

The Cathedral of Christ the Light

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ABSTRACT

This paper and presentation addresses the design of The Cathedral of Christ the Light which will serve as the Diocese of Oakland's new multi-use facility replacing the historic St. Francis de Sales Cathedral damaged in the 1989 Loma Prieta Earthquake. The paper focuses on the unique technical and structural engineering issues addressed during the development of the project architectural design concept. The facility program includes a 1500 seat main Cathedral sanctuary, as well as, a mausoleum, parish hall and offices, Diocese chancery offices, a conference center, the Bishop's rectory, a library, café and parking for 200 cars with a total occupied area of 252,000 square feet. The paper will present the overall design of the project including the development of the structural design concept of the Cathedral superstructure, as well as, significant aspects of the Cathedral's structural analysis, design, peer review and construction.



The Cathedral incorporates a highly innovative use of modest materials including glu-laminated timber, exposed reinforced concrete, high strength steel, aluminum and glass to provide lightness and luminosity into a symbolic form. Located 4.7 km from the Hayward Fault adjacent to Lake Merritt in Oakland, the 120 foot-tall main Cathedral sanctuary is seismically isolated and designed to resist a 1000-year earthquake without damage. The geometry of the Cathedral is derived from Vesica Pisces motif and concepts using intersecting spheres to create an efficient structural form. Advanced computer modeling techniques were used to capture the behavior of seismic isolation combined with the glu-laminated superstructure interconnected with pre-stressed high-strength steel rods and timber compression struts supported on a base of reinforced concrete reliquary wall and sanctuary floor structure. SOM undertook additional nonlinear analysis modeling to assess the unique structure's ability to resist strength and ductility demands beyond maximum considered earthquake levels. Construction of the complex is nearly complete with an opening dedication scheduled for September 2008.