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Historic or Landmark Structure Rehabilitation

Understanding Your Options

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Investment in a historic or landmark structure can bring reward, aesthetically as well as financially. But when leaks, crumbling masonry, and damaged roofing set in, that same building can also bring headaches. Still, as the saying goes, "you can't make a silk purse out of a sow's ear," but you *can* make a silk purse out of silk: time-tested materials and original quality of workmanship mean that, with the right guidance, a rehabilitation program can provide a deteriorating historic or landmark structure with many more years of useful life.

An expert in building envelope maintenance can design a plan that accommodates individual aesthetic, historic and budget considerations. Generally, the following should be included in an effective program:

- Investigation into existing conditions, including review of original construction documents and reports, as they pertain to maintenance issues.
- Preparation of detailed construction drawings and specifications — and

assistance in selecting the right contractor for the job.

- Representation and guidance in working with the landmark commission, where necessary.
- On-site construction administration by the design professional to monitor the progress of the rehabilitative effort and its conformance to specifications and drawings, as well as to respond to unforeseen conditions.

Where to Start

The best way to begin any rehabilitative work is with a thorough investigation. This phase of the project analyzes the current condition of the building exterior, the extent and probable causes of deterioration, and offers a framework for designing the most appropriate repair solutions. Through the investigation, emergency repair needs are identified in the context of longer range rehabilitation goals, reducing the potential for high-cost change orders and schedule delays caused by unforeseen conditions.

The first step for the design professional is to research and evaluate the original construction documents and records of earlier repairs, surveys, and building alterations. One key to understanding the problems affecting a structure — and to designing the right solution — lies with learning how the building was constructed.



Paul C. Lanteri, AIA investigates masonry deterioration at the turn-of-the-century Goodwin Hotel in Hartford, CT.

As Director of Architecture in the Connecticut office, Arthur L. Sanders, AIA oversees a wide spectrum of historic and landmark rehabilitative work. Paul C. Lanteri, AIA, Project Architect, is responsible for exterior envelope projects for the firm.



Behind the brick face of this historic structure, a probe reveals interior masonry that has disintegrated to powder. Note also the dramatic brick displacement and lack of a proper seal at the mortar joints, which can lead to moisture infiltration and further damage.

With historic structures, these documents are often unavailable, and even when they are, the building construction may deviate from that shown on the plans. In any case, on-site observations are vital to identifying the presence and extent of deterioration in facade, window, roof, and structural systems. Typically, this research may include photographs of problem areas, test cuts and probes, and laboratory analysis of sample building materials.

From these observations and analyses, the probable causes of deterioration can be identified, whether caused by inappropriate design, construction, or past repairs; failure of building materials; weathering; water infiltration; or other problems.

Failure to identify and treat the underlying causes of deterioration often results in their recurrence in the near future. For instance, re-anchored face brick will break down prematurely unless the material (steel, concrete, clay, brick, etc.) and condition of its back-up are taken into consideration. Moisture infiltration caused by improper

anchorage will necessitate early replacement of the new facade. To guard against such duplicate repairs, a thorough investigation of the building materials is essential before any work can begin.

In addition to locating and evaluating current problems, conditions which constitute potential risks to the future stability of the building envelope also need attention. Preventive measures should be included in the overall action plan to limit or slow future deterioration.

If the building is a National Historic Register property or a locally significant landmark, additional restrictions on repairs and other rehabilitative work may apply. Since the process of gaining approval for construction adds extra time to the project schedule, regulatory issues must be researched and addressed by the design professional as early as possible in the initial investigatory phase.

The goal of this investigation is to design a plan of attack for building rehabilitation and maintenance. After drawings and construction documents have been examined, probable deterioration causes and underlying problems have been assessed, and



Determining the moisture content of subsurface masonry is a frequently used investigative method that can help identify the integrity of back-up materials.

historic commission regulations have been taken into account, a rehabilitation program can be designed to meet the needs of a historic or landmark structure. This includes a scope of work, proposed phasing, and probable costs.

Emergency Stabilization

Once investigative work has been completed, stabilizing the structure should be top priority. Any hazardous conditions identified during the



As an emergency measure, netting was installed on this severely deteriorated, 80-year-old cornice to prevent loose materials from falling.

investigation, such as those that pose an imminent danger to public safety, should be secured immediately. Before any other work can proceed, loose, dislodged, or deteriorated building materials must be held in place to prevent accidents.

Other problems, such as water infiltration into occupied space, can damage interior materials and finishes if not remedied quickly. Conditions that could contribute to further structural damage should in general be addressed as soon as possible.

Any stabilization measures, however, should dovetail with longer-range rehabilitation plans. Rather than

increase costs of subsequent work or cause more damage to the structure, these measures ought either to enhance or lay the groundwork for future rehabilitative efforts. To illustrate, the common practice of installing netting to secure dangerously loose facade materials may be a good temporary fix until a more permanent solution can be identified and implemented. If improper anchorage is used, however, the netting can fail. At the other extreme, removal may be sufficiently difficult that further envelope damage is induced.

Timeline

With emergency needs met, other, less immediate — but equally important — problems can be addressed.

If budgeting permits, it often makes economic sense to do all needed repairs at the same time. This both prevents damage to newly repaired sections during subsequent construction, and avoids additional set-up costs.

A partial re-pointing project may not be cost-effective if the remaining pointing has to be done within a few years, incurring a second round of set-up costs for scaffolding and sidewalk bridging or other protective measures. Also, disruption to tenants is kept to a minimum if they need endure only one construction period.

It Seemed Like a Good Idea at the Time...

Rehabilitation work on historic structures generally requires highly skilled hand labor and extensive set-up time. Without detailed and exacting construction documents, there is no assurance that the work laid out during the investigation will be done properly.

Creative Solutions

Working with Regulations

During a recent rehabilitation project, Hoffmann Architects' design team was faced with a badly deteriorated, eighty-year-old terra cotta cornice, cantilevering three feet off the 14-story Taft Apartments, formerly the renowned Taft Hotel, in New Haven, Connecticut. Deterioration included open joints and severe corrosion of the embedded support steel. The entire cornice had been netted, and numerous large pieces had fallen into this protective barrier.

As a historic landmark, the building was subject to restrictions from the city commission on any rehabilitative work. But here, the cost of reconstructing the cornice as originally designed was prohibitive. Instead, the design team came up with a solution which satisfied both the commission and the owner's budget: recreate the cornice, down to the last detail, using FRP (fiber reinforced plastic). The required variances were obtained by the project team on the owner's behalf.



As the cost of repairing the ailing terra cotta cornice (inset) of this landmark building was well beyond the project's budget, the design team called for a replacement with more contemporary materials.

Creative Solutions (continued)

A Delicate Procedure

Detailed, lucid construction documents are imperative, as Hoffmann Architects' rehabilitation of one National Historic Register building illustrates. On the turn-of-the-century, Queen Anne-style Goodwin Hotel, in Hartford, Connecticut, an intricate brick facade pattern and thin mortar joints are among the distinctive details.

While these delicate features are characteristic of 1800s architecture, they are also problematic. The joint size and brick pattern prevent an adequate bond between the face brick and interior wythes (layers) of masonry. They also present difficulties in repointing the mortar joints to create a watertight facade.

To resolve the problem, Hoffmann Architects specified replication of the brick pattern at the areas of reconstruction, while bonding the face brick to the interior masonry with a series of stainless steel strap anchors custom-fabricated for this project. To meet the re-pointing challenge, the firm specified a custom mortar mix, which improved upon the strength of the original mortar while still maintaining its flexibility. The specifications also called for the combined use of hand and power tools to remove the existing mortar; to fill the joints, both injection and traditional jointing tools and trowels were indicated. ■



Intricate brick work and thin mortar joints necessitate clear construction documents and innovative methods to achieve rehabilitation.



This repair effort used roofing cement to seal over a leaking brick parapet wall — a solution that instead trapped moisture within and caused further deterioration.

In order for contractors to competitively bid and correctly implement the selected rehabilitation methods, documents and specifications must be created which offer a clear picture of the needed solution. While an investigation is important to survey existing conditions, identify emergency situations, and prioritize rehabilitative work, the report produced does *not* provide the level of detail necessary to ensure appropriate methodology.

A case in point: Once sites of water infiltration have been identified in a report, "quick-fixes" such as water repellent or waterproof coatings may seem like tempting solutions. But these coatings can instead trap moisture within the wall, leading to breakdown within the masonry, while the sealer masks evidence of the ongoing deterioration.

With construction documents in hand, however, the contractor has a clear map of how properly to remedy the problem.

Life span

Eventually, rehabilitated building components will reach the end of their useful life. The rehabilitation design should anticipate and plan for that

renewal, and not create problems for future repairs.

Installation of new roofing often involves edge-termination details that incorporate metal bars to compress edge flashings. Fasteners for these termination bars should be selected based not only on their holding power, but on the ease with which they can be removed. Some commonly used fasteners cannot be removed without destroying the substrate to which they are attached. Owners should expect to replace roofing, but having to replace masonry cracked by the attempted removal of incorrect fasteners shouldn't be part of the program.

From the Pencil to the Parapet: Making Design Solutions Reality

Once detailed drawings and specifications are in hand, on-site project

“Beginning with a quality structure means better building materials and, with proper techniques, longer lasting solutions.”

representation and construction administration services provided by the design professional help ensure a successful outcome. These project management methods are used to monitor the construction progress and verify that rehabilitation measures are being implemented as designed.

Through on-site project representation services, the architect or engineer is readily available to resolve problems and questions, which will inevitably arise during construction. In some cases,

(continued on page 8)

A Diversity of Buildings –A Diversity of Strategies

A successful rehabilitative program must take into account the specific needs of the structure, especially with regard to:

- Landmark status (national or local), and relevant rehabilitation restrictions
- Local building codes
- Primary function and tenant needs
- Surrounding community
- Budget

With these considerations in mind, a design professional tailors the rehabilitative program to suit each landmark or historic structure's unique situation.

Commercial Giant

The Bank of New York knows a thing or two about finances. So when it came time to address facade rehabilitation issues on their 52-story New York City headquarters at One Wall Street,



The master plan for this Art Deco landmark included masonry and roofing restoration, and rehabilitation of the 1,500 deteriorated steel windows.

built in 1932, and its 30-story annex, they wanted a budget-smart solution.

When the owners came to Hoffmann Architects, they complained of heat loss from the 1,500 original steel-frame windows but were unsure how to proceed. Other issues throughout the building were also troublesome and in need of work. Hoffmann Architects devised a four-year master plan to rehabilitate the exterior envelope, including masonry, roofing, and windows. Collaborating with historic and design organizations, window manufacturers, and the New York City Landmarks Preservation Commission, Hoffmann Architects helped the Bank of New York to identify and understand their options for the deteriorating windows.

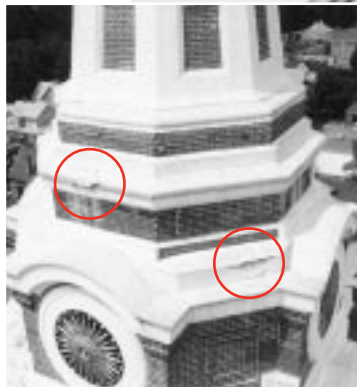
Small-Town Landmark

In the community of Naugatuck, Connecticut, the historic Congregational Church, designed by Stanford White in 1901, is the centerpiece of the town's architectural culture. When the brick and terra cotta steeple deteriorated to a dangerous condition, the Church needed a solution that could solve repair issues while still maintaining the aesthetic character so important to its congregation.

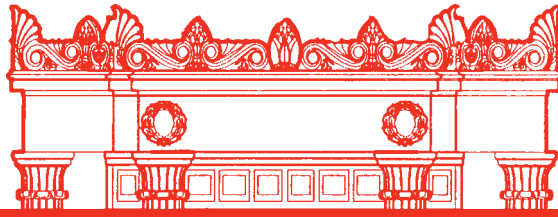
After previous repair methods failed, Hoffmann Architects was retained to investigate the cause of the problem. Based on the report from this study, the Church then asked the firm to find a lasting solution. The design team created plans for complete reconstruction of the spire using a new steel frame. This design ensured a

sturdier construction, adding many years to the life span of the structure. The team also replaced the brick/terra cotta of the original design with a brick/

precast construction to add further durability. The result: a steeple which looks like the original, but which will withstand many years more weathering. ■



The steeple of this Stanford White-designed church was rebuilt and then lowered intact by crane atop the existing structure. The new replacement adds durability and strength through a steel frame and brick/concrete construction.



REPRESENTATIVE PROJECTS

Historic and Landmark Structure Rehabilitation

As specialists in building envelope rehabilitation, Hoffmann Architects understands the concerns particular to a historic or landmark structure. Beginning with a thorough document review, the firm researches original drawings and specifications, as well as those for subsequent repair work. On-site probes, tests, and observations, as well as laboratory analysis of material samples, lead to an evaluation of existing conditions.

To remedy deterioration problems, such as loose or displaced building materials, leaks, and failing windows, the design team creates a program custom tailored to the needs of each individual structure. Community, building codes, function, and budget are all taken into account when organizing a plan of action. Hoffmann Architects are experts in working with historic and landmark preservation agencies to find rehabilitation solutions that meet aesthetic, historic, and economic goals.

Commitment to the historic or landmark building doesn't end at the drawing board. Hoffmann Architects offers full construction administration services to ensure that all work is carried out according to design, as well as to respond to last-minute changes.



The Guardian Life Insurance Company headquarters in New York City. (1911 D'Oench & Yost)



The Renwick Gallery, part of the Smithsonian Institution's National Museum of American Art in Washington, DC. (1859-61 James Renwick, Jr.)

The firm is there to see the project to a successful completion.

Among Hoffmann Architects' recent landmark or historic structure projects are the following:

President's House

Columbia University
New York, New York
1912 McKim, Mead & White

The Harvey S. Firestone Memorial Library

Princeton University
Princeton, New Jersey
1947 O'Connor and Kalham, Architects

Lockwood-Matthews Mansion Museum

Norwalk, Connecticut
1865-1869 Detlef Lienau

Vassar Observatory

Vassar College
Poughkeepsie, New York
1865

P.S. 196

New York City School Construction Authority
Brooklyn, New York
1923 William H. Gompert

Casa Italiana

Columbia University
New York, New York
1927 McKim, Mead & White

Asylum Hill Congregational Church

Hartford, Connecticut
1865 Patrick C. Keely

New York Stock Exchange

New York, New York
1903 George B. Post

Low Memorial Library

Columbia University
New York, New York
1897 McKim, Mead & White ■

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Part of the load-bearing wall, this intricate terra cotta element was handcrafted in the late 1800s. It was painted shortly after the turn of the century and then sandblasted some years later to remove the paint. The marred and pitted surface left by the sandblasting allowed moisture entry, leading to subsequent deterioration.

the owner may rely on the architect to serve as construction manager for the project, acting as the owner's advocate throughout the rehabilitation process and ensuring that budget, schedule, and design objectives are satisfied.

A Silk Purse

With the right guidance, landmark and historic structure rehabilitation need not be postponed due to anxiety, intimidation, or even tight budget. Beginning with a quality structure means better building materials and, with proper techniques, longer lasting solutions: a "silk purse" out of silk. The key is addressing underlying problems and thinking ahead to future effects. Through a well-designed program,

a historic or landmark structure can be rehabilitated to withstand many more years' weathering — without the headaches, or the sow's ear. ■

JOURNAL is a publication of Hoffmann Architects, specialists in the rehabilitation of building exteriors. The firm's work includes investigative and rehabilitative architecture/engineering services for the analysis and resolution of problems within roofs, facades, glazing, and structural systems of existing buildings, plazas/terraces, and parking garages.

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