

Project Profile

Franklin Institute, Franklin & Jordan Hall Renovation and Exterior Restoration
222 North 20th Street, Philadelphia, PA

Project Overview

Subcontractors: AAA - Metal Cleaning & Refinishing | Central Metals - Miscellaneous Steel | Eureka Glass & Glazing | The Gilder's Studio - Gold Leaf Gilding | Hispanic Painting | Majek Fire Protection - Sprinkler Systems | McCann Systems – A/V, Projection and Lighting Controls | Old Philadelphia - Cleaning & Pointing | Riteway Electrical | Shaffer, DeSouza Brown - Acoustical Panels & Motorized Shades | Visual Sound – Integrated Audio System

Please provide a complete and accurate overview of the project. Describe its purpose and scope. Provide specific statistics / details as you like.

In December of 2005, Congress authorized \$10,000,000 in grants for the rehabilitation and restoration of the Franklin Institute's Jordan Hall, Franklin Hall, and the Benjamin Franklin statue housed within. Sculpted by artist James Earle Frazer from 1906 to 1911, and designated as a National Memorial in 1972, the 20-foot statue of Franklin has attracted over three million visitors to the Museum since its dedication in 1938, and until the official start of restoration work in May of 2008, remained untouched for nearly 70 years.

As part of its "Inspire Science!" plan, the Franklin Institute awarded longtime partner C. Erickson & Sons the task -- and privilege -- of overseeing these historic restorations.

The project called for the a full historical refurbishment of the Franklin Hall interior, including protection of the marble flooring, as well as the Franklin statue itself, cleaning of all marble, limestone and pre-cast cement, restoration of bronze doors, grates, railings and gates, pane replacement for the four half-moon windows overlooking the Hall, pane replacement of the glass oculus at the peak of the 82-foot dome, and gold re-leafing around the oculus.

Additional to this work was the installation of a brand new audio-visual projection and lighting system, cutting-edge upgrades to not only illuminate the hall, but provide new educational presentations to visitors.

As the centerpiece of the entire project, the first and most important task was to protect the Franklin statue from the extensive work being done around it. Erickson, in conjunction with the historical curator and Facility Management Team were hands-on in the safety of the statue, which was enclosed within protective plywood for three months. Wisconsin-based Thyssen Krup Safway was responsible for the erection of a vast and elaborate scaffolding system around and above the encased statue, giving workers access to every inch and crevice of the Hall's dome.

Safeguarding of the historic Hall took place literally from the ground up, with the marble floor underfoot covered by a layer of protective insulation and plywood. Because the hall remained open as a passageway throughout for the duration, a public tunnel was constructed through the base of the scaffolding. Museum visitors were able to enter the museum by traveling up the iconic staircase from 20th Street, through the Jordan Hall lobby, beneath the scaffolding in Franklin Hall, and on into the Bartol atrium. Port holes in the plywood walls of the tunnel allowed visitors to witness the restoration as it was in progress.

Every inch of Franklin Hall's marble, from floor-level to a ledge approximately fifty feet overhead, was cleaned and re-pointed for the first time in years, and included the walls, columns, pilasters and cornices. A specially formulated product called Arte Mundit was used to clean the upper portions of the dome. Specified and approved by the project's historical conservator -- as were all products and techniques used during the cleaning -- this spray-on liquid was applied directly to the dome's surface, then peeled away like a rubber mask after curing for 24 hours. By this method, seventy years worth of acquired dirt could be easily removed without damage to the

dome's delicate, porous surface.

At the peak of the dome, the hall's inset oculus was wreathed by aging gold leaf. The re-gilding of the dome was done entirely by hand, using tissue-thin sheets of 24k gold leafing, each one layered onto the vertical surface by artisans at the topmost level of scaffolding. The oculus itself - a round glass and bronze lay light -- had each of its glass panes replaced, bronze mullions restored, and motorized horizontal shades installed, allowing multimedia presentations to be shown in the Hall during daylight hours.

Encircling the dome below the oculus are four enormous inset lunettes -- half-moon shaped windows. The interior panes of these lunettes -- 64 for each window -- were individually re-glazed with ClearSorber Panels, a special acrylic acoustical panel designed for use in large, heavily glassed areas. Part of the exterior renovations also included re-glazing of two of the four exterior lunettes, and the installation of vertical motor-operated shades. Additional acoustical upgrades included fabric-covered wall-panels on four sides of the hall, and on marble transoms above the Hall's four entrances.

The acoustics of Franklin Hall would become particularly important, as a major facet of the renovations was the installation of an entirely new audio-visual system.

Award-winning lighting designers Available Light equipped Franklin Hall with cutting-edge theatrical lighting and projectors, allowing the Hall itself to become a multimedia tribute to Franklin's life and achievements. Energy-efficient multi-colored LEDs and computer-controlled Vari-Lite luminaires installed complete the lighting detail, while a new Public Address and sound system provide the perfect audio accompaniment to the dazzling light show.

The project was important from more than just a restorative standpoint. The installation of the new lighting and audio-visual systems not only draws visitors into a far more interactive and educational experience, but highlights the true architectural beauty of the historic Hall itself: from Franklin's perch atop his impressive Seravezza marble pedestal, to the ornately painted plaster panels. Not just a passageway to other museum exhibits, the state-of-the-art audio-visual system has allowed this National Monument to become a dynamic tribute to Benjamin Franklin's life, writings, and contributions to science and society.

Each hour, during a three and a half minute presentation, "Benjamin Franklin Forever," LED lights illuminate the paneled dome in an array of colors and patterns, projecting the entire rotunda with longhand quotations, moving text, 3D graphics and even live-action video. Coupled with an original orchestral score blending 18th Century and contemporary styles, Franklin Hall is able to hold the senses rapt, utilizing every opportunity to both educate and inspire.

Marble cleaning and re-pointing was also carried out in the adjacent Jordan Hall lobby, and cove lighting additions were installed to dramatically illuminate the Hall's beautiful ornamental plaster ceiling. Antique bronze fixtures throughout both spaces were also restored, including Jordan Hall's decorative chandelier and sconces.

Not least among C. Erickson's restorative tasks was to clean and re-point the Franklin Institute's exterior. Although the joints in the limestone face were in generally good condition, 75 years of weather had taken their toll on the cornices and parapet. After consultation with the restoration consultant, the following steps were taken:

PARAPETS

Existing sealants were removed from all horizontal joints around the entire perimeter of the Science Center, and replaced with a lead "T" strip.

CORNICE

Existing sealants were removed from all horizontal joints on top of the cornice around the Central

Pavilion, and replaced with lead "T" strip. The top of the cornice, below the parapet's horizontal soldered joints, was sealed with lead flashing.

SITE WALLS

Re-pointing of all joints of on-grade stone walls, and reset displaced copings.

Mobile scaffold platforms were used to access all work on the Franklin Institute's facade.

Project Management & Timeliness

Please describe how the project was managed. If applicable, explain what best practices were used to manage the project. In addition, tell us how your team worked together to get the job done. How were you sensitive to the environment and the community surrounding this project.

TRAFFIC PATTERNS

An obvious concern of project management was foot traffic. With close to one million visitors a year, rerouting guests through key construction areas required ongoing attention and sometimes daily changes to traffic patterns. Clear, safe access was required for everyone entering, exiting, and passing through both Franklin and Jordan Halls, as well as adjacent areas that included the Grand Stairs, Atrium ticketing area, Franklin Cafe, Human Heart exhibit, handicapped entrances, and two sets of elevators.

Although the aforementioned tunnel through Franklin Hall acted as a main artery for visitors (as well as allowing them to have a glimpse of the work in progress), Erickson also created temporary, cattle chute-like passages, sometimes on a daily basis, to safely reroute the flow of traffic around targeted work areas.

SCHEDULING

There were three key issues in scheduling this project.

First and foremost, the opening date of the restored hall was published prior to the start of construction, making for a rigid fifteen-week project, with no room for extensions. The scaffolding alone took three weeks to install, using double shifts, and was removed again in Week 12, so that work on the marble floors and acoustical wall panels could be completed. The entire project was completed on schedule, in time for the annual conference of the Association of Science and Technical Centers, for which the Franklin Institute was the host institution.

Secondly, the state-of-the-art lighting system installed throughout Franklin Hall was completely custom, designed and implemented from scratch. This required many hours of detailed planning, communication and coordination with designers and installers, ensuring that the space could be measured and prepped, and lights could be fabricated, shipped, installed, and tested within the allotted timeframe, with slim allowances for errors in manufacture.

Third, scheduling construction work in so vast and vertical an environment provide its own unique challenges. All tradesmen were required to work off of scaffolding, with no one discipline able to work at the same time. Workers were kept to a strict, clockwork schedule, given a specific timeframe in which to complete their work, placing particular importance on efficient use of time. Completion of the work was sequenced from the highest point of the oculus, spiraling down to floor level, so that finished sections would not be exposed to dirt or debris from areas under construction above them.

SUBCONTRACTOR VETTING & EOP CONSIDERATIONS

There were two very important considerations in the selection of subcontractors. Erickson worked with the Franklin Institute to draft a carefully outlined EOP (Employment Opportunity Plan), ensuring that maximum number of minority-owned and minority-operated subcontractors and suppliers could benefit. From within this pool, selections were based upon factors relevant to

the delicate nature of the work, including knowledge of, and experience with, historical restoration, as well as the products used in such an environment. All subcontractors and vendors were carefully vetted before final decisions were made, ensuring a workforce both skilled and diverse -- a philosophy that would have no doubt appealed to Franklin himself.

Erickson remained committed to balancing the quality, historical, and EOP criteria of the selection process, and is proud to have successfully met all of the Franklin Institute's requirements for the project.

SAFETY - No injuries

Above all, the #1 priority for the project was safety. With the majority of the work completed high overhead, on towering scaffolds, there were an enormous number of safety issues that could have arisen. Erickson's Superintendent and Safety Manager made daily inspections of the project site, ensuring that all laborers, workspaces and practices were safe. Field personnel were required to meet with the safety staff to review the procedures prior to even stepping foot on the job site.

Despite the inherent dangers, Erickson's precautions and attention to detail ensured that the entire project was completed without a single injury.

Quality of Workmanship

Explain the level of workmanship / craftsmanship that went into the project.

The historical significance of the project, not only as a fixture of Philadelphia's culture and history, but as a National Monument, required the utmost care and attention to the materials and methods used throughout the restoration process: chemicals and cleaning agents were approved by restoration consultants Jablonski Building Conservation, Inc., before use on the actual surfaces, and techniques were scrutinized for sound practice and functional longevity before being employed. In particular, the consultant was able to choose every color of mortar for re-pointing, and evaluate and advise on the caulking of joints in the exterior limestone restoration.

From high-end theatrical light and sound designers and installers, to architectural advisors with an eye for both form and function, to the scaffolding specialists tasked with access the highest reaches of Franklin Hall, Erickson was proud to have selected the very best players in each of their respective fields.

Innovation in Construction Techniques or Materials

Explain special construction techniques, methods, and/or materials that were used on this project. If specific challenges arose as a result, how were they handled?

CHEMICAL PEEL

Arte Mundit, developed by FTB-Remmers, was the product used to clean Franklin Hall's upper dome, is based on a specially formulated latex dispersion which, during evaporation of the contained water, rubberizes into an elastic film. Once solidified, the film is then peeled off, taking with it any dirt accumulated onto the surface. This negates the damage or erosion that could otherwise be done to delicate surfaces, such as marble, concrete or plaster.

SCAFFOLDING AND VISITOR TUNNELS

Thyssen Krupp Safway was instrumental in making the high reaches of Franklin Hall's 82-foot dome accessible to every team member. An elaborate series of scaffolding, not only made the most lofty work possible, but safe as well. The scaffolds provided a secure, elevated workplace for all team members laboring overhead, as well as allowing museum visitors to safely pass through Franklin Hall. The complicated network of stairs, platforms and supports was truly a sight to behold.