

Session Track: Stucco
Session Code: CS11a

Paper: Analysis and Restoration of Lime-based Renders on an 18th Century Coquina Stone House in Saint Augustine, Florida

Presented by

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Patricia Miller and Mark Rabinowitz, FAIC, Conservation Solutions, Inc., Washington, DC, USA; and Joseph K. Oppermann, FAIA, and Jenny Wilkins, JOSEPH K. OPPELMANN - ARCHITECT, P.A.

Speaker(s) Biography

Mark Rabinowitz and Patty Miller are Senior Conservators with Conservation Solutions, Inc.

Joe Oppermann, project architect, and Jenny Wilkins, project manager, are with Joseph k. Oppermann - Architect, P.A.

Abstract

The Ximenez-Fatio House, located in St. Augustine, Florida, the oldest European city in America, dates to 1798, the Second Spanish Colonial Period. Distinctly Spanish in design, it was constructed as a two-story masonry structure with one-story ell. A second story balcony extends over the street at the front entrance. A two-story loggia is opposite at the rear. Initially a residence, it became lodging for travellers as early as the 1820s and served this purpose well into the twentieth century. As such, it was an early precursor of modern tourism.

Long recognized as one of the most significant early buildings in Florida, this National Historic Landmark was acquired in 1939 by the Colonial Dames in America and converted to a house museum. The Colonial Williamsburg Foundation and the National Park Service provided early advice and interpretive direction. Joseph K. Oppermann - Architect, P.A. was hired in 2004 to join with William Seale, historian, to coordinate the first comprehensive restoration effort. A myriad of modifications and inappropriate repairs masked the physical state and evolutionary history of the house.

The stuccoed masonry walls were singled out as a first priority repair. Built of coquina stone, a soft shelly limestone unique to the site, the house's exterior was originally faced with several applications of a lime-putty render, finished with a lime wash. In recent years, Portland cement stucco and acrylic-based paint coatings had been applied over or as replacement for the lime render and had reduced the rate of vapor transmission, trapping moisture within the porous walls, and prompting moisture vapor to the interior walls surfaces, causing damage to interior finishes and deterioration to the stone structure.

Conservation Solutions, Inc. (CSI) was contracted in 2005 to perform a series of tests on the building's historic materials. The testing scope was designed to provide the information necessary to identify the original renders and determine the most appropriate materials for restoring the exterior of the building. Cores and samples removed from the building exterior envelope were selected to expose examples of the earliest existing lime render, later Portland cement stucco, paint coatings, mortar, and original coquina stone substrate. Compression testing, mortar analysis, and water vapor transmission testing were performed on the coquina stone samples, original lime render samples, and Portland cement

stucco samples, as well as samples of currently available commercial lime-based materials to provide the essential information necessary for the selection of a new exterior render.

CSI is currently engaged in performing the work of repairing the remaining exterior historic renders using these findings. Render repair work includes the careful removal of paint coatings and Portland cement repairs to expose original render surfaces, stabilization of the historic renders using injection grouts, and replacement of losses with a new lime-based render. Exposure of the early lime renders and coquina stone also revealed previously undocumented changes in construction, providing answers as well as presenting new questions about the history and evolution of this historic structure. .

Session Track: Stucco
Session Code: CS11b

Paper: Concealing or Expressing the Past? Issues in Restoring an Early 20th Century Stucco

Presented by

Christopher Tavener AIA Einhorn Yaffee Prescott, A & E, P.C.
Albany, NY USA

Petr Justa, Gema Art Group, Prague, Czech Republic

Speaker(s) Biography

Christopher Tavener, an expatriate Briton, is a US architect with Einhorn Yaffee Prescott A&E, who specializes in the restoration and rehabilitation of 19th and early 20th century buildings. He spearheaded the architectural effort in the recent renaissance of the Washington State Legislative Building and is currently involved in stone restoration at the NY State Capitol, and in the rehabilitation and preservation of FDR's library in Hyde Park NY to house archival-grade storage and new exhibits. At times he investigates buildings overseas for the US State Department. He has spoken previously at APTI conferences on the use of substitute materials in terra cotta restoration.

Petr Justa is a graduate of the Dept. of Chemical Technology of Monument Conservation in the Prague Institute of Chemical Technology and a much published expert in the use of radiation, polymers and epoxies for conservation. He is a member of the Commission for Conservation and Restoration in the Czech Ministry of Culture and lecturer and former chair of the Board of Directors at the Institute for Restoration and Conservation Technology, Lytomyšl. He has studied and/or been engaged in the restoration of the façades of St Vitus Cathedral, St Nicholas Church, and the Small Fürstenberberg and Kowolrat Palaces in Prague, and is currently engaged in the study and rehabilitation of the Citadel in Erbil and the Persian arch in Cteisiphon, both in Iraq, as part of the Czech governmental aid to the Iraq Cultural Heritage. He is an accomplished restorer of stone and stucco, and International Projects Manager for the GEMA Art Group, restoration and conservation specialists in Prague.

Abstract

This presentation has as its bones the progress of a current façade restoration project in Prague, in the Czech Republic. The original and unusual stucco has failed. Several candidate replacement materials are being tested. A system will be selected for installation this spring.

It fits the New World/Old World theme on several levels. It teams an American client and preservationist with Czech restoration architects and contractors. It employs a very current model of project delivery, design-build; in restoration, design architects are traditionally closely involved in the construction phase. And the façades of the 1920s building, designed in a 19th century Beaux-Arts idiom, were finished with stucco that, while superficially reflecting common Czech practice and harking back to Renaissance models of palazzo design using lime renders, proved to employ an innovative, not to say puzzling, choice and use of materials.

The project will allow commentary on assumptions that underpin the Conference theme - that the conservation of the built environment is affected by availability and continuity of local materials and expertise, that traditional design is strongly influenced by the local climate.

- The failure of the original stucco system is a prime example of the folly of building in non-traditional ways that ignore the local climate. But what stucco system does not suffer in time? Everyone understands that while they are often provided at less expense than a desirable ashlar finish they demand maintenance. What is the correct restoration response – the less satisfactory or a more durable system?
- However, this stucco system aimed to surpass the potential of traditional stucco. It attempted to achieve, without paint, a realistic and closely observed impression of cut and honed stone, and it combined on-site rendering with factory pre-cast decorative elements. The restoration must avoid the life-threatening and expensive results of the delamination, but it may be truer to the history of this building to choose an innovative rather than a traditional system of façade treatment.
- Here, appropriate restoration materials and techniques may not be those that local restoration firms employ, although they are expert on the effects of the local climate and the performance of local aggregates and renders, and can provide the extraordinary restoration skill and experience that have been nurtured in Bohemia since the end of the 19th century.
- The building was designed by a German architect for a Jewish client. Its exuberant, essentially European but conservative design was out in tune with both Bohemian tradition and the fierce flowering of Modernist architecture in the early days of Czechoslovakia. Yet it now embodies some history. It was taken for headquarters by the German SS and, for a short time, the liberating Russian army and despite its flamboyant presence it achieved underground fame, in the run up to the Velvet Revolution, as a secret meeting place for Czech dissidents such as Vaclav Havel. It is not however an official landmark and, while in Prague, is actually on American soil. It is a building that, starting its design, speaks of a wider, non-local community. We should ponder the implications of associating preservation primarily with continuity and change in local traditions, materials and expertise.

Session Track: Stucco
Session Code: CS11c

Paper: Older Adobe ISO Compatible Render: The Saga of Reintroducing Lime Renders in the Southwestern United States

Presented by

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Margaret Thomson, PhD, Chemical Lime Company, Henderson, NV, USA

Speaker(s) Biography

EDWARD CROCKER, President of Crocker Ltd. and Crocker & Associates, has an extensive background in archeology, construction, ground water development and the preservation of historic earthen buildings. He was founding technical director of Cornerstones Community Partnerships, a non-profit organization that restores historic structures in rural Hispanic villages and Indian pueblos throughout the Southwest. Ed is a trained Mesoamerican archaeologist and a licensed general, electrical, and mechanical contractor.

Crocker Ltd. is an international architectural conservation and historic preservation firm that specializes in earthen architecture construction and repair. Crocker Ltd. works in conjunction with Crocker & Associates to provide assessments, treatment strategies, materials analyses, construction specifications, archeological and structural monitoring, National and State Register nominations, investment tax credit applications, and compliance guidance to governmental agencies, architects, engineers, and private owners.

Abstract

Repair to a material implies that damage has occurred which can be interpreted as physical and chemical incompatibility. The causes of damage can be simplified into the following categories:

- external mechanical damage due to earthquakes, wind, soil settlement;
- internal mechanical damage due to moisture movement (freeze-thaw, rising damp, cryptofluorescence, disaggregation),
- internal chemical deterioration due to chemical reactions causing expansion or disaggregation
- biologic deterioration causing cracking or disaggregation.

The last three damage mechanisms are related to presence of moisture. In cementitious materials, here meaning the binder to an aggregate, moisture transport occurs within pores. There are two basic mechanisms for pore development:

- evaporation trails of a material going from a plastic to hardened state, as is the case for compressed earth blocks and lime mortars or renders. There are more pores (i.e. 20%) and the pores are relatively large in diameter ($> 50 \mu\text{m}$).
- reaction of minerals with mixing water forming new minerals which occupy the water filled pores, as in the case of hydraulic cements (portland). There are fewer pores (i.e. 7 %) and they are relatively small in diameter ($< 2 \mu\text{m}$).

Complicating evaporation and hydration, is the particle size distribution of the aggregate and the aggregate to binder ratio.

The basic rules for obtaining compatible renders on soft historic fabric include: use original material, ensure reversibility, provide physical and chemical compatibility, aesthetics, ensure render weaker than the substrate (Holmström, 1982). Importantly, compressive strength of a material is inversely proportional to total porosity. The more porous a material the weaker it will be in compressive strength. It is suggested that porosity is a critical value to consider, to reduce the risk of internal damage and promote compatibility.

This paper is a companion paper to that to Crocker and Stanford. It reports on the material analysis of the adobe block and renders removed from the Canoa Ranch, outside of Tucson Arizona. The analysis was conducted to follow the guidelines of Holmström:

- determine original material (chemical and mineralogical analysis of the renders)
- ensure reversibility (not addressed in material analysis)
- provide physical and chemical compatibility (determine total porosity and pore size distribution).
- aesthetics (determine presence of coatings, aggregate particle size distribution to replicate surface texture)
- ensure render weaker than substrate (determine total porosity and composition).

Based on these analyses, recommendations are provided as to the repair renders for the adobe.