

RADIANT GURU

The building design for a new monastery required a radiant expert who could go the extra mile.

The Karma Triyana Dharmachakra (KTD) monastery is the North American seat of His Holiness the Gyalwa Karmapa, head of the Karma Kagyu school of Tibetan Buddhism. Founded in 1976, the monastery features traditional teachings as transmitted by Kagyu Lineage meditation masters since the 10th century. The center is located on a 24-acre site in the heart of the Catskill Mountains above Woodstock, N.Y.

In 1992, a shrine was built on the property by lamas, staff and volunteers. It was painted by a Tibetan artist-in-residence and decorated in the style and architecture of an authentic Tibetan monastery.

The journey to construct a four-level, 50,000-sq.ft. building to surround the shrine began in 2002. John Abularrage, owner of Advanced Radiant Design, Stone Ridge, N.Y., was brought into the project upon the recommendation of North Engineers & Design Associates, Kingston, N.Y., a firm he has worked with on numerous radiant heating projects over the last 20 years.

Abularrage had an initial meeting with KTD and took six lamas on a

tour of several radiant heating jobs he had completed. “They were familiar with radiant floor heating and it appealed to them for several reasons, including efficiency and comfort. Many of their classes and activities involve sitting on the floor and they were very interested in concrete stained floors,” he says. “They also needed control adaptability, as there would be many different uses for the building.”



Looking out at the new building from the shrine.

Abularrage obtained a contract for the project in Fall 2005. He then worked closely with North Engineers and Patrick Cliett, KTD's construction and facilities manager, on the design.

The new building is U-shaped. The base is 204 ft. and the legs are 162 ft.; the base is 36 ft. wide and the legs are 32 ft. wide. Like the shrine, it is modeled after a traditional Tibetan Buddhist monastery. There are 36 residential rooms, two apartments for visitors, large dining rooms and numerous common areas.



The new building is U-shaped and features four floors.

The shrine is situated between the top of the two legs, which has enabled the creation of a courtyard in the middle of the "U." The top floor (level four) of the new building is on-grade with the shrine and courtyard; levels three, two and one descend downward with the slope of the land, although each level does have exposure and windows.

The sheer size and shape of the building with its long narrow wings and many rooms – all divided by poured concrete partition walls – presented a challenge. It was impractical to install individual loops to each room. All tubing had to be drawn out before the building was erected in order to install hundreds of sleeves in the concrete walls. While every job that Advanced Radiant Design builds is designed and drawn prior to construction, the required forethought on the KTD project demanded that every detail be thoroughly documented prior to construction.

After the building was constructed, more than 15 miles of Uponor Multi-Cor tubing in different sizes was passed through the sleeves. The tubing is installed in a combination of embedded tubes in structural slabs and embed-

ded tubes in cap slabs on top of concrete planking. The finished floors are a combination of dyed/stained/epoxy painted concrete.

The mechanical room houses four, 256,000-Btuh, G215-6 cast-iron, oil-fired Buderus boilers that are staged, reset and rotated with a tekmar 268 boiler staging control.



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System control is provided by a fully networked tekmar tN4 control system. The boiler target temperature is set by the system via an outdoor sensor input to the stager that is integrated with indoor temperature feedback from the zones. Due to the size of the main control panel, it was fabricated in four sections at the Advanced Radiant Design shop.

All interconnecting control wiring was installed in advance and then completed on site when the panels went together. The panels systematically fit together like puzzle pieces.

There are 18 zones of radiant heat distribution. Because of the vast distances of the building, there are two injection mixing systems. The first, located in the main mechanical room



One of the two injection mixing systems feeds 12 of the 18 zones.



Before (top) and after (bottom). The finished floors are a combination of dyed/stained/epoxy painted concrete.

with the boilers, feeds 12 of the zones. The second remote “mini tube” mixing station feeds the other six zones. All zone circulators are three-speed, allowing for fine-tuning to appropriate speed based on ΔT for each zone at steady-state conditions.

Given the intermittent use of some of the spaces, the indoor feedback provides acceleration from an unoccupied mode without overshooting the desired temperature. The zones of residential rooms each have four temperature sensors spread through them to provide temperature averaging. This reduces the risk of any one room being able to skew the desired target temperature. All thermostats are located in remote mechanical rooms so that none of the occupants has direct access to them.

The control system was recently linked to the building automation system with a tekmar Gateway so that Cliett, the construction and facilities manager, can manage and monitor the heating system remotely from any online location. The system also allows Advanced Radiant Design to monitor the system from their office, in order to refine the system programming under real-time operation. Tekmar “scenes”—predetermined, pre-programmed usage settings—are under development as well.

“Working with Advanced Radiant Design was an extremely positive experience,” Cliett comments. “From top to bottom, everyone involved at Advanced Radiant Design was professional and cooperative throughout the rough-in and finish phases of the job.”

Cliett says the building’s comfort level is very high. “It gets very cold and windy here, and the building is always warm — we get many compliments about how comfortable it is. The heat is very evenly distributed. We are able to maintain a lower temperature without reducing the comfort level of the residents and staff.”

Cliett adds that comfort is indeed the “most attractive feature of the system. The ability to control the system from anywhere in the world is also very convenient.”

Now that the building is constructed, the staff is starting to populate it with silk tapestries, statues, paintings, art and books from Tibet. In addition to teaching, the group’s mission is to preserve the Tibetan language, art and culture.

“We were honored to have the Dalai Lama visit and bless the new building,” Abularrage says. “He was speaking in New York that day and his visit was kept out of the media. We only found out about his visit two hours before he arrived. Fewer than 1,000 people



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were present as he blessed the building from a meadow with the sun shining down and the mountain rising up in the background.”

While not the most complex, this is the largest single square-footage job in Advanced Radiant Design’s portfolio thus far. Now, when Abularrage — a nationally known radiant expert — is referred to as a “radiant guru,” the term takes on a whole new meaning.

Lisa Murton Beets is a Cleveland-based freelance writer specializing in HVAC-related topics and a frequent contributor to Radiant Living.

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