how to install a primary/secondary loop, and where to install the riser and the header are all very critical to the safe and proper operation of the equipment. With steam, you run into more specific issues, such as troubleshooting steam traps, condensate returns, and possibly condensate return pumps."

Tom Spall, owner of T.E. Spall & Son Inc., works out of Carbondale, Pa. His region has historically been a dominantly wet heat area. He prepares his technicians to handle, install, troubleshoot, and repair with weekly training sessions, as well as one-on-one field training.

"Wet heat technology requires that technicians have a more diverse skill set and knowledge of performance criteria for hydronic systems," he said.

For more information on the ACCA Radiant and Hydronics Council, visit www.acca.org/hydronics.

focus

Hydronic Chilled Beam System Regulates Military Environment

Wet Heat Technology Brings Comfort to Air Force Base

Weldin Construction's Mechanical Division has successfully completed multiple hydronic installations throughout the Joint Base Elmendorf-Richardson (JBER) Air Force base near Anchorage, Alaska. As the base constructed its Emergency Operations Center (EOC), Weldin's was on the top of the list to handle the HVACR installation work.

Highly classified and on the cutting-edge, some of the world's most advanced military technology is housed within the EOC. Though only 8,000 square feet in size, the facility has computers and work stations for more than 100 officers and is tasked with operating as a strategic central command in case of emergency. With all of the high-tech equipment inside the building, the facility requires substantial cooling, even during an Alaskan winter.

Headquartered in Palmer, Alaska, Weldin faced some challenges with this install; one of which was the amount of overhead clearance that was available. The main facility's floor is built on top of a 12-inch plenum that acts as a conduit for the maze of necessary electric and communications wires. This left no vertical space to spare. During the design process, it became apparent that there would be no room for ductwork either. The solution: Weldin opted for a hydronic chilled beam system.

Early Adopter Concerns

According to Weldin, hydronic chilled beam technology had not been specified to heat and cool a facility before. The technology is relevantly new to the U.S. market and government managers were wary to install this technology, but, trusting Weldin's knowledge and on-base experience, they elected to move ahead with the idea.

"Weldin has a fab shop and a one-acre yard on base," said Steve Nazaroff, mechanical division manager at Weldin Construction. "As general and mechanical contractors, we've had projects going on within the base continuously since 2001. The EOC is the third project that has incorporated engineering from Taco Inc. In 2010, we built an F-22 fighter jet flight-simulator building, and a training facility. Ironically, those two buildings also use a new and emerging hydronic recipe — LoadMatch — and they've performed flawlessly. That's the sort of track record we needed for involvement on this project."

Weldin's earlier JBER projects put hybrid, single-pipe, and primary-secondary hydronic technology to work with mechanical-system designs chosen because of their operational efficiency, yet unproven in the U.S. on a broad scale. A similar project on base — albeit from an entirely different engineer, installer, and manufacturer — had failed in the 1980s.

Concerns that the new chilled beam system wouldn't operate as planned were quickly settled; the Weldin team gained full approval within the hard-to-impress military community.

"We have a good relationship with government managers here," said Nazaroff. "They knew we could be trusted to handle the EOC project, and we weren't planning to let them down."

Chilled Beam Debut

Chilled beam technology is a method of delivering heating and cooling with what Nazaroff describes as "off-the-charts efficiency."

Visually, contractors should picture a flat, low-profile fin tube radiator mounted inside a sheet metal box suspended from the ceiling.

The hybrid system sometimes uses forced convection, which makes it an active chilled beam unit. Other times, air circulation is left to natural convection, making it a passive chilled beam system. These types of systems can approach 150 Btuh per square foot for passive operation and 400 Btuh per square foot for active systems.

Because chilled beams are ceiling-mounted and do not require the use of drain pans, chilled water-supply temperatures must be above


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❶ Jeremy Pennington, Mechanical QC, inspects part of the installation at the Emergency Operations Center on Joint Base Elmendorf-Richardson Air Force Base, near Anchorage, Alaska. ❷ Weldin Construction's Mechanical Division installed the hydronic system at the Emergency Operations Center, on base at Joint Base Elmendorf-Richardson. ❸ The chilled beam hydronic installation provides both heating and cooling for the facility.

Weldin's trucks were identified, background checks on technicians were completed, and ID tags were issued. "Like you'd expect with any job involving new technology, we had a few bugs to work out," said Nazaroff. "But now, after two exercises in the EOC, the personnel in the facility are completely unaware of the heating and cooling system, just as it should be. I like to refer to it as a stealth comfort system." N

the ambient dew point. As a result, dehumidification, or latent cooling, is usually handled by a separate, dedicated outdoor air system (or DOAS), supplying dry, conditioned air to the space.

Passive chilled beam systems supply the DOAS airflow through a separate diffuser or grille in the room. An active chilled beam supplies the DOAS airflow through the chilled beam, thereby increasing the capacity of the cooling coil through forced convection.

"What makes chilled beam technology so interesting is its broad applicability for commercial structures, and extreme energy and thermal efficiency," said Greg Cunniff, P.E., application engineering manager for Taco Inc. "Another key advantage is that a chilled beam system requires very little ceiling space and height."

To help with the pump energy demand from this system, Weldin specified Taco's pre-packaged LOFlo injection mixing system. It consists of a variable-speed injection circulator on the chiller side of the mixing block, and a constant-speed zone circulator on the beam side. According to the company, the use of LOFlo mixing blocks eliminates the need for a separate chiller or air conditioning system to handle the latent load.

"With a LOFlo system, we're able to use one chiller," said Cunniff. "Water comes out of the chiller at 45˚F. It supplies the DOAS coil for latent cooling, and goes to the mixing blocks where it's mixed to the exact temperature needed in the chilled beams. Return water is generally around 60˚."

In this manner, a 20-ton Aaon chiller supplies water to 32 Price chilled beam fixtures, each measuring 2 feet by 4 feet."

All or Nothing

The hydronic system at the EOC rarely coasts at the half-load mark. Either the facility will be empty, or an exercise will be underway, with 100 or more occupants, each served by one or more computers. When the EOC is occupied, the cooling load is 140,000 Btuh — nearly three times that of the heating load.

When this occurs, the LOFlo mixing blocks run at a steady, half-gallon per minute rate on the beam-side. Five of the mixing blocks are used and six or seven chilled beam units pull water from each of the mixing blocks.

"The system resets the chilled-water temperatures as the latent load increases," said Nazaroff. "Under normal load conditions, chilled water-supply temperatures hover around 59˚, about two degrees above the room's dew point. In the summer, the target temperature for the room is 68˚."

Stealth Performance

Three 5-ton Data Aire chiller systems handle the heavy load caused by computer infrastructure in some smaller rooms. The uninterruptible power supply (UPS) room and critical telecommunications room need extra cooling capacity to keep equipment functioning properly.

In the winter, and especially when unoccupied, the EOC calls for heat, even though it's mostly underground. Design temperature for the long heating season is 68˚. A Taco 2400 circulator moves 180˚ heating-supply water to satisfy the 52,000-Btuh heating load for the 16-room facility. Heat comes from a standalone steam boiler.

"Security is always a challenge that we encounter when working at JBER, and that's to be expected," said Nazaroff. "The challenge didn't last long though."