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PLAINS TALK

WPE WEST
PLAINS
ENGINEERING, INC.

Cedar Rapids WPE: Echo Hill

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MEMBER
PEER REVIEWED COMPANY



Echo Hill's new 23,100 square foot facility features a covered entry drive.

Did You Know?

• South Dakota, Iowa and Wyoming have USGBC Chapters. WPE is a corporate member of USGBC National and several of our employees serve as board members. To learn more about your state chapter go to:

SD: <http://usgbc.sd.wordpress.com>

IA: <http://usgbcia.org>

WY: <http://usgbcwyoming.org>

Plains Talk is a quarterly publication of West Plains Engineering, Inc. in which we highlight a few of our most interesting projects. Your comments are welcome at any of our locations listed on the back cover of this newsletter.

• The union of two congregations in 2007 created a new Presbyterian church whose needs could no longer be met by either of their existing buildings. This led to the construction of a new facility designed by Solum-Lang Architects. Construction began in October 2008 and the building was dedicated in October 2009.

Echo Hill's new facility is designed with nearly 23,100 square feet. The entryway to the building has a covered entry drive. A long entry vestibule serves staff offices and leads to the narthex which has a 350 seat sanctuary and features an exposed structural wood ceiling. The large chancel has space for storage, a pipe organ, drama skits and a 30+ choir and praise band. Additional spaces include a library, conference rooms, multi-purpose rooms, nursery, classrooms and two restrooms. A commercial kitchen serves the large fellow-

ship hall. A connecting café serves the narthex. Future additions to the building are planned therefore the mechanical and electrical systems are designed to accommodate future expansion.

The owner wanted an energy efficient, cost effective HVAC system and was interested in taking advantage of rebates offered by the utility companies. Natural gas was not available at this location, so options for the heat source were limited. A decision was made to use high-efficiency geothermal water-to-air heat pumps. A separately metered 480 volt electrical service was used to supply power to the HVAC system equipment in order to qualify for rebates from the utility company.

One of the biggest challenges was installing the mechanical and electrical systems in the high sloped ceiling areas of the sanctuary and narthex. The ceiling is exposed so all utilities had to be routed

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Rapid City WPE: South Dakota Housing Development Authority, Pierre SD Receives LEED® Certification

• The South Dakota Housing Development Authority was created in 1973 by the State Legislature to provide essential public functions. The mission of SDHDA is: *The Authority is committed to leading the affordable housing industry by our integrity, innovation and financial strength...to encourage the prudent investment of public financing and private capital...we are committed to the long term of affordability and feasibility of every project we undertake.* Decisions are guided by integrity, research and prudent planning. They chose a level of LEED Certified as that which most closely matched their mission.

The leaders at SDHDA had the opportunity to obtain more LEED credits; however, having made some decisions for highly efficient mechanical and electrical systems, the additional premium to go to the next step proved unnecessary. The important fact to remember is they had already gone down a path of highly efficient systems with the decision of high efficiency boilers, VAV reheat, and air cooled chilled water systems. These were coupled with many energy efficient envelope designs with daylight harvesting and lighting control, and many other features throughout the facility. Full energy modeling documented the energy savings over ASHRAE 90.1 requirements.



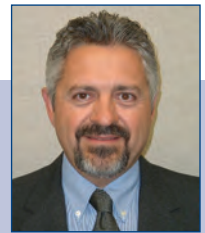
Regional material and recycled material content of some building materials also aided in the achievement of LEED Certified level. All the decisions set an appropriate quality to display their mission to those they serve.

The new facility is a unique design that appears less institutional than most businesses in their category. The design team included FourFront Design, West Plains Engineering and Albertson Engineering. The General Contractor was Glen-Barber Associates of Rapid City.

One of the main programs provided and managed by the South Dakota Housing Development Authority is the Governors House Program. In 1996, the Governors House Program was created as a way to provide reasonably sized affordable homes to income qualified individuals and families. To date, more than 1900 Governors houses have been sold to the elderly persons with disabilities and income qualified families in South Dakota.

About the Author:

Doug Feterl is the Principal and Office Manager in the Rapid City Office and has been with WPE for over 19 years.

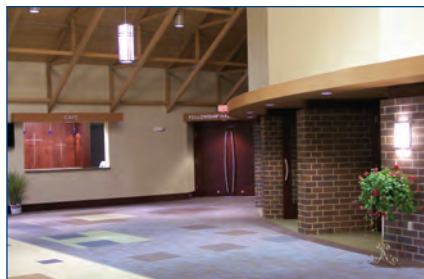


Cedar Rapids WPE: Echo Hill (continued)

through the truss system below a finished panel ceiling. The conduit and sprinkler piping was routed and painted to match the ceiling in order to conceal it. HVAC ductwork was routed near structural girder beams and trusses; it was also painted to match the ceiling.

The heating and cooling system consists of vertical heat pumps that distribute air around the building. Console heat pumps serve the entryway. The heat pumps exchange energy with a horizontal bore geothermal field. Pumps circulate fluid through the geothermal heat exchanger and the heat pumps. These pumps are driven by energy efficient variable frequency drives which are controlled by system pressure.

The design team located heat pumps and hydronic circulation pumps in second floor mechanical rooms that were designed to minimize sound transmission to noise



Echo Hill's interior features and exposed structural wood ceiling, a fellowship hall and cafe.

sensitive areas.

Lighting in the sanctuary and narthex consists of high output metal halide fixtures to provide the majority of lighting, plus decorative pendant fixtures. These pendant fixtures are not only for aesthetic purpose, but are dimmable to provide different levels of lighting for the many uses of both spaces. The raised alcove at the front of the sanctuary is illuminated by

theatrical style track lighting. All of the lighting is controlled through a dedicated lighting control panel which is tied to the audio/visual system computer that allows for control of both systems from one location.

About the Author:

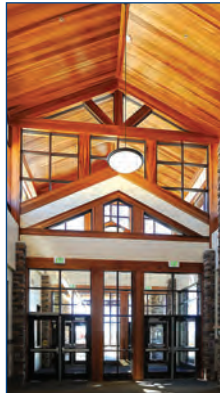
Brandon White is a Mechanical Engineer in the Cedar Rapids Office and has been with WPE for over two years.



Casper WPE: Pinedale Elementary School

• The town of Pinedale is located in Sublette County in the western half of Wyoming. Less than 2,000 people reside within city limits, but the local community extends well beyond town borders.

It was this extended community and the surrounding landscape that inspired the design for Pinedale's new elementary school. Completed in July of 2010, the 89,000 square-foot facility is patterned after the local ranches and focuses on local ecosystems. The kindergarten and first grade learning community's theme is "Plains & Meadows," while second and third graders enjoy "Rivers & Streams," and "Mountains & Forests" is the motif for the fourth and fifth grade students. Each learning community has its own distinct color scheme, tile patterns, and artwork, and present unique teaching opportunities and



learning experiences. The main entry to the building incorporates heavy timber and stone elements, which was inspired by the ranches and historical buildings in the area.

The architect for the \$19.5 million building was Sandstrom Architecture out of Orem, Utah. Layton Construction was the general contractor for the design-build contract. West Plains Engineering, Inc. provided electrical design services, and we coordinated our efforts with Taylor Electric, the electrical contractor for the project.

Photos courtesy of Chris Ostlund

About the Author:
Chris Kost is an Electrical Engineer in the Casper office and has been with WPE for over 8 years.



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Sioux Falls Office

Congratulations...**Jeremy Goodroad** who was recognized for 5 years with West Plains Engineering.



Congratulations...**Todd Weidner** who was recognized for 10 years with West Plains Engineering.



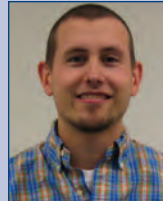
Congratulations...Rita and **Kevin Eggert** who celebrated the birth of their daughter, Amelia Rutu, on January 13, 2011, at 9:45 pm. Amelia was born weighing 8 lbs., 11 oz. and was 21 inches long.

Congratulations...Nicole & **Jeremy Goodroad** who celebrated the birth of their daughter Kaitlyn Marie on March 3, 2011 at 3:59 PM. Kaitlyn was born weighing 6 lbs., 13 oz. and was 20 inches long.

Cedar Rapids Office



Welcome...**Arlo Wiczorek** joined the Cedar Rapids office in October 2009 as a mechanical designer. Prior to WPE he worked for a local mechanical contractor. He graduated Iowa State University in May 2006 with degrees in mechanical and construction engineering. Arlo enjoys traveling, being outdoors, and spending time with family and friends.



Welcome...**Jacob McVey** began working at the Cedar Rapids office in December of 2009 as a CAD technician. Jacob graduated from Kirkwood Community College with an Associates Degree in Architectural Technology in May of 2008. He enjoys renovating his home, participating in Triathlons, running the Bix and attending Cubs games in Chicago.

'Tis the Season...Once again the Cedar Rapids office participated in the Downtown Window Decorating Contest. This year's theme was "A Christmas Story." With a group effort WPE came in 2nd place out of 16 other businesses.



Congratulations...**Justin Cooper** who was recognized for 10 years with West Plains Engineering.

Congratulations...Katie and **Blake Pauls** who welcomed their daughter Sylvia Ann on June 26, 2010, at 11:11 AM. At birth Sylvia weighed 8 lbs 4.4 oz. and was 20 inches long.

Casper Office



Welcome...**Kurtis Sweet** began working at the Casper, WY office as a Mechanical Engineer in January 2011. Kurtis graduated from the University of Wyoming in May 2009 and worked for ME&E Engineering in Durango, CO. He is a LEED AP BD+C and registered Engineer in Training. Kurtis enjoys spending time with his family, mountain biking and kiteboarding.

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Rapid City WPE: Utility Distribution Sectionalizing, Part I

• The term sectionalizing might be better understood if we thought of it as system restoration following an interruption of service. Or more importantly, how does a utility get electricity back to their customers? As many of you are aware, following a widespread outage the concept becomes how to restore the power to the greatest number of customers in the shortest amount of time utilizing the workforce available. Since there are typically fewer trained linemen than customers without power, a utility must thoughtfully manage its assets in order to restore power to as many customers as possible with a minimum number of procedures. So how does the utility accomplish this restoration process? First and foremost the utility personnel must have a detailed understanding of their system. This is where a sectionalizing study can be most helpful.

A detailed sectionalizing study not only determines system fault currents, voltage and capacity problems, but will also identify coordination issues. Once the study has been completed the utility should be provided with a list of recommendations that will correct or address these problems and issues. Some, however, are not easily corrected due to terrain or customer density for example. But through the study these issues are identified and special procedures established to handle outages in one of these troublesome areas. An example of this would be three or more reclosers in series on the same feeder where the fast trip curves are not given the proper time separa-



tion thus resulting in nuisance trips. The simplest solution, removing or relocating one of the reclosers is not always the best solution if it creates extended outage times following a permanent fault. So in this case a few momentary “blinks” may be tolerated in order to reduce the number of line miles patrolled during a permanent fault.

As mentioned previously, a detailed sectionalizing study will provide the utility with fault current values, both maximum and minimum, across the entire system. Voltage and capacity problems should also be flagged so work plans can be written to correct the situation. Today, all of these values can be easily obtained through the use of commercially available engineering analysis software. The preciseness of the study results lies in the accurate representation of the electrical system within the software model. The model must be an accurate representation of your electrical system if you are to rely on the results, and it must be in place before the sectionalizing study can be performed.

In our next newsletter, we will discuss Part II of this article and learn more about the system modeling process and why the accuracy of the model is critical.

About the Author:

Kevin Groves is the Utility Division Manager in the Rapid City Office. He has been with WPE for over 4 years.

