References

National Renewable Energy Laboratory (NREL)



Uponor involvement

Project highlights

- 2013 ASHRAE Technology Award Winner
- LEED® Platinum
- $64 million research support facility
- Features Uponor radiant heating and cooling
- Largest net-zero energy building in the U.S.
- Increased campus square footage by 60%
- Only increased campus energy use by 6%
- 220,000 square feet of office space

Products used

- 42 miles of Wirsbo hePEX™ tubing
- Zones from 48 to 250 ft. long, up to 24 ft. wide
- Loops with 6- to 10-inch on-center spacing

National Renewable Energy Laboratory (NREL)

Learn why engineers chose Uponor radiant heating and cooling systems to meet energy-neutral goals for the National... The National Renewable Energy Laboratory (NREL) in Golden, Colo., is the nation's only federal laboratory dedicated to the research, development, commercialization and deployment of renewable energy and energy-efficient technologies. When it came time to build a $64 million, 220,000-square-foot Research Support Facility on the campus, NREL engineers looked to Uponor radiant heating and cooling to help meet their energy-neutral goals.

"In designing and building the new facility, our aim was to move the needle in how America uses energy to heat and cool buildings," NREL Senior Engineer Paul Torcellini says. "It isn't enough to be energy-efficient when commercially viable technology exists to make buildings energy-neutral."

Among the many groundbreaking innovations that made the facility possible was a new method for installing radiant heating and cooling systems: the Uponor Radiant Rollout™ Mat, which enabled mechanical contractor Trautman & Shreve to

dramatically slash labor time and costs. These savings, in turn, helped NREL meet its budgetary goals and tight construction schedule.

Project Facts:

Location	Completion
Golden, CO, USA	2010
Building Type	
Industrial	
Project Type	
New building	

Engineers chose Uponor radiant heating and cooling systems to meet goals for the NREL

High-Performance Design

Centennial, Colo.-based Haselden Construction was the builder of the facility. Haselden Design-Build Project Manager Philip Macey, AIA, LEED AP, helped the project team through critical design decisions based on information in the contractor's cost model and the design team's energy, daylighting, natural-ventilation and thermal-mass models.

''Our goal was to maximize the passive performance of this facility,'' says David Okada of Stantec in San Francisco. ''Then we focused on making the engineered systems as efficient as possible. Thermal and energy modeling provided the information the design-build team needed to keep the design true to the project's aggressive goals.''

In recognition of Stantec's engineering consulting work on RSF, the company received the prestigious Engineering Excellence Grand Award from the American Council of Engineering Companies in April.

Unique Radiant Installation

Tony Barela, project manager for mechanical contractor Trautman & Shreve, needed an ultra-efficient tool to meet the twin performance criteria of energy efficiency and cost control. ''The job schedule was critical on this project,'' Barela says. ''Working with Haselden Construction, we knew that the five days allocated to us were not enough time to build all the radiant heating and cooling zones. It was critical we find another way.''

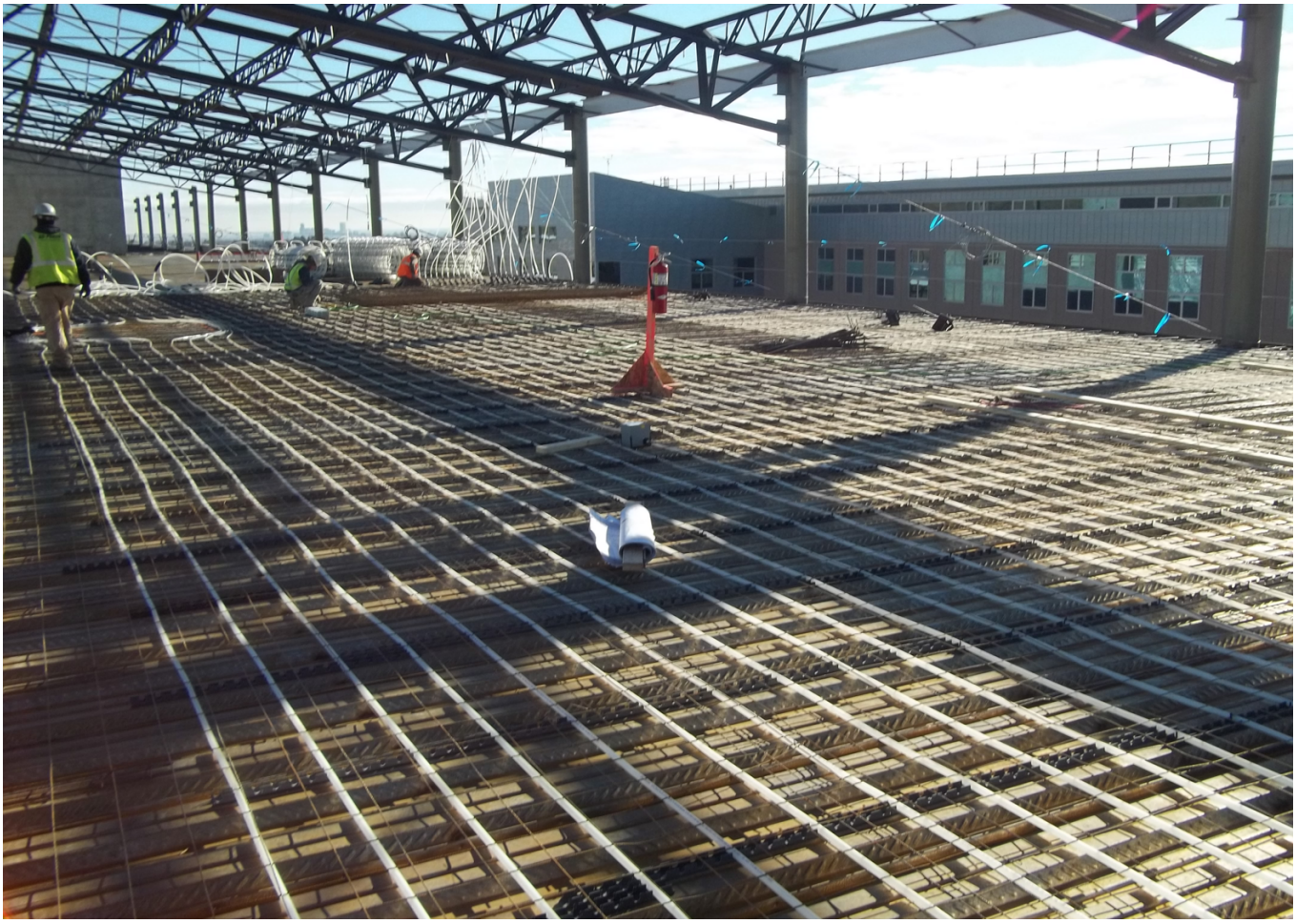
Working with local sales agents Tom Meek and Tobi Gibson from TM Sales in Arvada, Colo., Barela and superintendent Don Martinez devised a pre-fab plan for the radiant zones. After mapping out all zones, Trautman & Shreve purchased Wirsbo hePEX™ tubing in standard 1,000- and 500-foot rolls, then using 3-foot plastic rails (with loops in 6- to 10-inch spacings to hold the pipe together in an even width), they prefabricated their own radiant mats.

''Zones on this project ranged anywhere from 48 to 250 feet long and up to 24 feet wide,'' Barela explains. ''We customized each mat in whatever dimensions were needed.'' For example, on the widest zone, four 6-foot mats were connected to

complete that zone.

“Overall, we saved 28 days in the construction schedule,” Barela says, estimating the true day-savings was much more like 60 versus the time required in a conventional radiant installation.

NREL

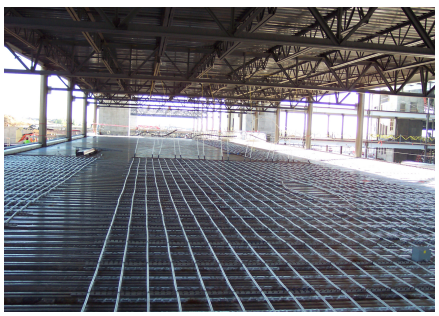


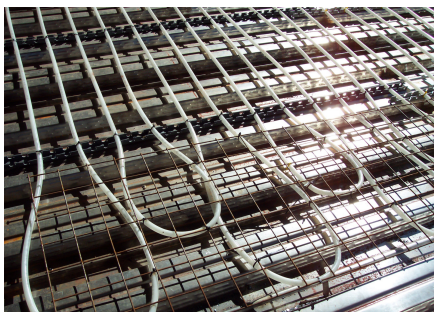












> It isn’t enough to be energy-efficient when commercially viable technology exists to make buildings energy-neutral.

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