



Nabih Youssef

Pioneering Seismic Pacesetter

By Richard G. Weingardt, P.E., Dist.M.ASCE, F.ACEC, D.Sc.h.c.

Since its founding in 1989, Nabih Youssef Associates (NYA) has become an internationally recognized consulting firm providing specialized structural and earthquake engineering services for both new and existing buildings. As a leader in implementing state-of-the-art technologies, NYA's contributions to the development of earthquake engineering codes and standards and performance-based design has made possible numerous elegant, cost-effective and leading-edge structures.

The firm's founder, Nabih Youssef, pioneered the concepts of performance-based design – refinement of the idea that buildings should move with earthquakes, not resist them – and of base isolation to protect structures seismically. Incorporating base isolation techniques into the design of the Cathedral of Our Lady of the Angels has given its structure a projected service life of 500 years.

Youssef used innovative steel-plate shear walls, instead of thick concrete shear walls, to provide the lateral strength for the 55-story LA Live! Hotel and Residences Tower in downtown Los Angeles, the first high-rise building in the city to have such a system. It reduced the weight of the structure by 30 percent, shortened the project's construction timeline and made available more window space. The thinner (1/8 inch) steel-plate shear walls also allowed for more rentable floor space – approximately 750 square feet extra per floor, and roughly 20,000 square feet total.

Nabih was born on May 29, 1944 in Cairo, Egypt, to Fouad and Amira Youssef. He was the third child of five boys and one girl and grew up in an upper-middle-class family within an ethnically, religiously and linguistically diverse community, which he described as a "Mediterranean culture." Nabih's father, from a large family who were mostly owners of large farms, was educated in the American College and held a government position with the interior ministry.

Following in the family tradition, Nabih attended French Catholic School. In his youth and early adulthood, he enjoyed

athletics and cultural activities, and was an active member of the YMCA as well as other sports and leadership programs. His favorite subjects were history, geography, engineering and science. He was 16 when he first decided on a career in engineering, influenced by the American space program.

Initially, Nabih thought he wanted to be a scientist because of his fascination with aerospace and its promises. However, at Cairo University he encountered several renowned faculty members who were graduates of Cal-Tech, MIT, ITT, Cal-Berkley and Cambridge/Oxford. He shifted from aerospace to structural engineering and received a bachelor's degree, with distinction, in 1967. After immigrating to the United States, he received a master's degree from California State University (CSU) in Los Angeles and then a postgraduate Diploma in earthquake engineering from the University of California at Los Angeles (UCLA) in 1974.

Nabih married Isis, a computer analyst, on April 28, 1974. They have three children, Michelle-Marie, John Paul and Christine-Marie. Michelle works in the field of education, John Paul is the founder and manager of Capital Creation Investments, and Christine is working on a master's degree in social work at the University of Chicago with a focus on special needs children.

Youssef started at Welton Becket in 1969. During his time there, he worked on such projects as the Hyatt Regency and Theme Tower in Dallas, Texas; the Moscow World Trade Center; the Washington, DC, Convention Center; and the 1975 redesign of Olive View Hospital, whose partial collapse during the 1971 San Fernando earthquake cemented his focus on seismic engineering. In 1982 he joined A.C. Martin Partners in Los Angeles, where he led its engineering division. He designed the Manu-Life Tower, Beverly Hills Civic Center, downtown Los Angeles YMCA and Home Savings Tower during this time. He then started his own firm in 1989.



*Nabih Youssef.
Courtesy of
NYA.*



LA Live! Hotel and Residences.

Not only modern in its architectural form, the hotel tower takes full advantage of a leading edge structural steel lateral force resisting system, comprised of unstiffened thin steel plate shear walls (SPSW), moment frames, Buckling Restrained Braces (BRB), mid-height outriggers and cap trusses. The design process exemplifies a successful collaboration of performance-based engineering and rigorous peer review by a panel of noted experts in each structural system type. The result minimizes the cost and construction schedule while maximizing the interior space available for architectural programming. Courtesy of NYA.

Significant projects in NYA's bulging portfolio, in addition to the Cathedral of Our Lady and LA Live!, include the J. Paul Getty Villa Renovation in Malibu, California; Cleveland Museum of Art Expansion; Skirball Jewish Cultural Center; Dodger Stadium Renovations; Los Angeles Coliseum Renovations; UCSF Ray and Dagmar Dolby Regeneration Medicine Building; Los Angeles City Hall Base Isolation; Los Angeles Police Department Headquarters; Broad Museum; and the New Stanford Hospital.

Youssef is registered civil and structural engineer in California, and is also licensed in Arizona, Hawaii, Nevada, New Jersey, New York, Ohio, Oklahoma, Oregon, Texas and Washington. He has been active in

a number of engineering organizations including the American Society of Civil Engineers (ASCE) and Structural Engineers Association of California (SEAoC). He is also a member of many industry-impacting engineering committees, most notably as the co-founder of the Los Angeles Tall Buildings Structural Design Council, a non-profit organization dedicated to advancement in research on tall buildings by means of an annual conference and scholarship program.

A recognized expert in the field of seismic design and seismic safety, Youssef has served as chair of the City of Los Angeles Mayor's Blue Ribbon Panel for Seismic Hazard Reduction, as a commissioner for Santa Monica Building and Safety, on the Governor's California Buildings Standards Commission and as chair of the Seismic Safety Commission. He has evaluated the seismic hazard in LA's existing inventory of older buildings and investigated numerous major earthquakes around the world including Managua, Nicaragua (1972); Tangshan, China (1976); Mexico City (1985); Loma Prieta (1989); Cairo, Egypt (1991); Kobe, Japan (1995); and Chile (2010).

Youssef is a Fellow in the Institute for The Advancement of Engineering. He is a member of the California Club, Jonathan Club and Downtown Breakfast Club and is very active in his church, where he works with the youth through education, training programs, leadership camps and sports. He is a co-founder of the Coptic Educational Foundation, a non-profit organization that encourages children in the community to pursue their educational goals, and provides support and funding so that they can receive college degrees. He has served on the board of Marymount High School (which his daughters attended), Junior Blind and the LA Conservancy.

In addition to his various publications and presentations, Youssef has taught at universities for more than 20 years. He has been a lecturer for key courses in structural design, preservation of historical structures and glass structures at the University of Southern California (USC) and the Southern California Institute of Architecture (SCI-ARC). He has also been involved in various industry and governmental panels, notably:

- Congressional Office of Technology Assessment Advisory Panel



Our Lady of the Angels Cathedral.

Although the building is essentially two stories, 150 feet tall, it has multiple roof diaphragm levels and shapes. The architectural features of the design (exposed concrete, tall slender walls, and an abundance of glass) placed exceptional demands on the structural design and construction. Designed as a place of refuge after major disasters for 500 years, the entire cathedral was base isolated, making it the heaviest building to ever be isolated. Response modification using different isolation; global finite element models and nonlinear time history analyses were performed to study the global response. For the concrete walls (BIAX), moment curvature analysis was performed to assess cracking at DBE displacement, and several different stress-strain models for concrete tension behavior were created. Courtesy of NYA.

- Vision 200 Committee (founder and chair)
- Seismology Committee of SEAoC
- Project Restore (past chair), a non-profit organization dedicated to the restoration and revitalization of historic facilities in Los Angeles, such as City Hall Lindbergh Beacon and Hollyhock House, designed by Frank Lloyd Wright.

Among Youssef's specialties are mono-coque structures that are highly irregular, such as the Cathedral of Our Lady of the Angels and Broad Museum. Other examples are the Glendale MSB, Hines La Jolla, Brinderson Towers, 1100 Wilshire and Madame Tussauds, Hollywood. He also has much interest in structural glass design and has been involved in many projects featuring it, such as a glass staircase for the Apple Store in San Francisco, a large glass cantilever at the Cleveland Museum of Art and large glass panels at Claremont McKenna College.

Youssef was the recipient of the 2010 AISC Designer Special Achievement Award, as well as a special AISC Presidents Award for

Excellence in Structural Engineering for LA Live! He received the AIA Los Angeles Presidential Award in 2008, the USC Architectural Guild award for Outstanding Achievement, and the 2001 Cal State LA Distinguished Alumni Award. In 1999 he received the Egyptian American Organization's Outstanding Achievement Award.

Said Youssef, "The complete integration of art, science and technology is the point at which design excellence is achieved. This profession is about committing yourself wholly to your vision and living it through your clients, projects, associates and life's opportunities." ■

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