

October 2003/Volume 21, Number 8

PM

Plumbing & Mechanical

► Keeping Today's
Whirlpools Clean

MAMMOTH JOB

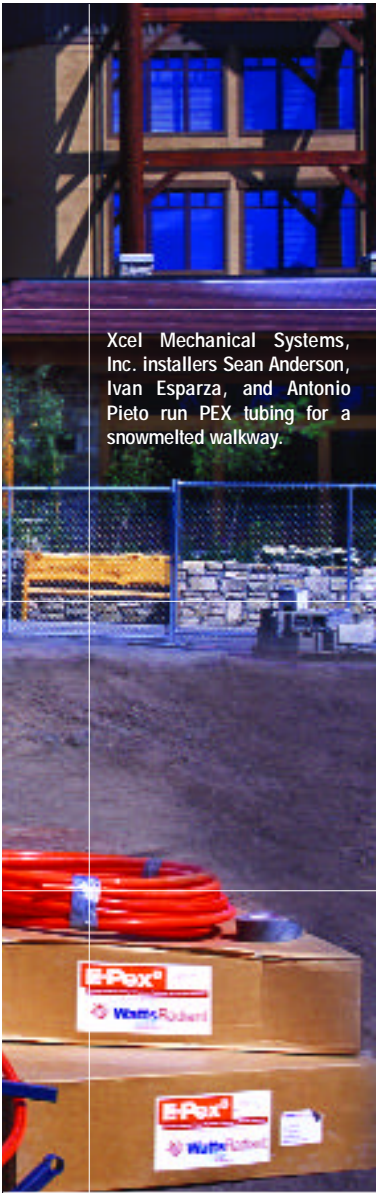
Special Healthcare Section

INSIDE ►

MAMMOTH JOB



Xcel owner/engineer Kevin Michel looks over the installation of the new Laars LP gas boiler and snowmelt piping at the Canyon Station facility.



Xcel Mechanical Systems, Inc. installers Sean Anderson, Ivan Esparza, and Antonio Pioto run PEX tubing for a snowmelted walkway.

We doubt Daniel Webster could have described it better had he been poised himself on the upper slopes of the Mammoth Mountain ski resort. This central California retreat, located in Mammoth Lake, about a half-day's drive from Los Angeles, San Francisco or Las Vegas and Reno, Nev., has certainly earned its name.

The mountain dominates the eastern Sierra skyline — the central peak looms 11,053 ft. and still is just a part of the resort's 3,500 acres. Winter brings more than 1.2 million skiers. Plus, a new multimillion-dollar lodging/retail development will only bring more.

"Mammoth" just as easily applies to the plumbing, mechanical and, in particular, the extensive snowmelt systems installed over the last couple of years by Xcel Mechanical, Gardena, Calif. And while we're thinking about it, we continue to be impressed by the help contractors get from other people you'll meet in this story, from manufacturers to reps, to complete such a mammoth undertaking. In all, some eight people formed an ad hoc design team to manhandle several major installations going on simultaneously and under tight deadlines and tough weather conditions.

As with everything immense, let's break it down and first describe the overall setup. Several years ago, the owner of Mammoth Mountain joined forces with Intrawest, a leading Canadian developer of ski resorts. While the resort wasn't lacking amenities, an \$800 million master plan was put in place to turn the relatively sedate community into a full-service resort destination.

As the first stage of the multiphase project began, Howard CDM, a general contractor based in Signal Hill, Calif., was hired to build and develop all base facilities to accommodate the mountain's extensive lift network.

"We, in turn, hired Xcel to design and install all the mechanical, plumbing and snowmelt for gondola lift stations and commercial/retail facilities," says **Rick Demshki**, project manager, Howard CDM.

Kevin Michel, Xcel's president, has a slightly different pedigree than many Wet Heads we meet in that he's also a P.E. With math and science as his strong suits in high school, Michel went on to earn a bachelor of science degree in mechanical engineering from Iowa State University in 1990.

Mam-moth (Mam'ə th)

adj. very big; huge; enormous.

That pretty much sums up the state-of-the art snowmelt job for a California ski resort.

BY STEVE SMITH

MAMMOTH JOB



Photo credit: Jason Gordon/Xcel.

Top: Concrete is poured into the lower "bathtub" at Canyon Center Gondola terminal.; Bottom: Sand is placed over snowmelt tubing and insulation in preparation for brick pavers at this Canyon Station deck.

After just eight months at his first job with a California mechanical contractor, Michel was put in charge of the engineering department. He eventually went on to gain additional experience running the firm's design/build department. He took his P.E. test in 1995. Then, along with **Greg Evans**, a fellow

colleague who was running the firm's plumbing and piping department, he left to start Xcel in 1998.

The majority of the fledging company's work is in industrial and commercial with about 60 percent of the business from design/build work — particularly valuable expertise for the

Tough Working Conditions

Think you've got a tough jobsite? Check out these statistics for Mammoth Mountain:

- Average 32 ft. of snow each year.
- Elevation at base camp: 7,953 ft. above sea level.
- Temperatures go as low as minus 20 degrees F.
- Total area of the resort covers 3,500 acres and 3,100 vertical ft.

Last December alone, Mammoth Mountain got 12 ft. of snow. And it's common for just one winter storm to drop 3 ft. of snow in the area.

Xcel's crews are on the scene year-round. But most of the heavy construction must be squeezed in to the three or four months of snow-free weather. (Mammoth's ski season is one of the industry's longest, opening in early November and often running well beyond Memorial Day. Fishing, golfing and mountain biking keep the area busy no matter the season.)

"Complications with the weather are always a problem," says **Kevin Michel**, president of Xcel Mechanical. "The snow can begin to fall in September — exactly the time everyone is rushing to finish the job."

Handling PEX tubing is especially challenging when the snow falls since it becomes more rigid and harder to install. In many cases, however, Xcel uses more flexible Onix EPDM rubber tubing for certain zones, especially stairs.

Plus, the Mammoth Mountain jobsite is 350 miles from Xcel's headquarters. "My foreman must be my eyes and ears for projects on the mountain."

MAMMOTH JOB

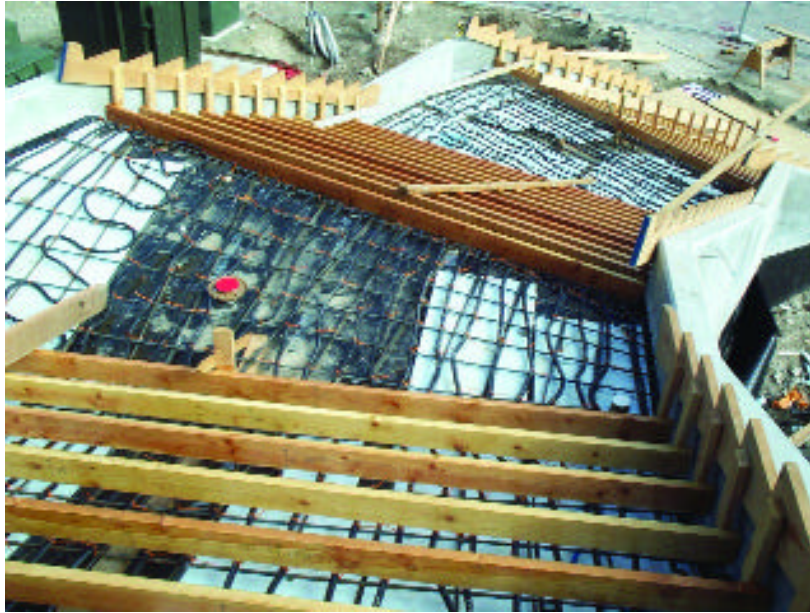


Photo credit: Jason Gordon/Xcel.

Village Gondola terminal south stairs are prepared for a cement pour. The flexibility of Onix tubing by Watts Radiant permits it to be contoured easily to the stair surface, even in cold weather.

Mammoth Mountain work.

As we'll see, the sophisticated zoning and controls of various snowmelt systems, as well as installing a modulating boiler brand-new to the market, caused more than one head to be scratched.

"I had no idea the company would

turn out like it did," Michel says. "I was hoping we could someday perform \$8 million in annual sales — and we did that in just our second year."

This year the firm is on track to perform around \$21 million in business and employs, depending on workload,

between 100-150 people, including five engineers, three of whom are registered P.E.s in California.

Over the last couple of years, Xcel earned about \$1.3 million for work on four major sites located up and down Mammoth Mountain. While the work also includes plumbing and mechanical work, for the purposes of this story, we'll focus on the complex snowmelt systems.

The Perfect Storm: Two winters ago, Xcel began making improvements to the McCoy Station, a day lodge located about halfway up the mountain, which includes a food court, bar and full-service restaurant.

"One aspect of that job was to build a large, brick paver dining deck with extensive snowmelt," explains **Jason Gordon**, jobsite supervisor for Xcel who manages a year-round work crew at Mammoth.

From that point, Xcel's work, you can say, snowballed. Last year, Xcel, along with the help of other industry professionals, raced to put the finishing touches on the Canyon Station, the mountain's main gondola/lift center that provides further access to 150 ski runs.

Crunch time was at its peak in the fall of 2002 as the threat of an early winter loomed. Canyon Station would include a 10,000-sq.-ft., radiantly heated deck (among other extensive snowmelt surfaces) linked to Canyon Lodge, one of the resort's first modern buildings. The deck featured a stage for concerts, as well as dining options. Canyon Station would also be home to a storage facility that would house all 37 gondola cars off-line while not in operation.

To get the work done, Xcel relied on the expertise of a few other industry professionals. **Mike Taylor**, president of manufacturers' rep agency Dawson Co., for example, worked closely with engineers and salesmen at Laars and Watts Radiant in designing many of the snowmelt systems. Meanwhile, **Keith Whitworth**, Watts Radiant design engineer, traveled to California to help with the designing of several of the snowmelt systems and

MAMMOTH JOB



PEX tubing is stapled down in preparation for a cement pour at the Village Gondola terminal (above) as Xcel journeyman Art Moreno does a pre-fire inspection at Mammoth Center (below).



Photo credit: Dan Frisch

CAD layout of the tubing. He also designed each of the HydroControl panels used by Xcel to minimize wall space required for piping and controls in tight mechanical room layouts, and greatly reduce field installation time.

"This required some rather intense design sessions where, at times, it felt like we were charting entirely new territory," Taylor says.

The design everyone settled on was a straightforward primary-secondary-tertiary system, but with some twists.

"We elevated the temperatures and delta-Ts to minimize pump sizing," Taylor explains. "And due to the possibility of cold starts in extreme weather conditions, we wanted to be very careful about the risks of cracking concrete gondola bays."

As a result, three distinct supply temperatures are used: one for air handlers, a lower temperature for the pavers, and lower still for the concrete areas — all handled with a modulating boiler from Laars, named Rheos, and injection mixing on the HydroControls.

If you aren't familiar with the boiler, one reason may be that the Canyon Station install was its very first commercial installation. Modulating burner technology was one function stipulated by Mammoth Mountain management.

"This is one of the 'greenest' and most environmentally sound boilers on the marketplace with NOx levels of less than 10 parts per million — that's a big plus in California," Michel says.

Pulling out all the stops to meet deadlines, **Bill Root**, vice president of sales and marketing, and **John Warner**, director of sales at Laars, pushed to get LP certification for the Rheos, with the first commercial prototype sent to an independent firm in Denver for high altitude testing. It passed and was immediately shipped to the jobsite. (Not only was it the first commercially installed boiler, it was also the first LP-approved unit as well.)

At the same time, Watts Radiant was under the gun to build the largest wall-hung HydroControl panel fabri-

THE BENEFITS OF SNOWMELT



Snowmelt on a snowy mountain? You better believe no one's about to shovel around this place. The mountain's altitude makes it a beacon for snowstorms from late fall through spring. The storms come fast as temperatures drop to near zero and frequently leave behind three to six feet of snow. By the end of each ski season, an average of 32 feet of snow will have dropped.

"We see snowmelt as a valuable investment," says **Tom Hodges**, director of development management and governmental relations for Mammoth Mountain. "There are many advantages for us to use this technology."

Certainly with as many skiers as the resort attracts, public safety is a primary consideration. While snowmelt assures less slips and falls, it also keeps the lifts accessible and

open for the 50,000 rides per hour all the lift stations provide.

Before installing snowmelt, the resort routinely put down volcanic cinder on the many public thoroughfares. But its use damages paved surfaces, to say nothing of carpet and wood surfaces indoors.

Typically, snowstorms roll in every five to 15 days.

"Because of the irregularity of the storms and the length of time between them," says **Bob Bradbury**, manager of facilities and energy management for Mammoth Mountain, "we tend not to idle our snowmelt systems. We use sophisticated building control systems to help us activate everything, permitting the buildings, decks and walkway systems to all 'talk to each other.'"

Essentially, Xcel Mechanical has automated the operation of several large-scale snowmelt systems spread throughout Mammoth Mountain's vast facilities. The integrated central building systems' control network can override local system controls or allow them to operate independently.

Interestingly, the system is programmed to recognize the characteristics of a small storm — with melt temperatures set at a modest, normal 34 degrees F — and a large storm system, when the computer ratchets-up the temperature to a more aggressive 39 degrees F for faster action.

For the Mountain Lodge, the resort's uppermost public facility, the system detects precipitation and activates the snowmelt. Then, information is passed down the line to alert other systems, activating them.

"We also take into consideration the sun's warmth and how we can use it to our best advantage," Bradbury says. "In fact, this is something we consider before the walkways, decks and other snowmelt surfaces are even planned; we orient them to take the best advantage of southern exposure."

Gondola decks, however, are quite a challenge. One side of the structure is always in the shadow; the other, frequently in the sun. As a result, such decks are always designed with at least two radiant heating zones.

Finally, drifting snow is another big challenge. "We place precipitation sensors strategically in shaded areas or those prone to drifting where snow can accumulate very quickly," Bradbury says. "These sensors also play a valuable role in helping us know when to deactivate snowmelt operations."

MAMMOTH JOB



Photo credit: Dan Frisch

Xcel owner/engineer Kevin Michel and job foreman Jason Gordon review snowmelt drawings.

cated by the firm. Changes to its function came mid-stream with new demands by the Mammoth Mountain management, and yet the panel was completed in just three weeks.

Finally, on Oct. 31, 2002, two of Dawson's experts and **Mike Elmore**, regional service manager for Laars, and **Kevin Trent**, western regional sales manager, traveled to Mammoth Mountain and directly into the region's version of *The Perfect Storm*. When they arrived at Canyon Station, preparations for system start-up — scheduled for the next day — were running at full tilt.

"Fortunately, we put in some long hours that day," Elmore said.

That night, with little warning, the winds began to howl and, moving in fast from the West, a squall dropped 6 feet of the white stuff in less than 24 hours and locked-up all of the roads for miles. Everything was at a standstill — except Canyon Station, where the new system was dutifully melting its first snowfall. (For more challenges that Xcel and the design team met, check out the sidebar "The Benefits Of Snowmelt.")

Double Duty: Meanwhile, as all this was happening on the mountain, just as much action was going on

down below. Canyon Station, in skiing parlance, is actually the upper station of the new Village Gondola Station, which was also under construction last year.

The new facility eliminates the need for any further driving once travelers arrive in the town of Mammoth Lakes. Its lower station is also located in the heart of the equally brand-new Village At Mammoth, a pedestrian-oriented "town" featuring hotel/condo-style lodging and dining, shopping and other resort amenities that will actually open next month.

The lower station is connected to the new 17,000-sq.-ft. Mountain Center, a new skier services building with equipment demos and rentals, lift ticket sales and activities desk, coffee shop, retail offerings and family services opening in time for this year's skiing season.

Together, the station and the center serve as a new gateway for the mountain. A six-minute ride on the 15-passenger gondola will quickly connect 3,000 guests per hour to and from the Village to Canyon Station.

Although two separate buildings, Xcel was in charge of building one mechanical room that would provide

power to both facilities, including 13,000 sq. ft. of snowmelt.

Beyond dealing with weather and construction crunches, Xcel Mechanical and the rest of its design team also dealt with several significant additions *after* the initial design of the facilities.

For example, snowmelt was added to two external sidewalk/bus-pad zones at the Village, which ended up being powered by Rheos boilers in the new Village Gondola Station. This changed that design completely from a single injection mix, low-temp zone to a dedicated three-zone, low-temperature HydroControl. (Actually, the changes even continued after our visit last August; Xcel is currently adding a fourth zone to this panel to provide snowmelt for three stairways.)

Further complicating that setup is that the Village is actually owned and operated by resort developer Intrawest, whereas Mammoth Mountain management remains in charge of the skiing facilities.

To make the shared setup fair, Xcel installed sophisticated Btu meters that will measure the exact amount of energy used by the Rheos boilers to heat the Intrawest zones; Intrawest is charged accordingly for the energy used for their systems.

In addition, radiant tubing was also placed under much of the Village sidewalks, though not necessarily all hooked up at the moment. Ultimately, a central heating district with piped-in waste heat from a geothermal generation station located four miles away will heat the Village sidewalks.

It's easy to see from this and other extra touches why snowmelt is so important to the resort's future.

"In the end, what really sets this project apart in my mind is the degree of collaboration among the firms in the supply chain," Taylor says. "Kevin Michel was willing to rely on our experience and expertise, Watts Radiant and Laars backed us up, and Xcel pulled it all together on-site. The result is tremendous value delivered to the owner. Quite a different story than the typical adversarial plan & spec cycle." PM