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## Surprises Aren't Fun When They Pop Up During the Renovation of Existing Buildings

By Michael E. Liu



Savvy builders and developers know to provide a contingency in their construction budgets, and the savviest know to include a bigger contingency when it comes to renovation work.

For architects and developers, there is no region in the country that offers as many varied opportunities for renovation and adaptive reuse as New England. For those to whom preservation of a rich architectural heritage is important and who recognize the obvious advantages in terms of

sustainable development, there can be no greater thrill than recycling and refurbishing an old building and putting it to a new use.

But rehabilitating an existing building is not for the unsophisticated. Knowledgeable developers will seek the help of architects, builders and consultants experienced in the renovation of existing buildings before jumping in.

“Every old building has at least one or two surprises to spring on you,” said Bob Verrier, founding partner of Chelsea, Mass.-based design firm The Architectural Team. “What people don’t realize is that you can predict certain kinds of hidden surprises in certain generic types of old buildings.” Verrier should know, having personally been the architect for more than 200 adaptive reuse projects, 150 of which were certified historic rehabilitations by the National Park Service. “Surprises in buildings,” he said, “usually equate to extra costs.”

Verrier groups generic challenges associated with specific building types into three categories. First, there are basic configuration issues, like the shape and size of the original building. Then, there are issues associated with buildings built during a specific era, which often are the results of a flawed technology used at the time but may be due to a particular economic and political condition prevalent when the building was built. Finally, there are oddities of construction related to the specific original use.

A typical configuration problem is that the building is too wide for the new use being considered. It is often the case where the original building served a manufacturing or storage role and a new residential use is being proposed. For a manufacturing facility, you need floor space and not a lot of windows. Not so in residential. The fix is usually selective demolition.

For different original building types, the opposite can be true. Late 19th and early 20th century convents and monasteries, for example, may be very long, but only 40 feet wide. The individual rooms that the monks or nuns lived in were very small, usually on either side of a narrow corridor. If the proposed conversion is to apartments, the traditional corridor with units on either side won’t work. It helps to consider different kinds of successful residential layouts. “If you’ve been around long enough, you get to know what solutions work for which configuration problems,” Verrier said.

If the first kind of problem is obvious, the second kind, which is due to technical flaws associated with a specific era of construction, can be insidious.

Verrier recalls one building, built in the 1950s, of brick cavity wall construction, which is a way of building exterior walls so the exterior face of the building is composed of a single layer of brick. It is separated from the rest of the back-up wall by airspace of an inch or so. Any moisture that gets past the brick is supposed to run down the airspace and back out of the wall system. Verrier, who was replacing windows in a 9-story building, found that the brick veneer could be moved with the palm of his hand. He found that the ties holding the brick veneer in place had been fastened with ordinary drywall screws that had rusted away. Unlike modern brick veneer buildings in which the brick veneer is usually supported at every floor or every other floor, the 9 stories of brick had been erected without any intermediate structural relieving angles – the structure was entirely supported from the ground.

The entire brick veneer had to be taken down and rebuilt. “At the time it was built, that particular kind of cavity wall construction was just not very well understood. We make sure to look very carefully at the condition of the ties when we come across cavity wall buildings of that era,” Verrier noted.

Another technology of the era, now almost forgotten, is the use of gypsum cement structural panels for floors and roofs. Most people know gypsum as the material commonly used in drywall sheets but it also was used as a structural flooring system. “Structural gypsum panels are a system that you see in a lot of nursing homes from the 1950s and ’60s,” Verrier said. They were light, cheap and easily installed. But when it gets wet it has a tendency to fall apart, which can result in leaks. You have to be very careful walking around on roofs of nursing homes of this particular era, Verrier said, “or you might wind up on the floor below.”

Then there are the surprises that come from a working with municipal buildings from the 1920s and 1930s. They often are beautifully documented with complete sets of highly detailed construction documents but, due to patronage and corruption, were often not built to the standard suggested by the drawings. “The buildings are often so well-drawn and detailed that they seduce you into a false sense of security,” Verrier said. “We had one case – the conversion of a police station into a hotel – in which the concrete structure was less than half the strength of what was suggested on the drawings. Luckily, we had it tested and were able to come up with a reinforcing solution before the construction contract was signed.”

The last kind of surprise, which comes with a specific kind of building type, is the kind most apt to snare the uninitiated. Verrier was the architect for the adaptive reuse of two streetcar-trolley garages, both into senior housing. “The first one we did was 25 years ago in New Bedford,” he said. “Once we got in there and began trenching the concrete slab for plumbing lines we kept hitting buried trolley tracks. That, of course, was a big unforeseen additional cost. The second streetcar-trolley garage conversion was 20 years later. It was the same thing; it looked like the trolley tracks had all been taken out. But this time we went looking and found them buried in the slab again. We didn’t have any extra [costs] the second time.”

There are countless kinds of buildings built for different purposes but professionals in the design and construction industry know what problems to look for in each specific type. When it comes to working with old buildings, there’s no teacher like experience.