

The Cleaning of Masonry Buildings

By Thomas H. Rudder

A building owner or manager has a building that has decades of dirt and grime accumulated on its façade. He is trying to decide whether to spend the money to have the building cleaned. There is a logical process any owner should follow when making this decision, starting with why he wants his building cleaned.

Why Cleaning is Important

There are four basic reasons for cleaning a masonry building:

- to improve aesthetics;
- to expose the substrate for evaluation and repair;
- to remove damaging pollutants such as sulfur and nitrogen oxides; and
- to open the pores and thus allow the normal transpiration of moisture.

Improving the aesthetics is self-explanatory. A clean building will display the true beauty of both natural and man-made masonry and will showcase the original architect's design and intent. Having a clean substrate will allow the owner/manager and the architect to evaluate the condition of the masonry and to decide where remedial pointing and repair is necessary.

The third reason, removing damaging pollutants, is because our air, especially in areas with high concentrations of industrial plants and automotive traffic, is full of sulfur oxides from the incomplete combustion of power plant coal and fuel oil and nitrogen oxides from the incomplete combustion of gasoline. These oxides move through the air and eventually land on everything, including our architecture. Add moisture in the form of rain or humidity to the equation and the oxides will turn

into sulfuric acid and nitric acid, both of which are very damaging to natural and man-made building substrates. This is a worldwide problem. Much historic architecture has been severely damaged in the United States and it has been a major problem in Europe and Asia.

Finally, although buildings should be watertight from the external elements, structures have to be designed to allow the moisture created within the building to escape and not get trapped within the substrate. This moisture exits the building in the form of vapor, through various avenues including the pores of the stone. If moisture is allowed to remain trapped within the stone, it will freeze in the colder climates and cause spalling. Eventually, the freezing-and-thawing cycle will cause internal failure of the stone. Clean stone will help the moisture to transpire out of the building.

Method of Cleaning

The owner/representative now has to make the determination on how the building will be cleaned. If it is a larger project, he can afford to enlist the help of an architect, a local preservation consultant, a contractor, and a product manufacturer's representative. If it is a smaller project, he might want to work with just a knowledgeable building cleaning contractor and/or a cleaning product manufacturer's representative. In either case, these experts can perform test cleaning areas that will provide the owner with representative samples on how his building will look once cleaned.

There are different ways to clean building substrates. The preferred method of cleaning is by using high-pressure water (1500 to 1800 psi at 4 to 5 gpm) and proprietary building cleaning products. The products should come from a manufacturer who has a long, demonstrated history of successful projects, and the contractor should also be experienced and have a long history of using building cleaning products and high-pressure water.

Another technology in the building cleaning market is cleaning by abrasion. Abrasive cleaning is just that, whether the media is sand, baking soda, sponges, glass beads, or dry ice. The building contaminant is removed by force and it can be very difficult to remove the contaminants without in some way harming the substrate being cleaned.



Some results achieved by abrasion may at first appear aesthetically impressive, but these processes are not necessarily the better mousetrap that they appear to be. Much of the blasting media will become imbedded in the substrate and give an appearance of cleanliness and uniformity. After the weather has had a chance to rinse the wall, the unevenness of the cleaning process will usually become evident. Also, a building that has been cleaned by any form of mechanical removal (abrasion) has had, by definition, some of its substrate's surface removed. The net effect of abrasive cleaning will increase the porosity of the stone, which in turn will cause the stone to absorb more of the moisture inherent with the area's normal weather systems. With the moisture will come new contaminants that are reembedded into the stone. The rate of accumulation of the new building grime can be much greater on a building that has been cleaned mechanically and usually will highlight the gun paths of the abrasive cleaning process.

High-pressure water and chemical cleaning, using the appropriate chemistry for the job, will emulsify the contaminants and then hold them in suspension until the rinse cycle is applied. The rinse cycle will then safely flush the product/contaminant effluent without harming the substrate that is being cleaned. Properly accomplished, it is safe, proven technology that addresses both

the needs of the building and the concerns of the environment. It is not a process for amateurs, but must be performed by trained professionals. Similarly, the choice of cleaning products must come from manufactures that have a long proven history of satisfactory performance in the building cleaning and restoration marketplace.

This Viewpoint article has been selected by the editors as an offering to the interest of our readers. However, the opinions given are not necessarily those of the International Concrete Repair Institute or of the editors of this magazine. Reader comment is invited.

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