



Background:

The Department of Defense (DoD) manages approximately 95,000 buildings that are 50 years of age or older; the majority of these buildings were constructed during the twentieth century. Wartime construction efforts associated with World War II dramatically shaped the environment at many DoD installations. Within the last 20 years, many of these often hastily constructed buildings have been determined eligible for listing in the National Register of Historic Places, and other mid-century buildings are reaching the 50-year age threshold. Throughout the DoD, these 20th-century buildings are reaching a critical point in their lifespan as materials utilized in their construction reach the end of their serviceable life and true replacement in-kind may not be an option due to various factors. These constraints require a creative approach to determine sensitive replacement options. In recent years, the Mid-Atlantic Region of the Navy has first-hand experience dealing with this issue at multiple installations, as it relates to the replacement of deteriorated 20th-century building materials.

Objective:

The objective of this project is to provide a useful tool that will assist DoD Cultural Resource Managers (CRMs), facility planners, architects, and engineers responsible for the maintenance and repair of historic twentieth-century buildings in complying with Section 106 of the National Historic Preservation Act.

Summary of Approach:

The approach to the project consisted of a six-part methodology consisting of: (1) a review of existing Legacy reports, National Park Service Preservation briefs, and other documentation regarding the rehabilitation or replacement of twentieth-century building materials; (2) development and distribution of a CRM survey questionnaire to identify materials of greatest concern; (3) primary and secondary research online and at key repositories; (4) consultation with multiple State Historic Preservation Offices (SHPOs), as well as other federal agencies; (5) on-site investigations at various DoD installations; and (6) discussions with individuals and organizations involved in private-sector tax credit projects.

Benefit:

This project will help expedite Section 106 compliance. The report provides a protocol that explains the factors that should be considered in determining repair versus replacement of historic windows. Information contained within the report can assist in the identification of substitute materials that will result in findings of no adverse effect, which will avoid the need for time-consuming consultations and costly mitigation measures. The project promotes sustainability by facilitating the repair and continued use of existing historic buildings. Information provided will facilitate regular maintenance and minor repairs that can extend the life of historic windows. When replacement is deemed the most viable option, careful consideration of replacement materials with regard to the impact on the historical integrity of a building is critical. By balancing

preservation concerns with federal regulations and program needs, the DoD can continue to ensure the long-term viability of the thousands of historic twentieth-century buildings it owns.

Accomplishments:

The project evaluated the feasibility of in-kind replacement, as well as identified suitable substitute materials based on available information and input from multiple SHPOs and Federal agencies. The report concluded that replacement of historic twentieth-century window types is not without challenges.

Steel Windows

The study of steel windows found that the best way to maintain the historic fabric is simple preventative repair, such as painting to lessen corrosion and single light replacements to maintain function. If the steel window remains functional, less invasive measures like storm windows and solar film can help meet energy and use requirements. Although in-kind replacement is still a possibility, aluminum has surpassed steel in lower costs, greater availability, and less maintenance. Aluminum can typically be substituted for steel, with certain caveats and historic sensitivity.

Corrugated Wire Glass

The study of corrugated wire glass revealed that the very innovation of the material was its inherent design flaw, as the embedded wire exposed to the elements would corrode and spall the glass. The fact that corrugated wire glass is no longer manufactured in the United States makes rehabilitation unlikely and restoration infeasible. No suitable substitutes were identified for corrugated wire glass, and alternative modern materials were explored.

Glass Block

The study of glass block highlighted the minimal maintenance required to retain the historic fabric: replacement of cracked blocks, occasional repointing, and prevention of metal tie corrosion. Its fall from favor was largely due to its inoperability and the resulting lack of natural ventilation. Glass block continues to be manufactured, which means in-kind replacement is feasible if applicable standards are met. No suitable substitute materials were identified.

The report also provides a list of manufacturers that can assist with supplying historically sensitive windows. For situations when in-kind replacement is not feasible, the report identifies some specific treatments that can be applied to minimize adverse effects. In addition, the report presents the history of the three particular window types that can be used toward the preparation of mitigation documentation.

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