



Historic Preservation Tax Incentives Program

Technical Preservation Services
National Park Service

Evaluating Substitute Materials in Historic Buildings

The Secretary of the Interior's Standards for Rehabilitation allow for the replacement of historic materials as part of a rehabilitation project if it is demonstrated that they are damaged and beyond repair. Replacement material can either be in-kind – marble for marble, wood for wood – or consist of a substitute material. New materials, including fiberglass, aluminum, vinyl, fiber-reinforced cement, synthetic stucco, cast stone, and other materials meant to replicate traditional materials are constantly introduced into the building products market.

Each proposed use of substitute materials is reviewed within the framework of the following general issues. First, the need for replacing historic material is assessed. Second, the amount and location of replacement material is evaluated in relation to the building's historic character. Third, the appropriateness of a particular substitute material is considered in regard to its appearance and other factors, such as the location of the application, and the known physical compatibility of the substitute material relative to the historic material.

While the goal may be to achieve an exact match when replacing a historic material, most replacement involves some measure of change, even if only minor. For example, new marble available today – even from the same quarry – will not be exactly the same as historic marble panels that require replacement. Thus the evaluation of any replacement material needs to take into account the quality of the match needed in terms of both appearance and performance for a given situation.

Need for substitute materials

If the historic material or element is not missing entirely from the structure, the first step is to determine whether deterioration of the surviving historic material is sufficient to require replacement with a new material. If replacement is required, substitute materials may be appropriate if the original materials have performed poorly, if there is no source for original materials, if craftsmen are not available to replicate the historic element in its original material, or if current code requirements do not permit the use of the historic material. For example, on building facades where the majority of historic serpentine veneer stones show extensive delamination, pre-cast concrete replacements that match the color, dimensions, and surface texture of the originals have been used successfully.

Amount and location of proposed application of substitute materials

The design of a building, its history, the materials used, and the degree of craftsmanship, combine to give a building its historic character. Different materials and elements play different roles in the building's historic appearance. Where a particular feature contributes significantly to the historic character of a building, the material or materials that make up that feature are likely to require a closer replacement match than materials making up a feature of lesser importance. A careful evaluation of the building and an understanding of the historic significance of its various materials and elements will assist in determining the degree to which substitute material may be acceptable.

All replacement work reduces to some degree the historic character of a building. While the limited use of substitute material on a historic building is acceptable, there is a point where the amount of replacement

material becomes excessive, when the overall sense of the building as a historic structure is lost and the building's integrity is diminished to an unacceptable degree.

The overall visibility of a character-defining material or feature is an important determinant in whether substitute materials will be appropriate. Generally, the more visible a feature is and the more important that feature is to the building's historic character, the more likely any change will negatively affect that character. For example, a replacement cornice using a substitute material proposed for a two-story building would have to match more closely the historic element than one intended for a ten-story building. Materials on the rear elevation or side elevations partially obscured by adjacent construction may be of secondary importance to the building's character.

Visual and other matches for the historic material to be replaced

Substitute materials, like all replacements, must closely match the design, color, surface texture, reflectivity, finish, details, and other qualities of the material or element to be replaced. For example, the defining characteristics of a historic roofing material usually include its size and shape, as well as its thickness, color, and reflectivity. An asphalt shingle may be available that matches the size of a particular roofing slate, but its thin profile and granular surface may bear little resemblance to slate. A polymer-based slate substitute may match the thickness and surface texture but only be available in a larger size than the historic slate. Before one can evaluate the appropriateness of either substitute one has to first identify the characteristics of the historic roof that are most important to how it is perceived on the particular building. This may lead to choosing one substitute over another or rejecting all if the resulting differences appear to be too great.

While visual qualities are an important component, other factors should also be considered when evaluating the appropriateness of a particular substitute material. In some cases, if the density and texture of a substitute material differ markedly from the historic material, the building's character could be diminished by its use.

Use of a substitute material should take into account differences between the new material and adjacent or related existing material. For example, proposed substitute materials may have rates of thermal expansion and contraction and rates of vapor permeability that differ from the adjacent historic material. In some cases, a substitute material may be so new that there is no information on how it will age and wear over time. When information on the durability and physical compatibility of a substitute material relative to adjacent historic material does exist, it should be evaluated. Repair or replacement using physically incompatible substitute materials could damage surviving historic fabric and should be avoided.

Many modern materials used as substitutes are promoted as maintenance-free. Historic materials that require maintenance offer the possibility for indefinite life spans sustained by the renewal of maintenance. Materials that are maintenance-free have more limited life spans, with replacement being the only response to deterioration.

For additional guidance, see *Preservation Brief 16: The Use of Substitute Materials on Historic Building Exteriors*, and *Preservation Brief 8: Aluminum and Vinyl Siding on Historic Buildings – The Appropriateness of Substitute Materials for Resurfacing Historic Wood Frame Buildings*, and the *Technical Preservation Services' Publications and Online Materials* index.

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