


A PETER LI PUBLICATION/\$6.00

SCHOOL

Planning & Management

CONSTRUCTION • FACILITIES • PURCHASING • TECHNOLOGY

A photograph of two men in business suits and red hard hats. The man on the left is older with white hair, and the man on the right is younger with a beard and glasses. They are both smiling and looking towards the camera. The man on the right is holding a large roll of white blueprints.

14 Ways to Get Better Performance From Your Architect

**THE CURE FOR TECHNOLOGY HEADACHES
HOW ARE SCHOOLS BEING RENOVATED?
YOUR 10 BIGGEST CARPET PROBLEMS SOLVED**

Reprinted from *School Planning & Management*

Curb Your Roof

It doesn't matter that you've installed the highest-quality roof if you use low-quality or improperly installed roof curbs.

by Julie Sturgeon

It took a hailstorm in Sherman, Texas (a suburb 50 miles north of Dallas, population 32,774), to call attention to the sad shape of the roof covering the town's high school: The 20-year-old roof was built almost dead level, so water pooled in pond-like areas atop this flat-as-a-pancake design. The hail damage only intensified the deterioration, and the entire covering leaked like a sieve onto the people below. The solution was to rip away the existing roof structure and rebuild, creating helpful drainage slopes along the way, as part of a total building renovation project.

But another potential disaster loomed to trap unsuspecting facility managers. That's because a new roof automatically demands new *curbs*: the square metal boxes that surround any penetration (e.g. a stack from the bathroom, a vent, the HVAC unit, skylights) to keep the structure watertight. In fact, according to Robert Banicki, president of Roof Products Inc., a majority of

leaks stem from improperly manufactured or installed curbs. "A lot of the industry says that's nothing but a square piece of metal, so anybody can do it," Banicki explains. Ahh, if only it were that simple.

Curbs must be designed to follow the slope of the roof to let water run off and to keep mounted equipment level. They must be structurally sound so that fewer angles are required to support weight. Curbs should be insulated and a minimum of eight inches above the finished roof.

Sherman Independent School District officials certainly were in favor of doing the job right the first time. "We needed roof curbs that met our design requirements and worked with our new roofing insulation," says Weldon Nash, principal of JPJ Architects (Dallas), the firm the school board contracted to lead it through the roofing maze. "Sometimes the curbs that come with the equipment don't feature welded corners or metal that's heavy enough." And even after the

district chose to take the custom route, the contract bid was more than \$14,000 under their budget, averaging \$5.91 per square foot of the 266,567 square foot space it had to cover.

"The roofs of America are in bad shape, especially schools," says Banicki. Even the Government Accounting Office concurs. According to its *1996 School Facilities: Profiles of School Conditions by State; Condition of America's Schools* report, 27 percent of American school roofs are inadequate.

Why Your Roof Leaks

The problem is twofold, Banicki points out: First, equipment manufacturers build curbs that fit their units, but not necessarily your roof type. For example, a rubber, or single-ply, roof doesn't require a *cant* (a beveled support). A built-up roof does. The reverse is also true: A general contractor usually builds curbs to roof-opening size and not to actual equipment size, often using scrap material lying around the job site. This leaves a large gap between the roof curb and equipment that issues an invitation for water to seep in, soaking and staining ceiling tiles. Should contractors rely on tar and pitch pockets to meld everything together, the tar cracks in cold weather or turns to goo in the hot sun, and the school is back to square one: leaks in the roof.

Second, in the complicated world of architects, supervisors, contractors and vendors and construction lingo, everyone assumes curbs are the other guy's baby — and school officials are left paying the bill. For example, Banicki says, the pre-fab curb manufacturer often believes the roofer will provide insulation, a cost the roofer figures in at \$20 a foot, minimum. And if the insulation is installed improperly on the inside face instead of enclosed inside the curb walls, the hot air in the building meets the cold curb and creates condensation. Eventually, water drips on the inside of the curb and into the building.

However, administrators rarely

COST-CUTTING MEASURES

Facilities managers don't need to read up on roof curbs to save still more money on the construction and usage ends of the bargain. Robert Banicki, president of Roof Products, Inc., recommends asking these simple questions:

- **Is wood being used?** Wood can be a costly curb choice. Many mechanical contractors will recommend wood timbers for roof-mounted condensing units, gas pipes and rooftop units. It's not a good option for these applications because any wood member eventually snakes or warps, especially when it's used as an expansion joint. Also, gas pipe installed on top of wood causes movement which scrapes away the roofing stones, digs into the insulation and lets water into the building.
- **How will the curbs be mounted?** You want to hear the verb "welded" or the phrase "sheet-screwed to a metal, wood or tectum deck or to the structural steel." (If your roof is concrete, the magic phrase is "ram setting.") This treatment means the equipment won't tumble across the roof and smash on the ground below in a torrential rainstorm. However, if Hurricane Hugo blows through, all bets are off.

ROOF CURBS

have the technical background to clarify conversations that include details such as, "In between the bar joists, you must add reinforcing angles to tie it together. But when the curb is strong enough, if it touches two members or even hangs out 3-1/2 feet on either side, it doesn't need structural angles." The key becomes basic communication, which is why Sherman High School and the district's subsequent seven elementary schools, whose roof repairs clocked in at 3.8 per-

cent under budget, have become models of how to communicate.

Communication is Key

"One of the real interesting stories about this project is the fact that the building renovation, including the design of the new HVAC system, was performed by another architect," Nash points out. JPJ then served as the designated architect for the roof, and the school board drew up a special section

in the specifications to make clear the separation between responsibilities. The result was similar to having a cardiologist treat a heart attack rather than passing off the emergency to the neurologist on call.

"Roof curbs belong under the architects' domain, pure and simple," Banicki says. "He's the boss who should take the bull by the horns and say, 'I don't want junk.' And when the custom folks are invited early in design,

WANT TO WASTE MONEY? DON'T COMMUNICATE.



According to Robert Banicki, president of Roof Products Inc., in one school the mechanical contractor didn't discuss installation of roof curbs with the architect. The problem being faced was that the roof could not hold the weight of three new rooftop units that had to be installed over corridors. The mechanical contractor had a structural contractor install steel frames on existing concrete block walls. Unfortunately, doing so made the air-handling equipment manufacturer's curb and units uninstalleable.

Roof Product's Inc., was called in for advice. They recommended installing water-tight pre-fab curbs with adapters on top to distribute the equipment loads to the existing steel structure.



Had the mechanical contractor talked with the architect before installing the steel frame, the method recommended by Roof Products, Inc., would have been to install custom curbs/adapters directly on the concrete block for HVAC load-bearing strength and roof integrity. The steel framing would have been unnecessary. The savings from clear communication and using this method would have been as much as \$12,000. In addition, the job would have taken less time and caused less frustration.

To contact Roof Products, Inc., call 800/262-6669 or visit their Web site at <www.rpicurbs.com>.

ROOF CURBS

we don't sit on our thumbs. We find out which fans and rooftops the mechanical contractors are buying so we know how to fit our curbs." Also, the off-the-shelf manufacturers' curbs are shipped with the equipment, a ticklish problem since they may not be on site when they are needed.

"If our work had been provided by a roof consultant who wasn't also a knowledgeable architect, the coordination would have been much more difficult," Nash agrees. "Because we were familiar with what the other architect would be doing, we could anticipate a lot of problems and head them off."

How to Insure the Right Fit

Facilities managers should request that curbs be spec'd *only* in section 07720, *roof accessories*, under the architect's responsibilities, according to the Construction Specifications Institute. It's also a good idea to add a footnote in the

skylight and *HVAC* sections: "All curbs are specified in section 07720." Facilities managers can breathe a sigh of relief at this point, knowing they've laid the foundation for an effective, less expensive roof.

Even retrofits can be cost-effective if the district starts with the same step as in new construction: Call the architect. "The worst thing school districts do is get six bids," Banicki warns. "They get six roofers. A roofer knows his *felts* (lingo for roll roofing materials), but sorry, he doesn't know curbs. If you tripped and fell dead, he'd roof right over you."

The answer to fitting a round peg in a square hole is often an adapter, costing anywhere from \$475 for a 15-ton unit to \$3,000 each for the more complicated solutions. However, a pre-fab curb solution in this case often doesn't require a roofer or a general contractor — just a mechanical contractor to tie the unit to the

adapter. Walking the roof with the architect outlines the situation — and custom adaptations average one-third the cost of forcing pre-fab curbs to work. It's rare that a school must rip out the current curb and start from scratch, Banicki assures, which means the job can be completed while school is in session.

Even if there are no penetrations on a roof, it will eventually leak because the felts don't last forever. "But when someone says, 'Hey, I have pre-fab curbs and it still leaks,' I suggest he or she grab a ladder and climb up to the roof," Banicki says. "Many times, when someone services a machine, they leave the door open where the filters are stored, so rain pours in there along with sandwich bags and soda cans, then drains down the duct. That's the only way rooftops can leak with structural curbs." ▲

Julie Sturgeon is an Indianapolis-based freelance writer.

Roof Leak Prevention & Retrofit Solutions.



Problem

- Existing platform is less than 8-inches above finished roof.
- Wood blocking is supporting unit.
- Improper flashing & power penetration.

Solution

- RPI installed curb extension to maintain minimum 8-inches above finished roof.
- Sloped adapter for water-runoff.
- Power penetration, watertight, through adapter, not platform.



Before buying or specifying new equipment or contracting a roofer, let us analyze existing conditions at your project. Without disturbing the roof or substructure, we can supply adapters for new HVAC, skylights, vents and any other rooftop equipment. Rely on RPI for a leak-proof, cost-efficient job.

7616 Lee Highway
Chattanooga, TN 37421

www.rpicurbs.com
Email rpicurbs@gte.net



Call Us For a Roof Curb Survey

ROOF PRODUCTS, INC.

Call Toll Free 1-800-262-6669