

BLASTED!

...NOW WHAT?

BY J. RANDALL COTTON

Do local historical society members shake their heads in dismay each time they pass your house? Do you find your house used as an example in a lecture on what not to do in a restoration? Do you get threatening late-night calls from preservationists demanding that you turn in your National Trust membership card? In other words, do you own an old brick house that has been sandblasted?

Yes, it's true that sandblasting can be damaging to brick. But in spite of warnings by the National Park Service, OHJ, and other preservation-minded groups, sandblasting still occurs on a regular basis, perpetrated on unsuspecting homeowners by callous contractors. So you may find yourself to be the owner of a sandblasted house -- either because you bought it that way, or you mistakenly (we'll give you the benefit of doubt) had it blasted.

All may not be lost. Before you put your house on the market, hoping it sells before turning to brick dust, you should be aware that there are measures you can take to help mitigate the negative effects on sandblasted brick.

But first, what are the problems with sandblasting old brick? Because OHJ has written extensively on this topic before, we'll be brief. The inescapable fact is that sandblasting is by nature an abrasive process by which dirt, stains, and paint are removed from the surface of the bricks. Unfortunately, so is much of the outer layer of brick. This is particularly troublesome for older brick because the "skin," or outer layer, is much harder than the softer core. The skin

serves to protect the brick from water penetration and pollutants. When it is sandblasted away, the brick becomes more permeable and susceptible to these hazards. Sandblasting also erodes mortar joints, one of the most vulnerable areas where problems arise.

The pitted surface of sandblasted brick and mortar allows a freer penetration of water from precipitation, run-off, and even moisture in the air. Because brick is so porous, moisture can normally evaporate out; the problems arise from what is left behind. Water-soluble salts and other pollutants (such as sulfates, nitrates, acids, etc.) are deposited as solids inside the brick surface as the water evaporates. For example, when salt deposits crystallize, they expand and break off the face of the brick (this is known as spalling). The problem may also be manifested as crumbling, powdering brick and mortar, or as efflorescence (a white salt deposit on the face of the wall).

Increased water penetration can also result in chronic dampness that does damage to interior walls and rots adjacent wooden members. In northern climates, moisture in brick walls can freeze, also a cause of spalling.

What to do then with sandblasted brick? The first solution is to do nothing. Well, not exactly nothing, but before running out to buy some miracle "cure" take stock of the damage -- if it's not causing any immediate problems, leave the masonry alone. Your strategy should be to give a thorough and periodic inspection of the sandblasted surfaces (once a year at a minimum). Look for the following danger signs:

BLAST-AIDS: SEALERS & WATER REPELLENTS

AMERICAN BUILDING RESTORATION
9720 S. 60th Street, Franklin, Wisc.
53132. (414) 761-2440. Old 200 Hydro-
Seal. Paraffin and resin sealer. Excellent
breathability and repellency.

DIEDRICH CHEMICALS: 300A E. Oak
Street, Oak Creek, Wisc. 53154. (414)
761-2591. Diedrich 303, a 10% resin solid
in a volatile thinner.

HYDROCLEAN: P.O. Box 2078, Hart-
ford, Ct. 06145. (203) 527-6350. Eon-
Clad Water Repellent.

HYDROZO: 1001 "Y" Street, P.O. Box
80879, Lincoln, Neb. 68501. (402) 474-
6981. PP/Hydrozo Clear Double 7.

PROSOCO: P.O. Box 1578, 755 Minne-
sota Ave., Kansas City, Kan. 66117. (913)
281-2700. ConserVare line.

THORO SYSTEM PRODUCTS: 7800
N.W. 38th Street, Miami, Fla. 33166.
(305) 592-2081. ThoroClear 777.

TROCAL: Dynamit Nobel of America,
10 Link Drive, Rockleigh, N.J. 07647.
(800) 631-1668. Chem-Trete-Bsm.

V.I.P. ENTERPRISES: 9690 N.W. 41st
Street, Suite 1, Miami, Fla. 33178. (800)
327-7479. Umbrella Clear No. 9100.

■ Spalling brick ("sheets" of brick which have detached from the surface).

■ Crumbling, powdering, or "rotting" brick and mortar. (See page 42 for method of determining severity of the damage.)

■ Cracks in the brick and, especially, between the bricks and mortar joints. You'll be looking for a pattern of cracks caused by deterioration, not by structural problems.

■ Efflorescence, a white deposit on the brick surface caused by soluble salts leaching to the surface.

■ Constant dampness in the brick walls, evidenced by staining of interior walls, peeling paint or wallpaper, presence of mildew, mosses, etc.

PREVENTING PROBLEMS

If any of the above conditions appear to be chronic and spreading, it may be time to take some action (which will be discussed shortly). But if the brick seems sound after each regular inspection, you may have escaped much of the potential damage that can be wrought by sandblasting. If that's the case, follow the old adage: "If it ain't broke, don't fix it." However, you must ensure that water penetration in the future be kept to a minimum. The following preventive maintenance practices are advisable for any brick buildings, but are particularly crucial for sandblasted masonry:

■ Make sure all the gutters, downspouts, and other water run-off systems are in good repair and clear of debris. Leaky or clogged gutters can cause rain run-off to be diverted down the brick walls -- deluging them with water-borne pollutants.

■ Ensure that the mortar joints are sound. Check for erosion and cracks and repoint if necessary. As much as 20% of a brick wall's surface area may be represented by mortar joints -- they're a prime source of entry. Be sure to consider the special needs of repointing old brick with a fairly "soft" mortar mix.



Sandblasting was the first crime perpetrated on these bricks. They were then repointed with a hard mortar -- speeding erosion.

(See "Repointing Masonry" on page 24.)

■ Correct conditions of "rising damp," splashback, and foundation wetness. (See OHJ's "Wet Basement" articles, June and August 1981.)

■ Caulk all joints between brick and other materials (wooden window frames, doors, eaves, etc.).

■ Remove water-entrapping vegetation from on or near the brick walls.

■ Replace or repair missing and deteriorated pieces of coping on parapet walls; repair all flashing around chimneys and openings; repair all rotted sections of eaves, cornices, roof, etc.

■ Don't use salt to melt snow anywhere near masonry walls.

If you follow the recommendations above and continue regular inspections, you can greatly reduce the potential for problems associated with sandblasting. But if problems still persist despite your remedial efforts and there is serious spalling, dampness, or brick rotting, consider one of the following "last resort" approaches.

PAINTING

Normally, painting brick is not necessary -- it's an added maintenance problem and offers little extra protection to sound brick. But deteriorating sandblasted brick is already seriously compromised, and a paint job can add a measure of protection. Properly done, paint can prevent liquid water from penetrating, while allowing vapor water to escape from the bricks underneath. Some paints can seal the surface, preventing evaporation and actually compounding the problem. Stay away from oil- or epoxy-based paints and other non-porous coatings.

As with all painting tasks, preparation is critical. Because the brick is already sandblasted, you shouldn't have to remove any old paint, but you may have to attend to these chores:

■ Remove all loose and crumbling mortar and brick



An eave overhangs this wall just a few courses above the top of the photo. The blasted bricks most exposed are "rotting" fastest.



A brick house can be sensitively painted. This building has been successfully painted in a Georgian color scheme.

with a wire brush, screwdriver, or chisel to provide a sound surface.

■ Remove any efflorescence by dry brushing at first, followed by clear water and a stiff brush if necessary.

■ Remove moss and other organic growth with an ordinary weed killer. Wet the wall with clear water first, so the weed killer is not drawn into the brick. Rinse and scrub the wall well afterwards to remove all traces of the chemicals.

■ Remove mildew and surface dirt. Try the following homemade cleaner:

- 3 oz. trisodium phosphate (TSP)
- 1 oz. detergent (Tide, All, etc.)
- 1 qt. 5% sodium hypochlorite (bleach)
- 3 qt. warm water

Scrub the brick surface with the solution using a medium soft brush and rinse with clean water.

■ Complete all repointing and caulking before painting.

■ Check the label on the paint you'll be using for the acceptable moisture and temperature conditions during application. Match these as closely as is feasible.

What kind of paint should you use? Generally, a water-thinned emulsion paint (latex) is best: either acrylic latex or vinyl latex. These paints allow the brick to "breathe" while offering protection from water penetration. Additionally, they are usually mildew- and alkali-resistant (alkali resistance is important when you apply paint over lime mortar). They're also easy to apply, clean up quickly, and readily available.

Most major paint manufacturers make a latex paint



Then again, painting brick can create an eyesore — as evidenced by this schizoprenic house.

suitable for masonry, and the label should list brick as an acceptable surface. To ensure proper adhesion, most manufacturers will strongly recommend using a specially formulated undercoat before using their latex as a finish coat. Be sure to use the specific undercoat made for the latex you're using -- don't mix brands. For example, use Sherwin-Williams Masonry Conditioner (A5V2) as a base beneath their latex top coats, or Wonder Bond (16100) if you use one of Devco's latex paints. Most of these undercoats should be thinned, as directed, to prevent glazing.

If the sandblasting has caused extensive pitting or cracking, you might consider another type of paint. Cement-based paints are capable of filling in these fissures. Cement-based paints aren't complete waterproofers, but they are capable of filling in heavily marred areas, and they do allow water vapor to escape from the brick. These paints come in powdered form and begin to hydrate when mixed with water, so they must be used immediately.

Although masonry paints can be applied by roller or spraying, brush application is preferable to ensure adequate coverage over coarse-textured brick walls. You can expect a well-prepared job on masonry to last three to eight years. As you can see, painting brick is a major and regular commitment.

What colors should you use? Traditionally, brick was often painted (you guessed it) brick-red. This can reduce the visual impact of painting brick that had previously been unpainted. Other colors run the gamut from pinkish salmon to dark reds and browns. Choose a color appropriate for the style and era of the house. White or pale yellow might be suitable for

a Colonial Revival house, earth colors such as grey or beige for a Gothic Revival, for example.

When considering color placement, think of the brick walls as the "body" of the house. The body color should be complemented with appropriate trim colors in the same manner as a frame house. Beware of dark body colors, though, as they may make the building look too heavy and foreboding.

WATER REPELLENTS

Like paint, water repellents are unnecessary for sound masonry; they can be expensive, need to be reapplied periodically, and can sometimes cause more problems than they cure. But for deteriorating sandblasted brickwork, they can be helpful because they prevent the penetration of water in liquid form, yet allow water vapor to "breathe" out.

Water repellents (also known as "sealers") differ from paint because they are colorless and are not just a surface coating but penetrate the brick to a depth usually from 1/8" to 1/2". Transparent sealers work by changing the capillary angles of the pores in the face of the brick wall from positive (suction) to negative (repellency). Their initial cost can be tolerable (15 to 25 cents per square foot) but they will probably need to be renewed every three to seven years.

There are problems with sealers -- they might trap crystalline deposits of salt in the brick and thus contribute to spalling. Sealers can also change the color of the brickwork, even though they are transparent. They can make future pointing and removal of efflorescence more difficult; therefore, these procedures should be done before applying sealers. In fact, all the preparations listed for painting apply for sealers as well.

There are numerous, colorless water-repellent products on the market, including silicones, stearates, waxes, resins, acrylics, rosins, polymers, silanes, and siloxanes. But in general, these products come in two types of solution: water-based and solvent-based. Usually, better penetration is achieved from solvent-based solutions, although they are more expensive.

All manufacturers of water repellents will claim that their product is better than the others. Read the product literature carefully. (See *list of suppliers* on page 38.) The Brick Institute of America recommends the following checklist when using a sealer:

- Choose a sealer made by an established, reputable manufacturer with a proven track record. Nationally-known brand names are the best bet.

- Use solvent-based sealers -- their molecular structure is smaller, permitting better penetration.

- Apply sealer only to a clean surface that's properly caulked, pointed, and free from all loose mortar and brick.

- Choose a sealer with not less than 5% solids,

preferably over 7%. The label should also indicate the effectiveness of the sealer, expressed as a percentage figure of repellency, and a percentage figure of "breathability."

- Try a test panel in an inconspicuous place; let it cure for several months and check for satisfactory performance in regard to color change, water permeability, etc.


- Apply the sealer in two flood coats with a 12-inch rundown, or at the application rate recommended on the product label.

- Hire a contractor with experience and ask to see samples of his work. If possible, get a written warranty from the contractor. Also check the manufacturer's warranty.

Remember, we recommend using water-repellent sealers only to alleviate problems of damaging water penetration which cannot be solved in more conventional ways.

OTHER ALTERNATIVES

If the sandblasted masonry has seriously deteriorated to the point where it has lost much of its integrity and is visually objectionable, you may want to consider opaque "waterproofers" such as bituminous-based coatings or stucco. These are really last-ditch remedies though; they will drastically alter the appearance of your house. In some parts of the country, however, brick and stone buildings were traditionally stuccoed, thereby making this solution more acceptable. This is a major project and will require the services of an experienced contractor.

Failed and deteriorated brick units can also be selectively replaced with similar brick. This too is a job for a professional mason and can run into a lot of money. But usually only certain isolated sections of brickwork that are highly vulnerable to weather will require this remedy. 



Applying a test patch of masonry sealer to brick in new construction. Photo courtesy of American Building Restoration.

ASSESSING THE CONDITION OF MASONRY

Restoration architect Max Ferro and masonry conservator Tom Russack have devised a scale which quantifies the deterioration of brick by assessing its relative hardness (or softness). To use this simple method, you'll need only a mason's hammer, a cold chisel (1/2 to 1-1/2 inches), and a sturdy slotted screwdriver. Because the method is destructive, use it sparingly and only for areas you suspect are deteriorating. There is a separate scale for both mortar and brick. Both scales go from 0 to 10, with 0 being most deteriorated, and 10 being the hardest. When you scratch brick, always scratch both vertically and horizontally. When you strike mortar joints, always strike them along their center lines.

BRICK CLASSIFICATION

- 0 Bricks totally disintegrated.
- 1 Bricks have spalled 1/4 to 3 inches within the wall plane.
- 2 Bricks have a fairly intact face, but rounded, eroded corners. Surface can be loosened by rubbing with the hand, or powdered by scraping with a fingernail.
- 3 Bricks are spalling in scaly layers that can be pulled apart by hand. Their component crystalline, jagged fragments are better bonded, and do not powder.
- 4 Bricks cannot be scratched 1/4" with fingernail, nor crumbled by hand, but can be broken apart with poking and jabbing of the screwdriver. Crystalline pieces can be semi-hard, or weathered and resembling compacted clay.
- 5 The screwdriver carves into the surface of the brick approximately 1/4" by hand, but bricks won't crumble after a dozen jabs. This is the first classification of stable, structurally sound brick.
- 6 The screwdriver must be driven in with the hammer to make the 1/4" indent. In doing so, it causes enough cracking to dislodge coarse, jagged pieces.
- 7 The screwdriver no longer penetrates, but does make a weak impression when hit with the ham-

mer. A slight ring and bounce attest to the solidity of the brick.

- 8 The chisel is needed to successfully crack the brick, first indenting the surface before causing a fissure to develop.
- 9 The chisel makes no indentation or impression, but shears brick cleanly. Strong vitrification of face. Crisp edges and corners.
- 10 A new brick, with absolute crispness of corners, and a clear ringing sound when struck by a chisel.

Use this scale to document the condition of your brickwork (sandblasted or otherwise). If your bricks rate a "4" or below, they are for all intents and purposes unsalvageable. In that case, an engineer should be consulted to determine the structural integrity of the building. If your bricks rate somewhere between "5" and "7," you might consider some of the remedial steps outlined in this article (sealing, painting, etc.).

A brick building typically (especially if it's been blasted) has some masonry units that are deteriorated, while others are sound. In that case, you can use this scale to decide which units should be selectively replaced, which side of the building would benefit most from sealing, etc.



MORTAR EVALUATIONS

- 0 No mortar present at least within 1-1/2" of the face of the wall. Mortar has leached or weathered away.
- 1 Mortar can be scraped away freely with a screwdriver or poked out with a finger. It crumbles freely and has an irregular surface. Joint treatment is unrecognizable and mor-

tar appears sandlike.

- 2 Mortar can be raked out easily with the screwdriver, but the face of the joint is still intact, with few surface irregularities.
 - 3 Scoring the joint along its center line with the screwdriver, it is easy to collapse it and break its adhesion with the brick. The mortar disengages freely and cleanly.
 - 4 When the mortar joint is scored and tapped with the screwdriver and the mortar prodded out, there is slight spalling at the edges and corners of the brick.
 - 5 The mortar resists all attempts with the screwdriver. Scored with a chisel, it disengages and pops free from face of the brick without damaging the brick.
 - 6 When mortar is lightly scored with a chisel, it disengages. The edges and corners of the brick are marred slightly because of mortar's adhesion to brick.
 - 7 Successive blows of the hammer and chisel are necessary to crack the joint, but when the mortar disengages, there is still little damage to the brick.
 - 8 Several blows with hammer and chisel are necessary to crack the mortar into short pieces, as in #7. The bricks are noticeably marred in the process.
 - 9 The mortar is tougher than the bricks, cracking the bricks after successive blows with the hammer and chisel. Rich mortar color, well-defined tooling marks. Solid adhesion apparent throughout brick-mortar interface.
 - 10 The mortar has high content of portland cement, approaching the strength of concrete. When removed with hammer and chisel, the adjoining brickwork is pulverized.
- Again, this scale is used for comparison. If mortar rates between "1" and "4," repointing is in order. If it rates "9" or "10," and the bricks are fairly soft, the mortar is too hard. In that case, it may be wise to have the rock-hard mortar ground out and replaced with softer mortar. Overly-hard mortar will damage the brick with seasonal and daily thermal expansion and contraction. 