

From Metal Foundry to Design House

Transformation of the Philadelphia Naval Shipyard

Philadelphia, PA

Submitted by Sika Corporation

The country's first naval shipyard dates back to the birth of the nation in 1776, when the Continental Congress leased land along the Front Street docks in Philadelphia to help house the new country's budding navy. Around 1801, the area became an official part of the U.S. Navy but was then moved to its current location on South Broad Street around the time of the Civil War.

During the 1990s, the requirements from the Navy were changing and the base realignment and closure announcements heralded the closing of nearly all naval activities at the yard except for a few key functions, which remain open to this day.

Today, the yard has been transformed into a sprawling business center, occupying 1200 acres (4.86 km²), and is home to 11,000 employees working for 143 companies in office, manufacturing, and research sectors. The 6.5 million ft² (604,000 m²) of usable real estate space is a combination of historic and all-new, high-performance LEED-certified construction projects.

THE PROJECT

As part of this shipyard revival project, Urban Outfitters (URBN), an apparel company, chose a very old section of the yard to be their new company headquarters. The new location, Building 18, was a former boiler and blacksmith shop, built around 1909.

Since this project is located within a Historic District, it was intended by the owners to comply with the standards set forth by the National Park Service Technical Preservation Service. The Technical Preservation Service outlines procedures for the restoration of historic buildings in areas such as repair mortars, heating and cooling, and concrete preservation, all of which were dealt with on this project.

BUILDING 18—FROM METAL FOUNDRY TO DESIGN HOUSE

Building 18 of the naval shipyard is a masonry structure. This 92,000 ft² (8550 m²) building will be the 11th building in URBN's portfolio at The Navy Yard. Building 18 was formerly a metal foundry and



The only cross-shaped building in the naval shipyard

is interestingly the only cross-shaped building at The Navy Yard, from a bird's-eye view.

The architects had several guiding principles for this ambitious and unique project. They wanted to create an environment that embodied the essence of URBN and its retro-chic merchandise. So rather than stripping the shipyard buildings clean, they decided to preserve the scars which the Navy had inflicted through a century of improvised modifications and expansions.

It was the intent of the design arrangements with the owner and the Historic Preservation Society that some of the old paint remained on the walls and ample material was reused; stairs were fashioned from wooden beams and windows were removed, reglazed, and reinstalled.

OVERALL SCOPE OF THE PROJECT

After the site was selected, a condition assessment was done to understand what was needed to bring this structure back to a service condition that met the current design codes.

The overall scope of the work included:

- Exterior and interior system renovations;
- Exterior brickwork restoration;
- Structural components, exterior envelope, and building connections;
- New interior systems; and

- Upgrades to mechanical, electrical, and fire-protection systems.

Anywhere that the existing building was not in compliance to the most recent building codes had to be addressed as well.

CONCRETE REPAIR STRATEGY

One of the main areas in major need of repair was the cinder concrete roof slab, which was showing obvious signs of corrosion. Spalling, corrosion, and lack of strength to meet the current code were some of the problems that had to be addressed. In addition to making the visible concrete repair, this decision was made to address the corrosion for long-term protection, even in areas that had not yet spalled. These areas, if left unaddressed, would definitely have failed in the future.

After the incorporation of a corrosion treatment plan, the necessary concrete repairs could be made. The final step was to apply a protective, decorative coating for long-term protection.

SPALL REPAIRS

Prior to any repairs, the existing coating had to be removed. Once the roof was stripped, a survey of spalled area was conducted to determine the limits of unsound or delaminated concrete. The repair areas were extended a few inches outside the loose or spalled concrete until sound concrete was reached.

CORROSION MITIGATION

The entire roof, approximately 50,600 ft² (4700 m²), was treated with a surface-applied corrosion inhibitor. This application was done with a sprayer.

STRUCTURAL STRENGTHENING

The roof was structurally strengthened by putting up two layers of high-strength carbon fabric in conjunction with a suitable epoxy material. The wraps were applied using a wet layup method. Prior to the installation of the fabric, any bugholes or surface defects were fixed with a paste epoxy to provide a flat surface for the fiber-reinforced polymer material to make intimate contact. The contractors had to overcome the challenge of installing all of the carbon fiber overhead and from a high reach. Due to the aggressive construction schedule of this project, they were also forced to work around other trades working in the same areas during the entire project. Once the installation of the two layers of carbon fiber-reinforced polymer was completed, a protective acrylic coating as applied on the surface to give it protection and a pleasing finish. A total of 22,600 ft² (2100 m²) of fabric was used to strengthen the roof slab.

MASONRY REPAIRS

Building 18 was a masonry structure. The façade was also going to get a facelift. Some of the work



Inside Building 18 before the renovations



Installation of carbon fiber wrap



Removal of damaged masonry

that was included in the scope of this transformation included:

- Spot pointing of brickwork, carefully done to reuse all brick wherever possible. A 4 x 4 ft (1.2 x 1.2 m) mockup area demonstrating the means, method, and material to be used was required, and had to be approved prior to the start of any work on this job.

- 100% repointing around window perimeter and joints between dissimilar materials such as brick and granite base-brick and terra-cotta.

TERRA-COTTA PATCHING

Any area that required terra-cotta patching or removal had a very controlled approval process. Initial investigation for inspection had to be performed by the contractor but the decision to replace or repair was taken after input from the architect and the owner. A carefully laid-out procedure was followed to repair and replace the sections identified. All terra-cotta patching was done using a mineral-based terra-cotta and brick repair mortar. This single-component, cementitious, mineral-based mortar is completely vapor-permeable and contains no latex or acrylic

bonding agents or additives. This material is specifically engineered for compatibility with oven-fired materials to provide a permanent repair, which both enhances and protects the original substrate.

EFFLORESCE CLEANING

The building façade was cleaned from efflorescence with due care taken to safely clean the historic masonry without damage or deleterious effects. This was accomplished using a chemical cleaner formulated for brick masonry.

SEALING

Extreme attention was paid to joint sealing details. Existing sealant was removed and resealed with an approved sealant for the following connections:

- Terra-cotta coping joints;
- Damaged overlapping lugs and cracks;
- Repair of terra-cotta sill joints; and
- Repair of overlapping lugs and cracks as required to ensure a watertight seal.

OTHER REPAIRS

Stucco sections were patched and coated for uniformity and aesthetic value. All brick replacement was done to match adjacent brick and required the approval of the designated consultant from the historical preservation agency.

THE FINAL PRODUCT

The vision of the owners in conjunction with the concrete repair and masonry solutions were able to redesign a century-old structure to make it home to one of the iconic brands of our time—a building housing a metal foundry retooled to a workplace where imagination and ideas will flow for many more years to come.



Repair of masonry in progress



Urban Outfitters' Anthropologie design house in use after restoration

Metal Foundry to Design House

OWNER
Urban Outfitters
 Philadelphia, PA

PROJECT ENGINEER/DESIGNER
Bala Engineering
 King of Prussia, PA

REPAIR CONTRACTOR
Masonry Preservation Group, Inc.
 Merchantville, NJ

MATERIAL SUPPLIERS/MANUFACTURERS
Sika Corporation
 Lyndhurst, NJ
TB Philly
 Phoenixville, PA