NATIONAL WINNER

$10M OR GREATER, BUT LESS THAN $25M

UCSF Mount Zion Outpatient Cancer Center

SAN FRANCISCO, CA

JUROR COMMENTS:

Creative use of AESS to form framing for bay windows, canopy and skylights.

STRUCTURAL ENGINEER
Degenkolb Engineers,
San Francisco, CA

ARCHITECT
SmithGroup, San Francisco, CA

STEEL FABRICATOR AND STEEL DETAILER
Gayle Manufacturing,
Woodland, CA (AISC member)

STEEL ERECTOR
California Erectors,
Benicia, CA (NEA member)

GENERAL CONTRACTOR
ProWest PCM, Inc., Temecula, CA

SOFTWARE
ETABS

PHOTOS
Michael O'Callahan 2001

The Mount Zion Outpatient Cancer Center contributes to the University of California San Francisco's (UCSF) goal of uniting renowned cancer scientists, clinical researchers and cancer care specialists in a cooperative and open environment. The new building serves an integral role as part of the Comprehensive Cancer Center, with a goal of facing the challenges posed by cancer through research, care and prevention. The UCSF Comprehensive Cancer Center is the only National Cancer Institute designated center in Northern California, an appointment that acknowledges its broad range of services linking cancer research and patient care.

The building is five stories above grade with two levels below grade. The sub-basement and

basement contain the radiation oncology department, and the first floor provides waiting areas and public amenities. The second floor houses a breast care center, with cancer-related clinics on floors three and four, and an infusion center on the fifth floor.

Designing a building with such an important purpose without intimidating patients created a challenge. The architect desired an "open" building that appeared delicate yet "strong and deliberate" that would be intuitive to use. Another challenge was integrating operating hospitals located on two sides of the site with the new building. A design with steel and glass elements weaving throughout the building, forming bay windows, canopies, trellises, sunshades, skylights, and the main lobby formed the desired solution.

Degenkolb met all challenges, designing each structural element to meet the vision of the architect and owner. Arching glass canopies form the new front entrance, held aloft upon efficient architecturally exposed structural steel pipe with pretensioned stainless steel rod bracing to limit deflection and resist lateral loads. The larger canopy and vestibule at the north end of the drop-off leads the visitor to a two-story garden lobby covered by a skylight supported on slender steel pipe columns and arches. In a subbasement waiting room, an ocular skylight gives views of the sky. A tube steel framework supports this skylight near the main entrance. The cylindrical structure, with its successive rings, and the playful, slanted plane of the glass itself, grant unexpected levity and grace to the building's exterior.

To meet the open space and flexibility desired by the team, the UCSF Mount Zion Outpatient Cancer Center was one of the first buildings to utilize an unreinforced Reduced Beam Section (RBS) Special Moment Frame (SMF) following the 1994 Northridge earthquake. With a structural design based on early FEMA/SAC documents, the 1997 design meets requirements set forth in the newly released documents from 2000/2001. The base of the building contains four Linear Accelerator vaults for patient treatment that required very thick walls and a proper ceiling structure for shielding. In addition, most walls also required the use of thick steel plate for complete radiation shielding between spaces. The layout of the building demanded that the basement step outside (under the sidewalk) of the exterior wall, forcing the design to transfer the perimeter moment frame. Through careful planning and coordination, Degenkolb was able to design and detail a portion of a required shielding element as a transfer beam for over seven levels of SMF columns.

Another desired element of the building was the use of bay windows, a signature feature of many San Francisco Bay Area buildings. The architecture, however, demanded a very thin sandwich in which to place the structure. Instead of the common cantilever steel framing typical of these conditions, Degenkolb designed the metal deck composite slab to cantilever outboard of the framing over 4′. Deflections and vibration performance were controlled by adding a tube steel "tie" column floor to floor, carefully hidden in the mullions of the window system.

Structural work also included the retrofit of the concrete shear wall building (Building B, directly east of the new building) using an exposed special steel concentric braced frame employing zipper columns for enhanced ductile performance. Degenkolb was also retained to design the structural portions of the remodel, shoring and underpinnings of the adjacent, fully functioning acute care facilities. As part of the shoring design, steel soldier beams with tie-backs were placed in cased drilled holes with wood lagging set between adjacent soldier beams. Due to the limited space between the adjacent structures, Degenkolb designed the soldier beams to function as the pile foundation of the exterior steel frame retrofit to the existing hospital. This method saved material, but more importantly, saved time and limited the disruption to the functioning hospital. To phase the multiple stages of work, this "project" was actually comprised of five different projects, with all structural work designed by Degenkolb, and all consisting of significant and innovative structural steel solutions.