

THESIS ABSTRACT

Peters, Judith A. "Modeling of Tomb Decay at St. Louis Cemetery No. 1: The Role of Material Properties and the Environment," Masters thesis, University of Pennsylvania, August 2002.

In this research, condition data from the Spring 2001 Dead Space Collaborative Studio of the total site were analyzed and used to identify candidates for further material analysis. A large sample set of individual materials and tomb systems was visually classified and evaluated for moisture absorption by total immersion. A selected subset of material samples and total systems was then tested further for moisture response by capillary absorption, drying rates, percent porosity, moisture vapor transmission, salt presence and composition. Normal and polarized light microscopy was used to analyze micro-structure, aggregate sorting, and composition. Specific stucco binder components were analyzed with Scanning Electron Microscopy (SEM), X-Ray Diffraction (XRD) and Thermal Gravimetric Analysis (TGA). The thesis includes a literature review of the history of the site, building materials and moisture driven decay mechanisms. Current condition images and illustrations of the decay mechanisms highlight the text. The conclusions drawn and the illustrations of the decay processes provide guidance for basic conservation recommendations for tombs in St. Louis Cemetery No. 1.

This characterization of tombs and analysis of building materials of St. Louis Cemetery No. 1 has confirmed the hypothesis that incompatibilities in building materials lead to certain moisture driven decay patterns. When subjected to the high heat and humidity of New Orleans, the differing hygroscopic properties of the materials in the system have exacerbated and accelerated decay mechanisms, resulting in gross cracking and delamination, with resultant stucco, mortar and brick loss. Without the periodic maintenance routines that were in place historically, these deterioration results grew into major structural failures. The overall condition of the site today is primarily the result of years of neglect and deferred maintenance and many of the repairs that were made have tended to exacerbate masonry deterioration caused by the differing properties of the original and repair materials.

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