

Technical Note: Why sodium bicarbonate blasting should not be used on historic buildings

Sodium bicarbonate blasting-what is it?

Sodium bicarbonate blasting (sodablasting) is a cleaning process where sodium bicarbonate is applied to a surface under pressure, using compressed air or water. It was originally developed for cleaning metals on a large scale. It has other industrial uses and is widely used for cleaning the hulls of boats.

Risks

It has particular risks for porous historic materials like brick and stone. These risks are two fold:

1. the removal of the surface by abrasion, and
2. the absorption of soluble salts into the substrate, both of which can lead to significant and irreversible damage.

Issue- Physical Abrasion

- Abrasive techniques are generally not recommended to remove paint from historic masonry buildings. This is because paint is often softer than the substrate and it will absorb the energy of the abrasive and bounce it back. The tendency of the operator is therefore to go in closer and harder to the paint layer. When the substrate is revealed during the cleaning process, the abrasive eats away rapidly at the substrate.
- Whilst sodium bicarbonate is softer than other abrasives like silica sand, it can still cause damage to surfaces.
- The surface of historic masonry is of vital importance to the ongoing health and integrity of the material because it usually has different chemical and physical properties to the body and serves to protect it. The loss of surface usually leads to more rapid deterioration of the masonry unit.

Issue-Soluble Salts

- The formation of salts within, or just under the surface of brick and stone may lead to deterioration. The crystallisation (and the resulting expansion) of the salts pushes the material apart and disrupts it. For further information, see *Salt attack and rising damp, A guide to salt damp in historic and older buildings* at: http://www.heritage.nsw.gov.au/docs/HVC014_Salt_Damp_tech_guide_FA_web.pdf
- Sodium bicarbonate is a very soluble salt that can be readily retained on the surface and in the pores of the masonry. Heritage buildings made with porous materials already carry a likely enhanced salt load simply because of the accumulation of salts over time. It is unwise to increase this.
- Sites can be relatively quickly washed down because sodium bicarbonate is readily dissolvable. However, this is likely to wash some of the salts into porous materials such as masonry.
- Damage from soluble salt crystallisation may not be immediate and will depend on the atmospheric conditions, such as humidity and rainfall patterns, and the porosity and

permeability of the substrate. Do not depend on the immediate appearance of a cleaning sample as evidence that it is an acceptable method of cleaning.

Issue-Environmental and Health Considerations

- Sodium bicarbonate (bicarbonate of soda, or baking soda) has low toxicity for human beings, which can sound attractive when choosing between methods.
- Although sodium bicarbonate is relatively benign as a chemical, it should not be washed down the drain, as it will contravene legislation (Protection of the Environment Operations Act, 1997, POEOA), because it contains residues of the cleaning activity.

Issue-Testing

- The choice of paint removal systems on masonry should be on the basis of carefully executed and monitored trials in discreet locations.

Conclusion

The removal of paint from historic masonry surfaces should not be undertaken by abrasive means because of the difficulty in controlling the technique to account for variations in the surface hardness of materials. Sodium bicarbonate is an abrasive technique that also has the potential to introduce harmful salts into the material. These salts can cause damage in the long term.

Recommendation

The Heritage Council's Technical Advisory Group have advised that sodium bicarbonate blasting should not be used on porous surfaces, (e.g. brick, stone, mortar and plaster), though a wide range of appropriate potential uses in other contexts is noted. Removal of paint from porous heritage substrates should generally be undertaken by non-abrasive means, like organic solvents or other inorganic paint removers contained in gels, poultices or pastes.



Brickwork damaged by a process that left high levels of salt in the bricks and mortar and damaged the surface through excessive pressure. Note the original smooth surface of the bricks beneath the paint layers to the right of the photo.

Photo: David Young

For further information, see:

- Salt Attack and Rising Damp
http://www.heritage.nsw.gov.au/docs/HVC014_Salt_Damp_tech_guide_FA_web.pdf

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