

HIGH-RISE



miyamoto. EARTHQUAKE +
STRUCTURAL
ENGINEERS



miyamoto.

save lives, impact economies

Miyamoto International is a global earthquake + structural engineering and project management company providing critical services that sustain industries and safeguard communities around the world.

We are experts in high-performance engineering that reduces lifecycle costs and produces a positive net impact on a structure's operation. We assess the performance of structures to identify specific vulnerabilities, and prioritize solutions that limit business interruption and reduce property damage.

Built on decades of earthquake and structural engineering experience in the field, our expertise supports how clients address the economic, political, social, sustainability and resiliency challenges in earthquake risk reduction and post-disaster recovery and reconstruction.

Miyamoto offices are strategically located worldwide in earthquake-hazard regions to positively impact economies and save lives.

Sacramento
San Francisco
San Jose
Los Angeles
Orange County
San Diego
Reno
Washington, D.C.
Mexico
Costa Rica
Colombia
Haiti
Liberia
Italy
Turkey
India
Nepal
Japan
New Zealand

make the world a better, safer place.



The TRX Signature Tower in Malaysia will be the world's 15th-tallest building at 1,483 feet (452m). It is expected to transform the city's skyline and downtown financial hub. Visitors will be greeted by a majestic 15-meter-tall Grand Lobby with water features and lush, green surroundings. Currently under construction, the 106-floor supertall high-rise has an expected completion date of mid-2018, surpassing the landmark Petronas Tower. Our staff experience includes coordinating and managing

the project with an overseas design team. The design is a complete structural system founded on a piled-raft system supported by a 4.2-meter deep mat foundation with 1.8-meter and 2.0-meter diameter bored piles. Designed as a modern icon nestled in a park setting, the building will seek Green Building Index certification by meeting the highest standards of environmental sustainability. At dusk, the building will animate and glow with colored lights inspired by Malaysian culture and economic vibrancy.

Exchange 106*

LOCATION:
Kuala Lumpur, Malaysia

YEAR:
2018 (expected)

CLIENT:
Mulia Property Development

CONSTRUCTION COST:
\$650-700 Million

SCALE:
34,000 SF per Floor
106 Floors, 6 Basements
1,483 Feet Tall (452m)

**Miyamoto Staff Experience*



Jasper is a 430-foot (130m) residential skyscraper located at 45 Lansing Street in the Rincon Hill neighborhood of San Francisco, California. The tower contains 320 residential units on 39 floors and 4 levels of subterranean parking. The tower is constructed with post tension slab, concrete shearwall core and founded on a 7-foot mat foundation. Typically for a residential project, concrete is selected for its noise reduction and fire proofing attributes. A post-tensioned concrete slab was used to minimize the floor-

to-floor height so that more stories could be placed with the building height envelope. Due to the small core dimension of 31'x32', and core height-to-width ratio of 12.9 to 1 (400' to 31'), stiffness of concrete core is required to meet building drift criteria. The lateral system is concrete core shear wall with concrete moment frames. The building lateral design utilized the Tall Building Guidelines and performed peer review process by a third party as required by the city of San Francisco.

Jasper

LOCATION:
San Francisco, CA

YEAR:
2017

CLIENT:
HKS

CONSTRUCTION COST:
\$110 Million

SCALE:
453,396 SF

AWARDS:

2015 BEST NEW DEVELOPMENT, SAN FRANCISCO APARTMENT ASSOCIATION (SFAA)

**Miyamoto Staff Experience*



Miyamoto is engineering a 23-story, mixed-use, high-rise with three levels of underground parking, ground-level retail space and five levels of offices. The remaining levels will be condominiums. This concrete structure is being designed with cutting-edge, performance-based design that incorporates seismic dampers at the upper levels. A special feature of this project is that the high-rise will have mechanical services provided to it by an independent central utility plant that will eventually service more than 30 surrounding buildings. The plant

will be housed in the basement of the adjacent parking structure, which is closely tied to the tower. Access between the tower and parking garage is provided at the lower levels, while pedestrian access is allowed for the remaining nine levels of the parking structure above ground. The intent of this design is to provide a structure that not only meets the code's goal of life safety, but will enable the structure to be fully operational without the added cost of retrofit after a major seismic event.

Reno Mixed-Use High Rise

LOCATION:

Reno, NV

YEAR:

2019

CLIENT:

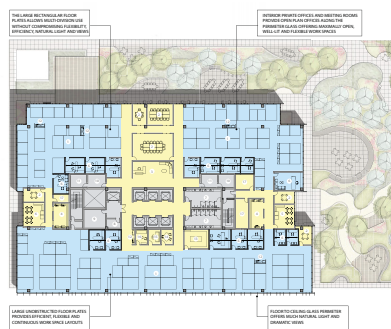
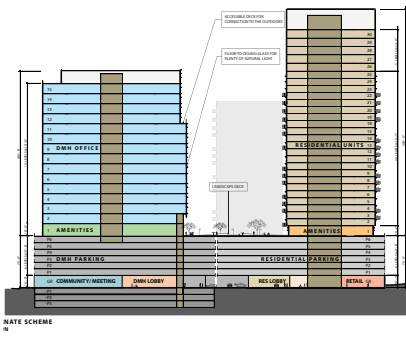
Secundo Vita Duo, LLC
Cathexes Architecture

CONSTRUCTION COST:

\$65 Million

SCALE:

301,000 SF Building
205,000 SF Garage



Vermont Corridor

LOCATION:
Los Angeles, CA

YEAR:
2017 (anticipated)

CLIENT:
Lincoln Properties (developer)
Johnson Fain (architect)
Clark Construction (contractor)

CONSTRUCTION COST:
Est. \$400 Million

SCALE:
23-Story office tower over 8 level
of parking (483,000 SF of parking,
472,000 SF of office)

28-Story residential tower
(300,000 SF residential and
229,000 SF parking, 10,000 SF retail).

Total project 1.5M GSF

Renovation of the existing eight-story
parking structure

The County of Los Angeles has invited private developers to a Public-Private-Partnership competition to relocate Department of Mental Health employees to a new, high-quality, architecturally prominent, cost-effective headquarters facility, consolidate other departments in the Vermont Corridor and provide the highest economic benefit to the County through sale or ground lease of the properties. The project area is located on Southern Vermont Avenue between Fourth and Sixth Streets. Miyamoto International was the Structural Engineer on a Design-Build team lead by Lincoln Properties, Johnson Fain Architect

and Clark Construction. Our team is collaborating with the design-build team to develop the design, including one office tower and two residential towers with retail on the ground floor. The office tower is a steel structure braced by Buckling Restrained Braced Frames (BRBF). The two residential towers are concrete structures braced by central core shear walls. The great synergy among the members of the design-build team has produced an aesthetically interesting architectural design with an economical and efficient structural system that meets a very aggressive construction schedule.



Recently completed with Gensler, this 26-story office tower is the San Francisco headquarters for LinkedIn. The building offers 450,000+ SF of office space, 2,209 SF of retail space, 8,500 SF of public space that is accessible to the public during working hours and two underground parking levels. Engineering on the building, which some describe as “severe yet sleek,” involved challenges such as exterior columns at the 17th level were transferred to accommodate the city’s setback requirement, yet maximize usable area at the owner’s request. A bent-beam design in the public space created support for the step/

sitting area, and allows for a major mechanical duct without headroom issues. We also engineered the TI for LinkedIn, including vibration control for the Level 2 Fitness Center, floor framing upgrades for Level 3 and a Grand Staircase connecting Levels 1 and 3. The scale and angle of the glassy building allows for vivid reflections of the surrounding Second Street neighborhood.

The lateral system is steel BRB & EBF core with steel moment frames. The building lateral design utilized the Tall Building Guidelines and performed peer review process by a third party as required by the city of San Francisco.

LinkedIn Headquarters*

LOCATION:
San Francisco, CA

YEAR:
2016

CLIENT:
Gensler
Thomas Phifer and Partners

CONSTRUCTION COST:
\$100 Million

SCALE:
452,418 SF

**Miyamoto Staff Experience*



Engineering for The Grand, a 22-story apartment building with retail, required design and detailing for the shear walls and boundary elements, P/T slab layout, two-way cast-in-place concrete slab and mat foundation design. The apartment high-rise in downtown Oakland features 238 units ranging from studios to three-bedroom apartments. The building is a single

high-rise tower over a multi-level parking podium with retail shops, lobby and motor court on the street level. A series of rooftop decks provide a variety of outdoor spaces. Other amenities include sophisticated floor plans, an outdoor spa and sun deck, fitness center and concierge service.

The Grand*

LOCATION:
Oakland, CA

YEAR:
2008

CLIENT:
Essex Apartment Homes
Architecture International

CONSTRUCTION COST:
\$96.3 Million

SCALE:
500,000 SF

**Miyamoto Staff Experience*



Izmir High-End Mixed Use Project

LOCATION:
Izmir, Turkey

YEAR:
2010

CONSTRUCTION COST:
\$250 Million

SCALE:
2,400,000 SF

Located in the new Central Business district of Izmir, the third largest city in Turkey, this high-end mixed-use project is designed to be an important landmark and compelling urban center for the entire region. The development will house approximately 2,400,000 SF (220,000 square meters) of retail,

restaurants, residences, offices, and parking. This includes cultural areas and a shopping center, which is set to be the largest in the region. The project utilizes a wide and spacious open-air design that is compatible with the Aegean lifestyle and climate



The Legend

LOCATION:
Kathmandu, Nepal

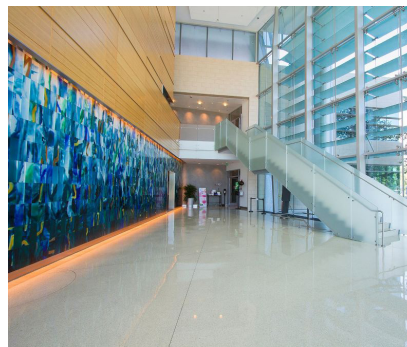
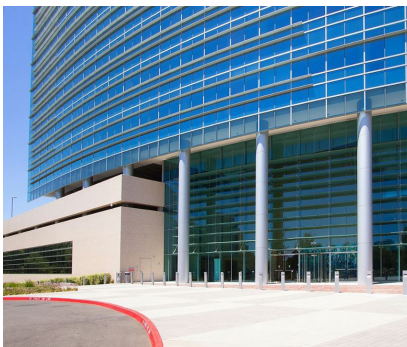
YEAR:
Pending

CLIENT:
CG Developers of the Chaudhary Group

SCALE:
420,330 SF

Miyamoto is providing the structural engineering and architectural local representation of CG Developers' new multi-use commercial complex to be built in Lalitpur, Nepal. This building is a 10-story office block and an 11-story serviced apartment block. This will be an iconic building because of its unique and innovative design and is the only commercial center in Nepal featuring a helicopter pad to provide easy and efficient access. It is also being built in very close proximity to

the Minister's residence and many United Nations offices. Miyamoto has provided the structural design for the complex, which combines a moment frame system with reinforced concrete shear walls, in accordance with earthquake resistant design standards and criteria. Additionally, Miyamoto has conducted research and performed structural analyses based on the parameters of the April 25th earthquake to ensure that the building will perform well in future earthquakes.



This 15-story office tower rises above two levels of public space along the historic Sacramento River Walk and attained LEED Platinum certification. There is a five level, 306,000-SF parking garage attached to the main tower. The lateral systems used include concrete shearwalls, concrete monument frame, steel eccentric braced frames and steel moment frames. Additionally, precast column and beam system were implemented in the parking levels to hasten the construction and reduce cost. Energy efficient innovations and sustainable

strategies were incorporated into the design to reduce energy use by 17 percent. This was estimated to save the building \$1.7 million annually in energy costs. An underfloor air distribution system helps reduce energy loads throughout the open plan office areas. In order to increase productivity, 90 percent of occupants have access to natural lighting and the workplace features several quality-of-life amenities, including a walkable site that employees can enjoy during the workday.

CalSTRS*

LOCATION:
Sacramento, CA

YEAR:
2009

CLIENT:
California State Teachers Retirement System
HOK

CONSTRUCTION COST:
\$266 Million

SCALE:
409,000 SF

**Miyamoto Staff Experience*



The Airport Center Building – a 13-story concrete office building with basement that was originally built in 1966 – is undergoing conversion into a dual-branded select service hotel with more than 400 guest rooms. Key features of the renovation include addition of a roof-top swimming pool, spa, bar and enclosed lounge. New interior light wells are introduced through the height of the building and elevator service is extended to the roof amenity level. The building is seismically retrofitted to the requirements of the

2014 Los Angeles Building Code. The seismic retrofit components include new concrete shear walls and foundations, and wrapping the interior columns with Fiber Reinforced Polymer.

The main challenges of this project were to preserve the historic character of the decorative concrete columns on the building facade, and to add the roof-top amenities with minimal structural strengthening.

LAX Hyatt Adaptive Re-Use and Seismic Retrofit

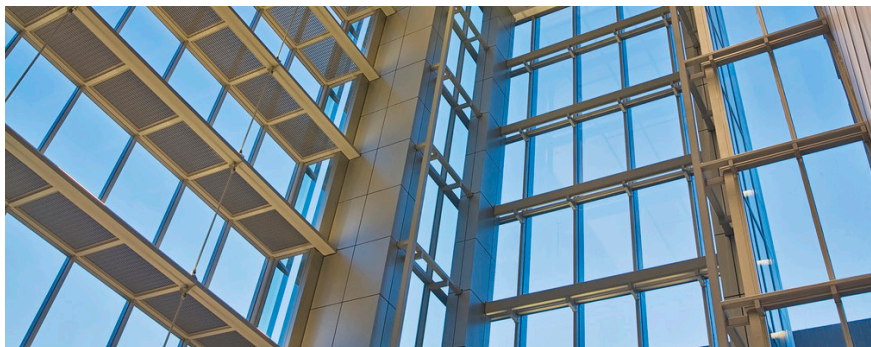
LOCATION:
Los Angeles, CA

YEAR:
Winter 2018

CLIENT:
Carrier Johnson + Culture

CONSTRUCTION COST:
\$60 Million

SCALE:
280,000 SF



The engineering of the 25-story, U.S. Bank Tower in downtown Sacramento involved SCBF plus SMRF dual system, a seismic design for steel buildings using Special Concentrically Braced Frames and Special Moment Resisting Frames to strengthen tall structures. The tower is the second tallest building in Sacramento.

Work required design and detail of the exposed hanging trusses for the seven-level open atrium main lobby providing stunning views of

Sacramento's Capitol Mall. It was built during tough economic times by developer David S. Taylor, who led the development of many of the high-rise projects that redefined Sacramento's skyline a decade ago.

The tower's 621 Capitol Mall location is a premiere address in California's capital city. The building is home to some of the area's largest law firms, the state Court of Appeals, the California Restaurant Association and high-end Morton's Steakhouse.

U.S. Bank Tower*

LOCATION:
Sacramento, CA

YEAR:
2008

CLIENT:
HOK

CONSTRUCTION COST:
\$132 million

SCALE:
366,291 SF

**Miyamoto Staff Experience*



Sikka Karnam Greens

LOCATION:
Noida, India

YEAR:
2015

CLIENT:
Sikka Group

SCALE:
Approximately 2,500,000 SF

Sikka Karnam Greens is a luxury, multi-high-rise project in the heart of the Noida sector near the Faridabad Noida Ghaziabad Expressway and the Wi-Fi Tai Expressway. The project was designed to be Earthquake Resistant Structure Zone IV compliant. Offering units from 590 to 1,920 square feet, the multi-tower community offers an entertainment zone, clubhouse, kids areas, recreation amenities, a pool and

gym, meditation center, walking and jogging tracks, badminton, basketball and tennis courts and many other amenities and is conveniently located at the doorstep of a future Metro station and next to several world class information technology companies. The proposed International Airport Greater Noida site also is just minutes away.



At the DN OxyPark, Miyamoto India provided complete structural design services and post contract services. The soaring, multi-building project were designed as reinforced concrete moment resisting framed buildings with shear walls on this premium residential project spread over 4.125 acres in Bhubaneswar, India. All of the 300+ apartments have uninterrupted views and luxurious amenities. According to

the developer, DN Homes, the project was inspired, designed and ruled by the area's natural surroundings with more than 78 percent of the space reserved for open expanses, greenscapes and bodies of water. The structures include four elegant towers named Flora, Fauna, Aqua and Terra ranging from five to 17 stories. The total built-up area is about 70,000 square feet including the basement.

DN OxyPark Group Housing

LOCATION:
Bhubaneswar, India

YEAR:
2015

CLIENT:
DN Homes Pvt. Ltd.
SK Das

CONSTRUCTION COST:
\$30 Million

SCALE:
70,000 SF



The evaluated building is 44 floors total (39 floors above the ground, 5 underground) designed as 180m-high, multi-story reinforced concrete structure. The lateral resisting system consists of reinforced concrete shear walls and moment frames. The client hired Miyamoto to evaluate the building's performance for post-earthquake sustainability and confirmation for business continuity. The most serious post-earthquake

problems experienced in high-rise buildings can be summarized as facade damages restricting the building usage, shutdown of vertical transportation resulting in direct business interruption and plumbing damages preventing the water supply. The evaluation was carried out per the USRC* (United States Resiliency Council) Rating System's Safety, Damage and Recovery criteria.

High-rise Building in Istanbul

USRC Rated Evaluation

LOCATION:
Istanbul, Turkey

YEAR:
2017

CLIENT:
Mapfre Insurance

CONSTRUCTION COST:
\$48.5 Million

SCALE:
45,500 m²

**Miyamoto International is one of the founding members of USRC.*



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