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Restoring With Compatible Materials

By Rhonda Maas



Using the right materials is critical for successfully renovating historic buildings, but finding them can be a big challenge. When selecting materials for an old building, stronger is not necessarily better – but matching is. All the characteristics of the original masonry – chemistry, porosity, appearance, strength and moisture absorption – must be understood and respected.

Of course, the properties of natural stone have not changed, but bricks have evolved over the last century. Differences in size, moisture absorption and compressive strength make it impractical to mix new bricks with old.

Mortar also has evolved during the last century. Modern mortars are much stronger and stiffer than historic mortars. New joint sealing materials wreak havoc with old masonry buildings if they are stronger than the surrounding bricks. When the masonry moves and the mortar doesn't, it is the masonry that breaks. Historic mortars contain rounded natural aggregates like river sand, instead of today's sharper manufactured aggregates. They typically contain more lime and less cement, so they are softer and stickier. Bottom line, historic mortars have more movement capacity and put less stress on the masonry.

So where does one find stone, bricks or mortar suitable for repairing or restoring an old building?

For stone, the place to start is the building. Sometimes, the weathered faces of exterior stones can be turned inside and a fresh face exposed. For small repairs, a piece can be removed from a stone in a hidden place and used as a Dutchman patch to repair more visible damage.

Next, try to find the quarry from where the original stone came. If the quarry can be identified and is still operating, it is simple to get a match. And keep in mind, a closed quarry is not the end of the road; it's sometimes possible to salvage remnant stones left behind when quarry operations ceased.

Salvage yards are another source for historic stone. Knowing local construction history is useful. For example, many stone buildings built in Denver in the late-1800s used orange sandstone quarried in Manitou Springs, Colo. When one of these buildings is demolished, the valuable stone is salvaged. Even stones that are too small for building blocks can be carved to replace small details or to make grafts.

If this fails, a region- or nation-wide search may be required. Samples and lab test results can be sent to quarries for matching. If an exact match is unavailable, err on the side of a denser stone, especially for an individual unit like a windowsill.

Reclaiming bricks can be a similar process. The first place to look is the building. Original bricks can be moved from areas out of sight – often higher up – and installed where they will be seen.

A salvage yard that specializes in demolitions and reclaimed bricks may be a source for materials of the right vintage. It is likely that two different types of bricks were used in any given multi-story structure – hard-fired durable “face” bricks for the exterior and more common, softer bricks for the bulk of the structure. Making the wrong selection can mean the difference between a facade that lasts another 100 years and one that gives out after only 20.

If there are not enough historic bricks available to finish a project, segregate new bricks from old, with the new bricks in less visible areas if possible. This results in a more harmonious appearance and reduces the risk of damage caused by an expansion mismatch.

As for mortar, a materials lab can come up with the right formulation to match the look, strength and mix design of an historic mortar. One need not travel far to find the same ingredients the original masons used. Lacking today’s transportation, they likely used whatever was closest, so check local quarries or even nearby riverbanks to find sand the right color and size.

Carefully selected and tested modern materials can help improve the performance of an historic building. For example, a pre-finished (not galvanized) steel cap installed over a brick cap can improve drainage and protect the underlying brick. Some patch materials, joint sealants and coatings may be compatible. Testing for adhesion and water vapor transmission will identify an appropriate material.

Rhonda Maas is the co-founder and president of Building Restoration Specialties Inc. (BRS), which specializes in masonry restoration, preservation and conservation of historic buildings. Founded in 1986, BRS has a bonding capacity of about \$7 million, and is positioned to handle projects ranging from \$2,000 to over \$2 million. Learn more at www.brsrestores.com.