

Maintenance: Washing Exterior Structures

Washing Exterior Structures

Cleaning dirt, organic growth and debris from the exterior of a structure is an important maintenance task that will help to extend the life of the material. When organic growth develops on a structure it acts as a food source for other forms of fungi and creates a microclimate that traps moisture close to the surface, hastening deterioration. Combined these factors not only detract aesthetically from the structure but can lead to advanced degradation and eventually shorten the lifespan of the material. The method used to wash the surface should be the gentlest means possible and should not include high pressure techniques. Though important, cleaning the surface is not a permanent solution to prohibit biological growth.

Guidelines

- I. Prior to beginning any course of treatment it is important to evaluate the existing condition and consider factors including the material, type of growth, and prior treatments. These details will help in selecting an appropriate cleaning method.
- II. Always test the selected cleaning process on a sample area before committing to the process for the entire surface.
- III. Methods for washing exterior structures vary, but when it comes to cleaning historic buildings the means must be mindful of the delicate nature of the materials.
 - a. The preferred method of cleaning historic structures by the gentlest possible means be used. The most widely accepted technique to remove organic material is by hand, using a bleach and water solution with a soft scrub brush.
 - b. Avoid abrasive cleaning methods as it is widely accepted that cleaning a surface in this manner can abrade the substrate, contributing to a loss of historic fabric. This not only applies to wood but also to these techniques can pit masonry and remove the hard exterior layer meant to protect the material from the elements.
- IV. Protect the landscape from chemicals used during washing.
- V. Organic biological growth cleaners are available on the market. In addition to wood, these products can also be safely used on brick and other forms of masonry like granite, brownstone and marble.
- VI. Pressures greater than that of a typical garden hose (40-60 psi) are not typically necessary in most washing applications. No pressures higher than 100 psi should be used on wood or soft masonry (e.g. brownstone and marble); no pressures higher than 400 psi should be used on hard masonry (e.g. granite) or concrete.
- VII. Consult an architectural conservator if simpler methods for removal do not provide the desired effect.

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Technical Information

I. The following should be considered when selecting a cleaning method:

- a. Type of Material
- b. Age of Material
- c. Condition
- d. Prior Treatments
- e. Type of Growth

II. Testing

Prior to cleaning any surface, it is important to evaluate its condition to ensure that the washing method selected will not have an adverse effect on the material. Condition is key—a roof may be covered in organic growth, but prior to taking action, the shingles must be tested to ensure that they are in stable enough condition to receive the treatment. The type of material has a major impact on the washing means selected—wood shingles behave differently from granite foundations which can accept higher levels of pressure. Always test a section approximately 3' square prior to continuing treatment to verify that the method does not negatively impact the surface.¹

III. Use gentle methods

Abrasive cleaning methods are dangerous because there are often subtle architectural details found in mouldings, corbelling, or other building components which can be damaged or lost entirely because they are “blasted” off the surface.

Understanding pressure washing and power washing is a vital component when considering the surface cleaning options. Pressure washing takes hot water through a hose and projects it through a nozzle creating a high pressure stream. The force with which the water is applied is measured in psi, or pounds per square inch. Pressure washers can use extremely high psi, typically ranging anywhere from 1,500-15,000 for some of the professionally sized models.² Power washing utilizes the same process as pressure washing, but utilizes cold water. Risks involved with power washing include: getting water behind the substrate,³ driving paint or another covering into the substrate, and abrading the softer spring wood, raising the grain which changes the texture. Neither application is the best choice for historic structures.

IV. Protect the landscape

The chemicals used to remove organic matter from building surfaces can be damaging to the landscape and care should be taken to minimize the negative impact. Prior to beginning any work, the ground and nearby plants should be wet with a hose and then covered using a tarp. When washing roofs, take notice of where the downspouts carry water and protect that area if possible. If at any point the solution comes in contact with a plant, immediately spray the area with copious amounts of water to dilute the mixture. Once the washing is complete, carefully

¹ Sydney Freedman. “Architectural Precast Concrete,” *Twentieth Century Building Materials: History and Conservation*, 104.

² Anne E. Grimmer, *Preservation Briefs # 6*, “Dangers of Abrasive Cleaning to Historic Buildings.” available at <<http://www.nps.gov/history/hps/tps/briefs/brief06.htm>>.

³ Sharon C. Park, AIA, *Preservation Briefs # 19*, “The Repair and Replacement of Historic Wooden Shingle Roofs.” available at <<http://www.nps.gov/history/hps/tps/briefs/brief19.htm>>.

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remove the tarp so as not to spill the contents onto the ground. Thoroughly wet-down the area after the tarp is removed. After a rain storm, the area should again be sprayed to ensure that runoff from the building does not damage the landscape.

V. Cleaners

In general the best method of cleaning utilizes the common garden hose, a soft natural bristle scrub brush, and a mixture of hot water and bleach. The typical mixture is 3:1—three parts hot water and one part bleach. Using the brush, scrub the area vigorously. After scrubbing, rinse the area with clean water. In the past, some have added the cleaning agent TSP (trisodium phosphate) to the mixture, but that practice should be avoided because the phosphates in TSP act as a food source for mildew. When cleaning masonry, an organic biological growth cleaner should be used instead of bleach; the same scrubbing directions apply to these products. Follow the manufacturers' specifications for diluting the cleanser.

VI. Water Pressure

The typical psi (pounds per square inch) for a garden hose is 40-60 psi. As part of general practice, a psi above 100 should not be used on wood or soft masonry as it can cause more substantial damage than lingering organic growth or dirt. If the milder means of cleaning does not work on harder surfaces, like concrete, a higher psi of 100-400 can be used as long as the hose remains 3-12" away from the substrate.⁴ If necessary, harder substrates may be able to handle less damaging aggregates in conjunction with higher levels of pressure to clean the surface; but be mindful that this is not the ideal and that testing is crucial in this scenario. Organic materials like walnut or cocoa shells are softer than typical aggregates, but they are still abrasive and should only be used after trying to clean the area manually using the method described above. In order to ensure the gentlest means possible is used to clean the area, begin with the lowest psi at 6-8" away from the surface and move the hose forward ½" at a time. As a secondary option, return the hose to 6-8" away from the surface and increase the pressure in increments of 50 psi to determine the pressure: distance ratio at which the material will be removed without damaging the substrate.

VII. Additional Consultation

If the simpler methods listed above do not provide the desired results, always consult an architectural conservator. Analyzing the offending material will help provide a treatment plan. Conservators can also test harsher chemicals, like certain acids, or provide the proper mixture and force for slightly more abrasive methods to determine if they will remove the offending material.

It is important to note that there is no one sensitive way to permanently rid a building from organic growth. Once a mold spore is in the wood, it will bloom again. Modifying the area by removing overhanging branches and increasing the level of light that hits the surface is the most effective solution to the problem.⁵ Applying the water and bleach solution to the surface when

⁴ Martin E. Weaver. *Preservation Briefs 38*, "Removing Graffiti from Historic Masonry." available at <<http://www.nps.gov/history/hps/tps/briefs/brief38.htm>>.

⁵ Kay D. Weeks and David W. Look. *Preservation Briefs #10*, "Exterior Paint Problems on Historic Woodwork." available at <<http://www.nps.gov/history/hps/tps/briefs/brief010.htm>>.

Property Care White Papers

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necessary will help keep the microclimate at bay. Spraying mildewcides on wood surfaces is another option.

Works Consulted & Further Reading

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