PHOTOS BY GIL LEORA

Everything old is New Again

BY JIM SCHNEIDER

TRADITIONAL AND MODERN TECHNIQUES ACHIEVE RENOVATION'S ENERGY GOALS

WHILE SHOWING OFF HIS LATEST RENOVATION, DEVELOPER MARTY BHATIA, principal of OM Development LLC, Chicago, recalls a visit to a 3,000-year-old palace in Jaipur, India. The ancient structure has a system that sends captured rainwater down tubing onto huge rugs draped over openings on the north side of the building. In the summer, wind blows into the structure through the wet rugs, producing cooled air inside. • "They had air conditioning. That was 3,000 years ago and they had what we now call cutting edge," Bhatia explains. "So are we really cutting edge, or are we just pulling our heads out of the sand?" • Architect Dave Hampton, owner and principal of Echo Studio, Chicago, reiterates this sentiment. He tells of an old synagogue where the exterior wall has lots of windows. "It doesn't rely on electric light because it doesn't need to," Hampton says. "Older buildings more often than not got it right because they had to. They couldn't solve their problems with technology." • With their collective minds steeped in the simple, practical approaches of the past and their hands on the technology of today, Bhatia's team set out to make a 125-year-old building perform like state-of-the-art new construction.

THERE ARE WINDOWS IN THE PANTRY AND MASTER BEDROOM CLOSET TO ALLOW DAYLIGHTING IN THOSE SPACES.

SECURITY ENVELOPE

The house looks like many others in its Southside Chicago neighborhood. There is classic brick on the outside and the interior is elegant, efficient and functional. What makes it really stand out is what you can't see. Originally built in 1883 as a multifamily building, its renovation and conversion to a single-family home exceeds Energy Star requirements by 80 percent. Very few homes in Chicago can make such a claim.

Not just another certification plaque to hang on the wall, this impressive rating translates into real cost savings in the life of the building. The 3,300-square-foot (307-m^2) home costs approximately $650 per year to heat and cool. A comparable-sized home in Chicago costs an average of $6,100 per year to accomplish the same.

The savings are caused in large part to the building's highly efficient envelope. "You hear a lot of talk about LEED and points and green permits, but very little talk of envelope," Hampton says. "That's the number one thing. It's not sexy, but it is important."

This building team recognized that importance and put a great deal of effort into the envelope. For example, the roof achieves a total-component R-value of 58 and features a double radiant barrier. "The radiant barrier on the roof is an Energy Star roofing product and we put a secondary radiant insulation barrier on top of the roof deck," explains the project's engineer, George Sullivan, principal of Eco Smart Building, Chicago. "That cuts heating and cooling loads by 40 percent, and cost-wise it's next to nothing."

"Low-E, argon-filled windows cut the heat gain in the summer and reflects heat into the building in the winter," Sullivan adds. "Soy spray foam insulation was used in the above- and below-grade walls to achieve an R-value of 28. All the plumbing walls are insulated with wet-spray and dense-pack cellulose for air and heat bypass, as well as noise. This is part of the Advanced Air Seal protocol that was used to develop the building's performance rating. The ceiling spaces are also dense-pack cellulose."

Wet-spray cellulose is used on walls and stops air and heat movement, as well as reduces noise. It also functions as an effective fire stop in a number of applications. Dense pack entirely fills a netted cavity in the building, does not settle over time and has noise attenuation qualities.

Efficiency also was considered when placing the HVAC system. The one-furnace setup uses a single trunk line that runs between the first and second floor with vents blowing down to the ground floor from the ceiling and up to the second story from the first floor. An in-floor radiant heating system in the basement supplies a thermal mass that uses much less energy to operate in the heating and cooling seasons. The stacked stair, open floor and return air system combine to generate a chimney effect that cuts the overall heating and cooling requirements for the building by using natural ventilation and the thermal mass storage of the basement slab floor. The basement slab was designed to achieve the maximum storage values for year-round thermal use.

IN THE DETAILS

A walk around the home shows that careful consideration and a good dose of old-fashioned common sense were put into every possible aspect. There are windows in the pantry and master bedroom closet to allow daylighting in those spaces. "The closet light is probably one of the most left-on lights in the house," Bhatia says. "With natural light, how likely are you to turn on that light if it's a bright day outside and you're just going to grab something? You probably won't."

In the kitchen, all the cabinets are made of maple from a sustainable forest in nearby Wisconsin. A seven-day programmable Energy Star thermostat allows heating and cooling to be programmed and adjusted to kick in only when the house is occupied. Low-VOC paint is used on the walls and the can lights are rated as airtight under IC, or Insulated Contact, standards. The three bathrooms in the residence have dual-flush toilets to save on water usage.

The backyard is set up for a rain garden to address water issues outside. Planted with perennial local plants, a rain garden is a landscaping feature designed to absorb storm-water runoff from impervious surfaces, such as roofs and paved streets. "People who have below-grade basements where the gutter goes directly into the sewer system tend to get back up and all kinds of problems," Bhatia explains. "A lot of those problems can be helped by a rain garden. That runoff water actually gets captured and put in the ground."

Achieving the home's maximum efficiency, however, lies in the hands of the homeowner. Through Bhatia's sales team, OM Realty Group, Chicago, occupants will be educated on the green qualities of the building so its full potential can be realized. "There will be a homeowner's manual. There will be pictures of the rough walls so they'll know where the plumbing and insulation are. They'll know the manufacturers, how everything works and what the preventative maintenance schedule is."

KEEP IT SIMPLE

There is nothing showy about the green aspects of this home. For the development team it's not about the show, or "green bling." It's about the performance of the building. "A lot of people want things like geothermal, solar power and a green roof," Sullivan says. "They want to shove all these things onto a building without looking at the shell."

"I had a prospective client who had an old building and she asked about all the 'green bling,' wondering where she should start," Hampton recalls. "I told her she needs to start with a roof. You can put any kind of flashy system on a sieve and it's not going to do anything. Again, it's not exciting, but if you don't start with that exterior envelope, all the 'green bling' in the world is not going to save you."

Much of this project's success comes from the team's dedication to working together to learn and solve problems as a group. "It's not just about energy-efficient housing, it's about energy-efficient teams," Bhatia explains. "The reason why there are developers is for coordination. Architects have their protocol and their education and the engineer has a whole different perspective. I think it's important to have the engineer on-site. The good thing about our team is that we sit down, the architect suggests something, the engineer modifies it and if the builder says it's going to cost double, we go back to the drawing board and refine it."

ALL THE PLUMBING WALLS ARE INSULATED WITH WET-SPRAY AND DENSE-PACK CELLULOSE FOR AIR AND HEAT BYPASS, AS WELL AS NOISE. THIS IS PART OF THE ADVANCED AIR SEAL PROTOCOL THAT WAS USED TO DEVELOP THE BUILDING'S PERFORMANCE RATING. THE CEILING SPACES ARE ALSO DENSE-PACK CELLULOSE.