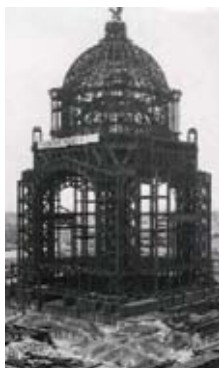


REHABILITATION OF THE MONUMENT TO THE REVOLUTION IN MEXICO CITY

EDITED BY KELLY M. PAGE



Structure of the Monument to the Revolution

Fondo Casasola/núm. Inv. 88713, 1930. CONACULTA – INAH, Sistema Nacional de Fototecas

The Monument to the Revolution is a landmark and monument commemorating the Mexican Revolution of 1910. The structure was originally designed to be the Legislative Palace. The Palace was commissioned by President Profririo Díaz and designed by the French architect Émile Bernard. The structure was originally designed with a large central dome and adjacent wings serving as the Legislative Chambers. The first stone for the building was placed by the president himself in 1910.

As the building was being erected, however, the Mexican Revolution of 1910 was on the verge of beginning. The revolution would last over 2 years and would eventually overthrow the dictatorial rule of President Díaz. With the revolution in full swing, the construction of the Legislative Palace was suspended. The structure was abandoned with just the central steel structure erected due to a lack of resources. The incomplete structure was further damaged from a strong earthquake in June 1911.

In 1928, the Mexican architect Carlos Obregón Santacilia proposed to use the incomplete structure to erect a monument to the recently concluded Mexican Revolution. A massive monument repre-

sentative of the Art Deco style popular in the 1920s was proposed. The modifications and construction of the proposed monument took place between 1933 and 1938. The resulting structure consists of four large pillars that support a central dome with a total height of 220 ft (67 m). This is the central portion of the original design for the Legislative Palace. The adjacent Legislative Chambers were never constructed.

Years after its completion, the monument was also converted to a mausoleum for the remains of the main figures of the Mexican Revolution. A Revolutionary Museum was later constructed in the basement in 1986. The monument is located in Republic Square in downtown Mexico City.

THE PROBLEM

The underlying structure is made of structural steel framing the four pillars and the central double-walled dome. The steel skeleton is covered by architectural stone blocks and the cupola is formed with concrete. The concrete-domed cupola is covered with copper plates.

The structure suffered from long-term exposure to pollution in Mexico City. Furthermore, since



Copper roof cover removal



Crack injection

1986, little or no maintenance of the structure was performed. Consequently, the state of the building deteriorated. Cracks in the dome structure resulted in leaks through the roof. During rainy periods, leaks persisted through the roof into the interior of the building where visitors to the mausoleum and historical museum passed through. The conditions rendered the building nonfunctional; thus, it was visited less and less.

A renovation of this historic landmark was planned to restore the structure to its original splendor in time for the 2010 centennial celebration of the Mexican Revolution. The current mayor of Mexico City, Marcelo Ebrard, was scheduled to officially reopen the Monumento a la Revolución on November 20, 2010, during the centennial celebration. Thus, the repairs to the building had to be conducted quickly to meet this strict deadline.



Waterproofing cupola's interior

SCOPE OF THE REPAIR WORK

The scope of the repair work included:

- Removing and salvaging the existing copper roofing plates;
- Removing unsound concrete in the cupola concrete lining and on the observation deck level;
- Restoring the damaged portions of the concrete section;
- Epoxy injection of cracks through the dome;
- Installation of a waterproofing system over the concrete dome and over the observation deck floor;
- Putting back the refurbished copper roof plates; and
- Repair and protection of the façade stones.



Leveling slopes with premix mortar

THE SOLUTION

The concrete repairs, epoxy injection, and waterproofing on the top side of the dome all presented some unique challenges given the ever-changing slope of the domed roof. The unsound concrete was removed from the exterior of the dome and replaced with a prepackaged shrinkage-compensated repair mortar. Cracks were sealed and injected with a low-viscosity injection (LVI) epoxy. Once the repairs were complete, the surface of the dome was prepared to the appropriate profile to receive a waterproofing membrane. The membrane selected was a 100% solids, spray-applied polyurea. This material was selected in part because it could be readily placed on the sloping exterior of the dome, but it was also selected based on its temperature resistance. The membrane was required to resist service temperatures of 194°F (90°C) that were estimated to be present in summer months between the copper roofing plates and the concrete.

In addition to the exterior repairs and waterproofing, the interior of the cupola received a cement-based acrylic coating and the joints were



Waterproofing application of the cupola



Waterproofing membrane on observation deck

sealed with a polyurethane asphalt-modified sealant. The copper plates that were removed were cleaned and polished before being reinstalled on the roof of the cupola.

The concrete floor on the observation deck at the base of the cupola was also repaired with a leveling prepackaged mortar. The deck was properly sloped

and coated with a polyurethane waterproofing membrane system.

A SUCCESSFUL RENOVATION

Repairs to this historically significant structure posed many challenges. Executing proper repairs and waterproofing details under difficult access conditions proved difficult. With the restorations complete, however, this renewed structure is able to continue to proudly commemorate this important moment in Mexican history. And, importantly, the restorations were completed in time for reopening the structure during the centennial celebrations on November 20, 2010.



Finished project

Photo courtesy Matthew Rutledge

Monument to the Revolution

OWNER

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Mexico City, Mexico

PROJECT ENGINEER

Megarquitectos
Chimalistac, Mexico

REPAIR CONTRACTOR

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MATERIAL SUPPLIER

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