



CARMEL MISSION FOUNDATION

Carmel Mission Basilica Restoration Report June 2013

Funded by the Carmel Mission Foundation, the \$7.2 million restoration of the Carmel Mission Basilica was completed in June 2013. The project began in 2008, when Fr. John Griffin, recognizing the need to restore the Mission complex, commissioned a study to determine the condition of the existing buildings.

This study revealed the historic buildings were in critical need of repair and restoration. One of the primary and most essential needs was to stabilize and waterproof the exterior of the Basilica. Its massive stone walls had cracks and spalls, and were suffering from moisture damage, either from a lack of a protective plaster coating, or from existing cement plaster, trapping moisture between the plaster and the walls. There were also many instances of severe deterioration of historic lintels and roof framing.



Newly restored Carmel Mission Basilica – June 2013

Background

The Carmel Mission (Mission San Carlos Borromeo del Rio Carmelo) is a National and State Historic Landmark, and one of the primary economic engines for the Monterey Peninsula, drawing thousands of visitors from around the world. Founded by Junípero Serra in 1771, it was the second of nine missions established by him, and the headquarters of the California Mission System. In 1784, he passed away at Carmel and, in accordance with his wishes, was buried at the foot of the altar.

Construction on the stone church, now a Basilica, began about ten years later, literally above his grave, and was completed in 1797. At the same time, adobe buildings were constructed to enclose the Mission courtyard on all sides. The architecture of the Carmel Mission is significant, as the Basilica is one of the few stone mission churches in California. It is constructed of sandstone, faced mostly with sand-colored plaster. Measured on the inside, the nave is 150 feet by 29 feet. The 220-year-old walls are approximately five-feet thick at their base. The interior of the Basilica is unique among mission churches because of its wooden tunnel vault ceiling, shaped in the form of a reverse catenary arch, spanning 29 feet. The church features distinctive Moorish details like the star-shaped window on the front façade and the Moorish dome. The planks forming the vault are supported by three transverse faux stone ribs carried on pairs of Doric pilasters, or rectangular columns, projecting from the interior wall and reflected on the exterior of the Basilica at these points by large stone buttresses.

The stone church was significantly altered around 1815, when the stone vaulted ceiling was dismantled for safety reasons. The stones were then used to construct a side chapel, today the Bethlehem Chapel, and an outside stairway to the bell tower. The missions were secularized in 1834 by the new Mexican government. Mission lands were sold and the Carmel Mission was abandoned. In 1852, the roof collapsed. Meanwhile, in 1850, California became the 31st state, with its capital initially located in Monterey. The Carmel Mission was returned to the church by President Buchanan in 1859.



Carmel Mission Basilica circa 1880s

The first restoration of the Mission occurred in 1884, putting a Gothic style roof on the church, which was the fashion at that time. The second restoration of the Mission was begun by Harry Downie in the 1930s, and the Gothic style roof was replaced in 1937 with the present roof, more in keeping with the church's original design. In 1961, Pope John XXIII honored Carmel Mission's church by designating it a Minor Basilica. The Mission was designated a National Historic Landmark in 1962, and was listed on the National Register of Historic Places in 1966.

Third Restoration - Challenges

The third major restoration of the Carmel Mission commenced in 2008. This multi-year/multi-million dollar restoration program is divided into four phases, with the Basilica's restoration representing the initial phase. Several significant challenges were associated with its restoration. First, as a non-reinforced masonry building, the Basilica had to be seismically retrofitted, but without changing its appearance. Secondly, the Basilica had to remain in continuous operation

during the restoration process for masses, weddings, funerals and other services and events. Another challenge was protecting the ceiling from the elements while the roof was removed. Carmel has about a five-month window (June to October) with generally dry weather. Therefore, roof removal and reinstallation had to occur during this window of opportunity. The final challenge was coordinating the timing of the project with fundraising, so that sufficient funding would be available when needed.

Carmel Mission Foundation

Funding responsibilities fell to the Carmel Mission Foundation. The Foundation was formed in 2008 as a 501(c)(3) non-profit organization solely for the purpose of restoring and preserving the historic properties and artifacts of the Carmel Mission into perpetuity. It is totally independent from the church. Fundraising started with the receipt of a \$650,000 matching grant from the National Parks Service, Save America's Treasurers Program. In conjunction with the Basilica restoration, the Foundation raised over \$6 million in cash and pledges from Carmel Mission parishioners, the local community and beyond, and from public and private foundations.

Basilica Restoration

The Basilica phase of the Mission's restoration program was divided into two parts: (1) the \$5.0 million seismic retrofit to strengthen the walls and roof; and, (2) after additional funds were raised, the \$2.2 million restoration of the exterior walls, buttresses, towers and dome, plus infrastructure upgrades to include new electrical, lighting, and fire suppression systems, and a new boiler for the radiant heating system. Phase I also included a new Americans with Disability Act (ADA) compliant restroom building and walkway ramps.

Project Team

To manage this project, a team was formed consisting of representatives from the Carmel Mission; the Carmel Mission Foundation; Blach Construction, the general contractor; and Franks Brenkwitz and Associates, architects of record. In choosing the general contractor, one of the key criteria was that the contractor be an advocate for the project. Looking back on the Basilica restoration project, this team was outstanding in their effectiveness, communication, and especially their cooperation with each other. As a result, the project was a complete success, coming in significantly under budget, in record time, and with no lost time accidents.



Weekly project team planning meeting

Master Planning

Following organization of the project team, master planning commenced. Research was conducted to gather historical photos and information about the Basilica's construction. A land survey was made to document the Mission's buildings, their relationship, and landforms, including topography. A hydrology study was conducted to measure groundwater, its sources and drainage patterns, and to identify potential hydrological problems, such as wall or floor dampness. A structural engineering firm was retained to address structural shortcomings, the lack of reinforced masonry walls, and the wooden roof. As the Mission is both a National and State Historic Landmark, a preservation architectural firm was hired to guide the project team through the process of dealing with the federal and state agencies. Additionally, the Save America's Treasures grant from the National Park Service triggered the need for compliance with additional governmental regulations and reporting. All of this had to be factored into the planning and cost. The Basilica's entire infrastructure was evaluated, including the electrical, plumbing, communications, 74-year-old floor radiant heating, and fire protection systems. Construction drawings were prepared and permits, agency, and governmental approvals were obtained.

The general contractor then began work on a constructability review, worksite accessibility and logistics, plus a plan to accomplish the work without affecting the Basilica's day-to-day operations. Efforts also began to locate and hold special order materials.

Restoration Process

The plan for the \$5.0 million seismic retrofit was to strengthen the Basilica walls by inserting over 300 steel rods into horizontal and vertical cores and then grouting them into place; and, to strengthen the roof structure with additional wood beams, cement bond beams, steel I-beams, and metal collectors.

By July 2012, the Foundation had raised the needed \$5 million to start the seismic retrofit. As a result, work commenced in August with the construction set-up. This involved erecting safety fencing around the



Scaffolding and tile platform on south side of Basilica

Basilica and constructing an entrance tunnel to provide safety for the public, while work was being performed overhead. Artifacts were wrapped for protection, and scaffolding was erected around the south, west, and north sides of the Basilica. Work on the east side, or front façade, was accomplished using a knuckle-boom lift, which was moved into place when needed. A

decision was made to store the removed roof tiles at roof level versus storing them on the ground in order to reduce labor and breakage. As a result, two elevated storage platforms were erected, one on the south side, and one on the north side of the Basilica.

In September, the scaffolding and the roof tile storage platforms were completed. Roof tiles were then removed and stored on the platforms. Concurrently, horizontal core drilling on the west buttresses commenced.

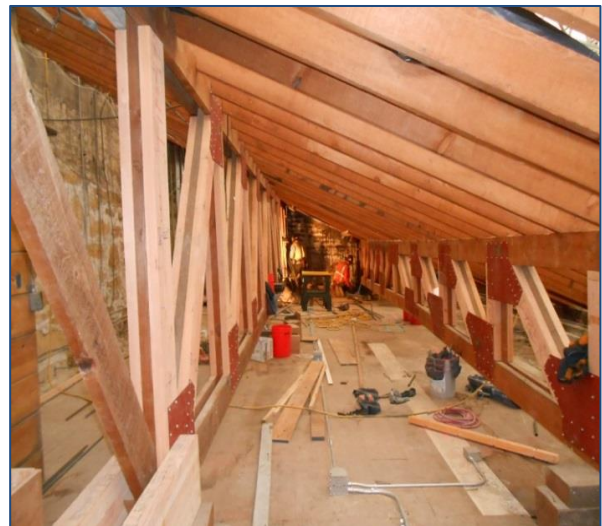
Because of the uncertainty of the five-month weather window, it was decided by the team to erect a weather protection structure, which would completely cover the top of the Basilica. Though this would be expensive, it would allow the project to commence in the fall of 2012, versus waiting until the spring of 2013. Furthermore, having this protection over the top of the Basilica would mean that work could continue into the winter on a daily basis, regardless of weather conditions, while the ceiling would remain protected. Factoring in



Installing weather protection structure over Basilica

the loss of productivity due to having to cover and uncover the roof daily with tarps, plus delays due to weather, the weather protection structure was considered a cost effective and prudent alternative. The weather protection structure was erected in October on top of the existing scaffolding and anchored to the ground by heavy cement K-rails, used for vehicle traffic dividers, and by the weight of the two tile storage platforms.

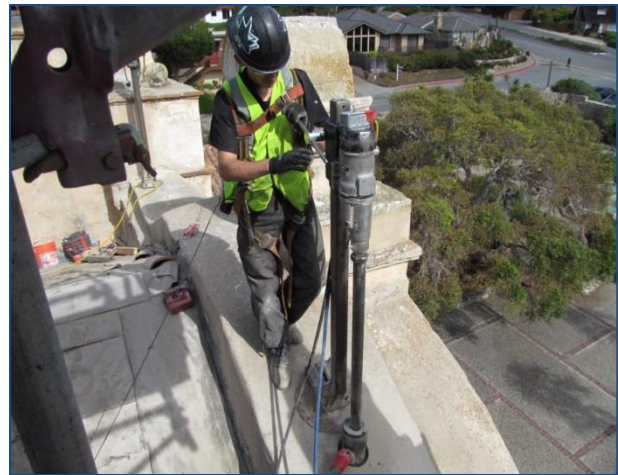
October also saw the start of roof strengthening work with the removal of the old Douglas fir roof sheathing. However, not all sheathing could be removed at the same time, as it could destabilize the walls of the Basilica. Using new laser imaging technology, measurements had been earlier obtained in the attic, thus allowing many of the new wooden beams and metal collector plates used for strengthening the roof to be precut or prefabricated. Meanwhile, electricians started working to replace the Basilica's electrical system. Work also began on installation of the copper piping for the fire suppression system. Though copper was more expensive, it was chosen to provide a longer system life.



Strengthening roof trusses above the sacristy

November saw the installation of steel I-beams to better tie the Basilica structure together. The drilling of vertical cores into the walls was followed by inserting steel rods and grouting them into place. Installation of new electrical panels, plus conduits for electrical power, lighting, and fire alarm systems continued. The first phase of shotcrete (concrete conveyed through a hose at high velocity) bond beam installation began in order to strengthen certain portions of the Basilica's walls and towers.

In December, drilling of the 300+ wall cores continued, as did seismic strengthening of the roof with installation of additional wood beams and metal plate collectors to strengthen trusses, wood blocking to separate and strengthen rafters, and metal plates to tie rafters to the walls. Once all work beneath the roof was completed, new roof sheathing installation could begin. Unlike the Douglas fir planks that had been removed, the new sheathing consisted of specially treated 4-foot by 8-foot plywood sections, which would better distribute lateral earthquake forces. In addition, work began on the new ADA restroom building.



Core drilling on the front façade

At the end of December, the project team explored the possibility of shifting forward the planned \$2.2 million in exterior repairs and infrastructure upgrades, at that time estimated to be about two-to-three years out into the future, pending additional fund raising. If this work could be moved forward and begin quickly, there was the possibility of saving over \$1 million of the \$2.2 million projected cost. This could be accomplished by utilizing the existing scaffolding and contractor infrastructure already in place for the seismic retrofit, not to mention avoiding the escalation of labor and material costs over the next few years. To realize these savings, the Foundation first needed to quickly raise about \$1 million in January, as this potential overlap window was closing daily. Due to the enormous generosity of a few Foundation supporters, the additional funds were raised, which enabled the team to realize a savings of over \$1 million on the Basilica restoration.

In January 2013, a shotcrete bond beam collar was constructed around the inside perimeter of the south bell tower just below the bell window openings in order to strengthen the tower, which carried the heavy weight of the dome above. Special core drilling in the Basilica walls allowed conduit to be run for electrical wires, so they were not exposed on outside wall surfaces.

February saw the completion of the new roof sheathing installation, thus enabling the weather protection structure to be removed. Meanwhile, epoxy repair of the redwood eaves and other exposed wood surfaces began.

In March, the roof tiles were reinstalled. Trenches were dug to bring in from the street the needed underground service and utilities to support the new restroom building and the Basilica fire suppression system. New ADA ramps were constructed and repairs were made to existing stairs and sidewalks to provide a safer and more accessible environment.

From the additional funds raised in January by the Foundation to accelerate the last part of the Basilica restoration, work was able to commence in March on exterior fabric repair to the walls, buttresses, towers, and dome. However, before starting, special restoration techniques and materials had to be developed that were in keeping and compatible with existing Basilica materials.

In April, exterior restoration work continued, shifting to the towers and dome, and new rain gutters were added. Inside, a new lighting system, together with new chandeliers, was installed. The chandeliers were custom made, based on images of chandeliers hanging in the Basilica during the 1940s. The old boiler for the radiant heating system was replaced with a new boiler, which reduced pressure, thus prolonging system life and increasing energy efficiency. By the end of April, most of the exterior scaffolding had been removed.

In May and early June, the focus was primarily on finishing exterior restoration work closer to the ground. Additional work involved site cleanup, power washing walkways and courts, preparing the flowerbeds for future landscape work, and the installation of handrails for the new ADA ramps. The wood floors in Crespi Hall, used by the contractor for an office and staging area, were refinished and its parking lots repaved. Finally, the safety fences were removed and the entire construction site was reopened to the public.

Conclusion

As a result of all of these efforts, the Basilica is now three times stronger than it was before. All work performed and materials used were with the expectation that it would be 70 to 100 years before the next major Basilica restoration was needed. The appearance of the exterior restoration work is outstanding; yet, the Mission kept its historic look. Based on the numerous complements received, the public seems very pleased with the restoration results.



Reinstallation of roof tiles, while dome restoration is underway

The Mission continues to be a primary economic engine for the Monterey Peninsula. November 25th of this year is the 300th anniversary of Junípero Serra's birth. We are pleased to have been able to complete the Basilica's restoration in time for Serra's Tricentennial, and the increase of worldwide visitors expected for this very important year.

Next Phase

Phase II of the Mission's restoration program addresses the Mission's multiple museums. Included are seismic retrofits, infrastructure upgrades, as well as facility and courtyard improvements for better visitor traffic flow. We plan to enhance the museum experience by telling the story of the Carmel and Alta California Missions and their significant impact on California's history, through improved museum displays, better descriptive information, and state-of-the-art technology.



Oldest library in California in the Convento Museum

This next multi-year/multi-million dollar project will need help from those who are parishioners, from our friends in the larger community, including public and private foundations, and from visitors worldwide. Planning by the project team for Phase II is now well underway.

Thank You

To all of the donors whose generosity has made this Basilica restoration possible, we extend to you our utmost appreciation. Our goal now is to complete the remainder of the Carmel Mission restoration work, so that with your help, this historic treasure will be restored and preserved for the enjoyment of future generations.

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