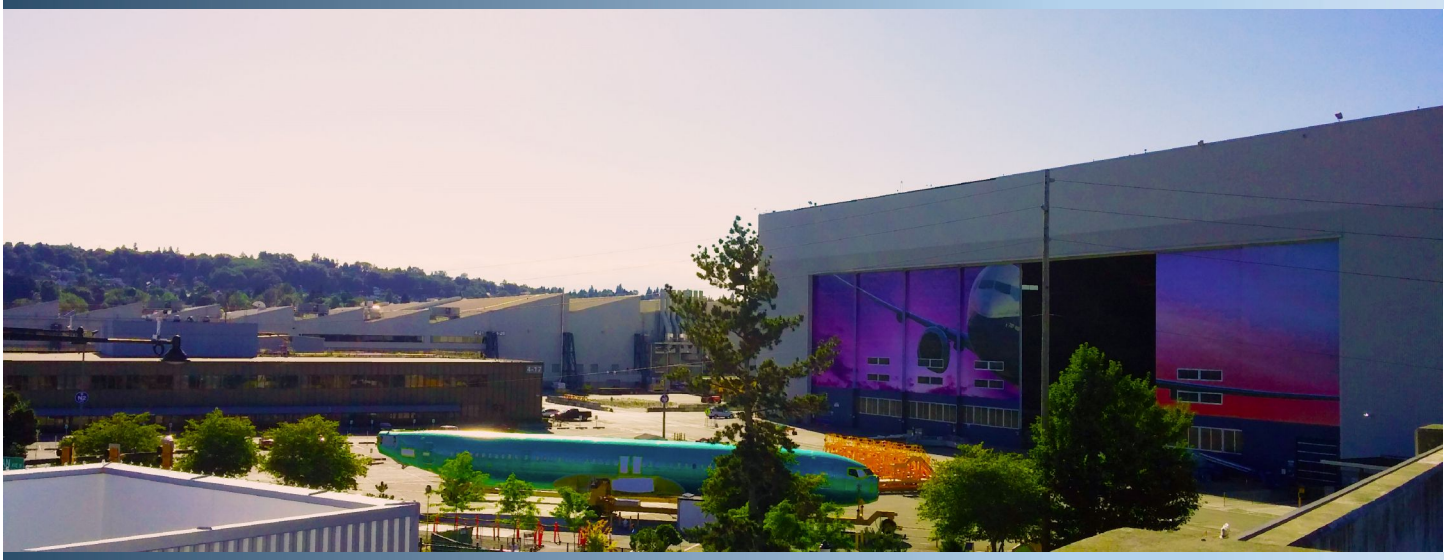


S&A

SPITZNAS & ASSOCIATES

FIRM PROFILE

INTRODUCTION

WHAT

Spitznas & Associates is a full-service structural engineering firm based in Seattle. We specialize in the following practice areas:

- Design of New Buildings
- Additions/Renovations to Existing Buildings
- Design of Bridge Structures
- Seismic Assessments and Retrofits
- Services for Contractors

HOW

Our goal is to always produce a superior product. Our formula is straightforward:

- We are a team of highly-skilled engineers with broad market sector experience.
- We use advanced structural analysis techniques.
- We maintain a strong culture of collaboration.
- We are highly-responsive to our clients.
- We use internal quality control procedures that are far above industry standards.

WHY

We are passionate about structural engineering and the built environment. Here's why:

- We believe that structures are important community assets—they are critical to our regional and national economies. Building structures provide housing and host diverse employment and educational opportunities. Bridges connect communities, open new opportunities for citizens and are essential for commerce. Our infrastructure plays an important role in the lives of all citizens.
- We find tremendous satisfaction in helping architects, developers and public agencies bring their visions to reality. One of the most rewarding experiences for us is finding the most economical engineering solution without compromising safety or architectural form and function.
- We strongly support utilizing existing infrastructure to its maximum potential and we are committed to ensuring public safety.
- We believe that the construction of a structure is extremely challenging. Therefore we work with the contractor and design team to minimize the "hiccups" that are inherently going to be encountered on any project. Our involvement begins with the schematic design and extends through construction completion.

PRINCIPALS

Paul Spitznas, P.E., S.E.

Paul has diverse structural engineering experience in both bridge and building design and has been the engineer of record for over $1 billion in construction. He has led multi-disciplinary design teams for numerous facilities projects for The Boeing Company and has designed unique bridge structures including the longest floating bridge in the world. Paul has shared his advanced understanding of structural engineering by giving numerous lectures to university-level classes and has given industry presentations on drilled shaft design and performing seismic analysis.

Pat Harrigan, P.E.

Pat has over 19 years of experience in the field of structural engineering and project management, including special structures, bridge analysis, and structural design and seismic upgrades for industrial plants, historical structures, hospitals, airports, hotels and commercial buildings. Prior to becoming an engineer, Pat worked as a steel fabricator which gives him unmatched insight into producing highly constructible designs.

Joshua Yunker, P.E.

Josh has experience across a broad variety of building and material types. He has successfully completed the structural design of medical facilities, educational institutions, aviation facilities, military installations, and commercial buildings. In addition to new construction, Josh has experience in engineering seismic upgrades for existing buildings, as well as a wide range of structural tenant improvement projects for commercial properties.

EXPERIENCE

MARKET SECTORS

Our principals have designed and managed many high-profile projects. We have broad structural design experience in the following major market sectors:

- Aviation (airport terminals and hangars)
- Bridge Structures
- Educational Facilities
- Hotels and Housing
- Industrial/Manufacturing Facilities
- Medical Buildings (including hospitals)
- Military Projects
- Office Buildings
- Parking Structures
- Port/Waterfront Structures
- Retail Buildings
- Warehouses

PROJECT CREDITS

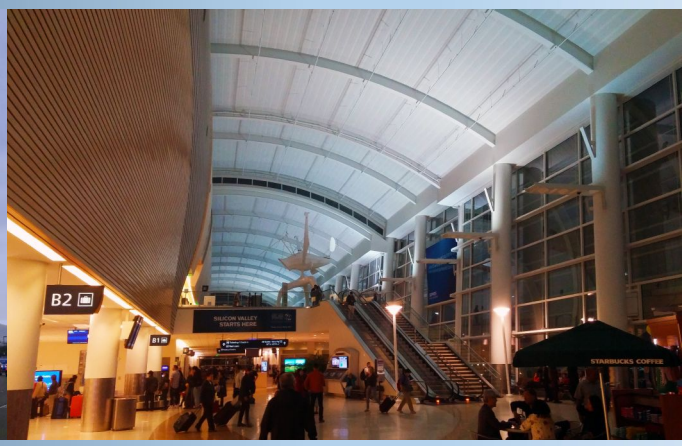
Prior to joining S&A, our staff worked for several renowned structural engineering firms. The following pages detail our staff's project experience while employed at other firms. The S&A employees, their project roles, and the firms they were employed at are indicated for each project by the following notations:

(1) Paul Spitznas, Project Manager, Magnusson Klemencic Associates
(2) Paul Spitznas, Design Engineer, Magnusson Klemencic Associates
(3) Paul Spitznas, Design Engineer, Washington State Department of Transportation
(4) Pat Harrigan, Project Manager, Magnusson Klemencic Associates
(5) Pat Harrigan, Design Engineer, Magnusson Klemencic Associates
(6) Pat Harrigan, Project Manager, BergerABAM
(7) Pat Harrigan, Design Engineer, BergerABAM
(8) Pat Harrigan, Project Manager, PAO Structural Engineering
(9) Pat Harrigan, Design Engineer, PAO Structural Engineering
(10) Joshua Yunker, Project Engineer, Meier Architecture + Engineering
(11) Joshua Yunker, Project Engineer, Wiseman + Rohy Structural Engineers
(12) Joshua Yunker, Project Engineer, SMR Consulting Group
(13) Joshua Yunker, Design Engineer, Magnusson Klemencic Associates

EXPERIENCE – AVIATION

Norman Y. Mineta International Airport Terminal B and North Concourse (2, 4, 13)
San Jose, California

Design of a new architecturally significant 1,600-foot-long by 90-foot-wide airport terminal structure for the City of San Jose Department of Aviation. The structure added ticketing areas, retail space and new aircraft boarding gates, each of which can accommodate a Boeing 757. The structure is three elevated stories with an underground tunnel approximately 60 feet wide to accommodate baggage handling and mechanical equipment. The elevated structure was designed using structural steel framing with special truss moment frames as the lateral system, which allows flexibility for future expansion of this facility. The underground tunnel is a pile-supported concrete structure designed to withstand full hydrostatic uplift due to the proximity of the Guadalupe River. Project was the winner of the 2011 American Council of Engineering Companies' National Engineering Excellence Honor Award and Platinum Award for Washington. The project also won the American Institute of Steel Construction's IDEAS2 National Award.



EXPERIENCE – AVIATION

San Francisco International Airport - Terminal 3 Expansion (4)
San Francisco, California

Expansion and seismic upgrade of Terminal 3 at San Francisco International Airport. The upgrade and expansion included a new concourse of approximately 45,000 square feet which provided a seismic buttress of the existing terminal. The expansion was accomplished while the airport maintained operation of the existing facility and involved modernization to 5 airplane gates and associated terminal support space.

Ibrahim Nasir International Airport Terminal Concept Design (1)
Male, Republic of Maldives

Project consisted of redesigning the steel roof structure for a new terminal expansion. The design dramatically simplified the steel framing scheme and reduced the erection complexity. Steel tonnage and foundation costs were reduced by approximately 50%.

EXPERIENCE – AVIATION

Doha International Airport Maintenance Hangars (2)
Doha, Qatar

Alternative design for two hangars with a combined area of approximately 570,000 square feet. Design reduced steel tonnage by 30% by utilizing concrete-filled pipe arches to support the roof structures over the hangar doors.

Boeing 5-50 Paint Hangar (4, 5)
Renton, Washington

Modernization of a paint hangar located at the Renton Airport for the Boeing Company. Modernization included a seismic upgrade of the steel structure and new concrete underground process air delivery trenches. The site is situated in the Cedar River floodplain and required micropile support for the seismic upgrade and underground trenches.

EXPERIENCE – BRIDGE

Oakland Airport Connector Superstructure Review (6)
Oakland, California

Rapid transit project for the Bay Area Rapid Transit (BART). Developed project specific welding specifications, calculations and design details for the elevated structural steel truss structure.

SR 520 Evergreen Point Floating Bridge Replacement (3)
Seattle, Washington

At a length of over 7,700 feet, it will be the longest floating bridge in the world upon completion. Structural design engineering, analyzed effects of various superstructures on the bridge and created design criteria. Performed numerous studies comparing the performance of potential bridge configurations during the concept phase. Photo courtesy of WSDOT.

EXPERIENCE – BRIDGE

Manette Bridge Replacement (3)
Bremerton, Washington

Post-tensioned, prestressed, spliced girder bridge with a total length of 1,650 feet. Foundations include 12-foot diameter drilled shafts and utilize precast tub pier caps. Seismic analysis performed in accordance with the AASHTO Seismic Guide Specifications, which included response-spectrum displacement demand determination and nonlinear pushover analysis displacement capacity determination. Photos courtesy of WSDOT.

FB Hoit Bridge (8, 9)
Federal Way, Washington

Load analysis of the bridge for the Washington State Department of Transportation. Analyzed bridge members for construction loading that occurred during the sandblasting and painting of this multi-span steel bridge. Analysis included wind loading due to the containment "tents" used during the sandblasting process and gravity loading for vehicle traffic and the weight of materials and equipment used on the under hung work platforms. Photo courtesy of WSDOT.

EXPERIENCE — EDUCATION

El Cajon Valley High School Physical Education Building (11)
El Cajon, California

Design of new 23,300 square foot two-story gymnasium building. The building uses special reinforced masonry shear walls for lateral support. Design challenges included multiple roof levels with clerestories and transfer frames to the second-floor rigid diaphragm. The gravity system consists of composite concrete on metal deck at the interior second-floor level, and topped and un-topped roof deck at the roof levels. The decking at all levels is supported by steel beams and girders. The foundation system consists of conventional reinforced concrete shallow foundations.

O'Farrell Charter School Gymnasium and Shade Canopies (11)
San Diego, California

Design of new 14,000 square foot single story gymnasium with an adjoined 3,400 square foot lunch area. In addition to the building structure the project includes 8,800 square feet of shade canopies that connect multiple buildings on the school campus. The lateral system for the gymnasium consists of special masonry shear walls. The canopies are supported with cantilevered columns. The roof system of the gym consists of both topped and un-topped metal decking. The decking is supported by steel beams and girders. The foundation system consists of conventional reinforced concrete shallow foundations.

Marie Curie Stem School (10)
Pasco, Washington

Design of a 72,000 square foot two-story elementary school with interstitial mechanical mezzanines throughout. In addition to the two-story classroom portion, the project includes a gymnasium with attached kitchen and library/administration space. The lateral force resisting system consists of cold-formed steel stud and sheeting shear walls and special masonry shear walls. The gravity system consists of steel beams and girders supported off of steel columns.

EXPERIENCE – HOTEL/HOUSING

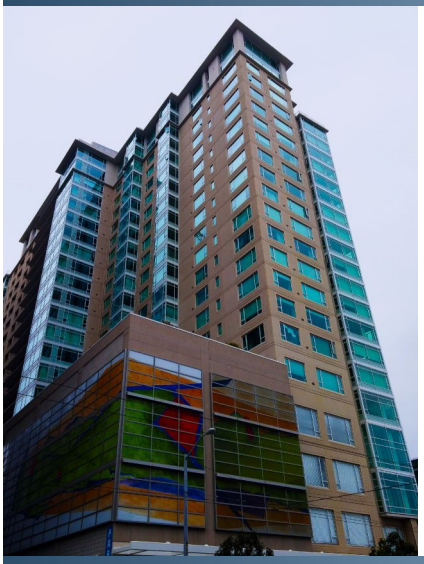
Arterra (2)
San Francisco, California

Design of residential structure with four levels of podium parking. Three separate buildings (6, 9, and 16-stories) rise above the podium level. The structure utilizes special reinforced concrete moment frames and is situated on bay mud, which required the use of 200-foot deep piles.

The Watermark Condominium Tower (4)
San Francisco, California

Twenty-two story condominium project located on Bryant street in the San Francisco "South Beach" neighborhood. The structural framing was post-tensioned flat slab with central core shear wall elements as the lateral system. The project included three stories of parking, a large podium level with an outdoor swimming pool located above the parking levels.

EXPERIENCE – HOTEL/HOUSING

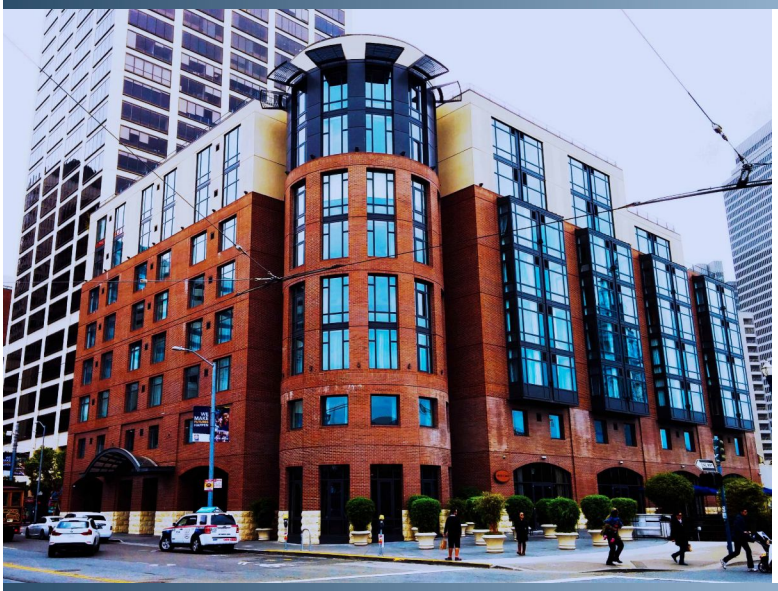


SOMA Grand (2)
San Francisco, California

Design of 22-story residential building. Project features 5 stories of parking with 17 levels of condominiums above. Special reinforced concrete shear walls (core with outriggers) were used for the lateral system and post-tensioned flat plate for the gravity system.

Hyatt House (4)
Emeryville, California

Thirteen-story hotel designed with concrete post-tensioned flat slabs and shear walls as the lateral elements. Site was located on sensitive soils and required the structure to be built on concrete precast pile foundations. The elevated structure utilized lightweight concrete to minimize the loading on the foundation.



Hotel Vitale (4)
San Francisco, California

Nine-story "boutique" hotel located in downtown San Francisco for Joie de Vivre Hotels. The building system is concrete, post-tensioned gravity framing with concrete moment frame as the lateral system. The structure is located on sensitive soils, which required a site-specific lateral analysis and a complex pile foundation support.

EXPERIENCE – INDUSTRIAL

Boeing 4-20/21 Seismic Upgrade (13)
Renton, Washington

Project involved the seismic retrofit of two adjacent long-span airplane manufacturing buildings originally constructed in the early 1940s. The structural solution utilized exterior buttresses that incorporated friction dampers, minimizing the number of interior renovations needed and eliminating significant rerouting of utilities. Non-linear time history analysis of the existing structure was used in order to model the affects of the dampers and provide the most efficient structural upgrade possible. Care needed to be taken in order not to impart excessive stiffness into the seismic force resisting systems to avoid overstressing the existing structural system during a seismic event. This cost-effective solution also allowed for uninterrupted operation of the fully functional plant, which manufactures the 737 passenger jet.

Boeing 4-20/21 Truss Assessment (1, 5)
Renton, Washington

Project included assessment of existing roof truss system. Detailed analysis of stresses in roof truss members and connections due to combined roof and overhead bridge crane loading.

Boeing 4-20/21 Crane Rail Replacement (1, 5)
Renton, Washington

Design of new crane runway rails supporting overhead bridge cranes. Geometric restrictions and span configuration required sophisticated analysis and custom rail design.

Boeing 4-20/21 Structural Analysis (1)
Renton, Washington

Non-linear time history analysis performed to determine the structural modifications required to remove the joint between the 4-20 and 4-21 buildings.

Boeing Multi-Mission Maritime Static and Fatigue Test Frames (2, 13)
Renton, Washington

Design of two airplane test frames to facilitate static and fatigue testing of the Boeing 737 Multi-Mission Maritime Aircraft (MMA). Frames built and testing performed in the 4-20 building.

EXPERIENCE — INDUSTRIAL

Boeing 4-20 737 Horizontal Build Line 2 (Wing Line 4) Assembly Design (1)
Renton, Washington

Semi-automated 737 wing assembly line consisting of multiple manufacturing positions. Design included all supporting utilities, slab-on-grade, pile supported foundations with extremely stringent deflection requirements..

Boeing 4-20 Line 4 Future State (1)
Renton, Washington

Extension of Wing Line 4 including additional manufacturing positions for 737 wing assembly. Design included all supporting utilities, modifications to existing slab-on-grade, and foundations for material lift.

Boeing 4-20 Wing Mitigation Tool (1)
Renton, Washington

Foundations for Boeing Tooling structures that provide 737 wing storage. Design required sophisticated analysis due to extremely stringent deflection limitations.

Boeing 4-20/21 Catwalk Upgrades (1)
Renton, Washington

Upgrades and replacement of catwalk components in a 1,000,000+ sf airplane manufacturing facility. Original catwalk was constructed in the 1940s. Extensive field investigation was performed to determine components requiring replacement and/or modifications.

Boeing 4-21 South Employee Entrance Upgrade (6, 7)
Renton, Washington

Modernization of the south employee entrance to the 4-21 building in Renton for the Boeing Company. Upgrade includes a new exterior deck, entrance vestibule, and employee lunch room. Upgrades to the first floor restrooms include new handicap accessible facilities and installation of showers.

EXPERIENCE — INDUSTRIAL

Boeing Future Factory (4)
Everett, Washington

Design of a 160,000 square-foot remodel of the existing office towers located in the Everett 40-22/26 building. Assisted the owner and architect in the upgrade and remodel of existing and new office spaces in the Everett aircraft factory. Design involved installation of approximately 120 skylights over the production floors and the remodel/upgrade of existing five-story towers for new office space.

Boeing 45-02 Delivery Center Renovation and Seismic Upgrade (2, 4)
Everett, Washington

Renovation and seismic upgrade to an existing 18,000 square foot aircraft delivery center. Design also featured a 4,000+ square foot addition. The upgraded facility provided Federal Aviation Administration staff, airplane purchaser staff and Boeing staff with modernized office space and conference rooms.

Boeing 787 Static Test Frame Foundation (4, 5)
Everett, Washington

Fast-track design of the reaction frame foundation for the 787 static testing program. The foundation consisted of a thick (3-foot mat) "outline" of the airframe with reaction fixtures cast in the mat to allow the hold-down reaction loading from the frame to be applied to the foundation via the airframe. There were also isolated tower foundations that were used to support the steel reaction frame. The design was improved from other static test foundations in that the outline of the airframe reduced the need for a large mat foundation under the entire aircraft and localized the thickened slab to only the specific areas where it was required for the imposed loading.

Boeing 787 Static Test Frame (2, 13)
Everett, Washington

Design and detailing of a primary reaction frame for the 787 full-scale static airframe test. The structure is comprised of a steel superstructure 208 ft wide in order to accommodate and load test the new Boeing 787 Dreamliner airframe. Because the steel erection for the test frame was done by "heavy lift procedure," with the one-million-lb structure assembled on the ground and hydraulically jacked 80 ft into place, a staged construction analysis in SAP 2000 was used to analyze the separate lift sequences. This construction approach allowed test hardware installation to be accomplished close to the ground, minimizing lift requirements, maximizing schedule, and improving safety.

Boeing Portland (85-105) Factory Expansion (2)
Portland, Oregon

Approximately 10,000 square foot office space addition and 30,000+ square foot expansion of a high-bay aircraft manufacturing facility.

EXPERIENCE – INDUSTRIAL

Boeing 9-53 Integrated Technical Development Lab (1)
Tukwila, Washington

Project consisted of the renovation of an existing technology lab located within the 9-53 building. Design included new mechanical equipment pad and surrounding protective bollards.

Boeing 9-101 Advanced Developmental Composites (2)
Tukwila, Washington

Various improvement projects to the 9-101 building in Tukwila. Projects included modifications to the existing building and the addition of new foundations and trenching to support tooling.

Boeing 9-101 Crane Upgrades (1)
Tukwila, Washington

Addition of new overhead bridge crane crossovers and flythroughs. Modifications to existing bridges to add control panel platforms. New catwalks and modifications to existing building structure (lateral bracing, etc.) to support changes to overhead crane system.

Boeing 9-101 JOBS Router (2)
Tukwila, Washington

Foundations for JOBS Linx 20 router, which is a semi-automated airplane part manufacturing tool. Project included vibration/damping analysis resulting in the use of Unisorb elastomeric sheets. Extremely small foundation displacements were permitted

Boeing 2-88 Parpas Machine Foundation (1)
Tukwila, Washington

Design of foundation for a Parpas Gantry Milling-Machine. Existing augercast piles were used in addition to new piles in order to meet strict deflection criteria.

EXPERIENCE – INDUSTRIAL

Boeing 4-44 Seismic Retrofit (2, 4)
Renton, Washington

Seismic assessment and upgrade of a one-story building that houses mechanical equipment servicing an aircraft production facility. Structural solution permitted continuous operation of the facility during construction by utilizing exterior strongbacks and a horizontal rooftop truss.

Boeing 18-61 Connexion Maritime (2)
Kent, Washington

Design of a rooftop satellite antenna platform situated on top of the Boeing Kent Space Center facility.

Boeing 24-50 Cleanroom Dehumidification (1)
Frederickson, Washington

Structural design for the dehumidification and humidification of the 24-50 cleanroom in Frederickson. Design required analysis of existing roof trusses for increased gravity load and review of lateral system for increased mass. Support platforms were installed for added large dehumidifiers located on the roof.

Boeing 24-60 ++Chord Mill #3 (1)
Frederickson, Washington

Foundation design for wing-chord milling machine with very small permissible displacements.

Historical Building Seismic Upgrades (8, 9)
Lakewood, Washington

Seismic upgrade of three historical structures for the U.S. Geological Survey. The structures are unreinforced concrete masonry unit (CMU) shear walls with wood-framed roofs. Reinforcing included the installation of steel strongbacks to support wall out-of-plane loads and steel braced frames to supplement the CMU walls for in-plane loading.

EXPERIENCE — MEDICAL

Providence Everett Medical Center Women's and Children's Center (4)
Everett, Washington

Medical center designed for birthing and neonatal intensive care. The building is a five-story, steel-framed structure that uses a special truss moment frames as the lateral load resisting system.

Eastvale San Antonio Medical Office Building (11)
Eastvale, California

Two-story medical office building. The building consists of concrete tilt up panels at the perimeter and steel framing on the interior of the building. The foundation system consists of conventional reinforced concrete shallow foundations.

Swedish Hospital (9)
Issaquah, Washington

Design of a temporary construction braced frame building lateral system for a nine-story, steel-framed structure. The temporary system was required to resist lateral loading due to wind to allow the steel frame to be erected before the concrete shear walls were placed.

EXPERIENCE — MILITARY

Tactical Equipment Maintenance Facility (12)
Fort Hunter Liggett, California

Design of a 74,600-ft² tilt-up structure. The building consists of a single story shops portion, two story office portion, and a high bay maintenance wing. The gravity system consists of composite concrete on metal deck floor slabs at the 2nd floor office, and bare metal roof deck on steel framing over the shops area. Long span steel trusses with steel beams and metal deck were used as the roof system over the maintenance wing.

P1069 Open Bay Recruit Barracks (12)
Camp Pendleton, California

123,000-ft² four story barracks facility. The building uses special reinforced masonry shear walls for lateral support. The gravity system consists of composite concrete on metal deck roof and floor slabs supported by steel beams and girders.

P129 Public Works Building (12)
San Diego, California

Design of a 12,500-ft² single story building located on the Naval Base Point Loma. The building uses special steel moment frames for lateral support. The gravity system consists of open web steel joists supported by steel girders and columns.

P753 Replacement Pool Building (12)
San Diego, California

Design of a 8,000-ft² single story pool building located on the Marine Amphibious Base, Coronado. The building uses special reinforced masonry shear walls for lateral support. The gravity system consists of open web steel joists supported by the perimeter masonry walls.

P294 & P293 Barracks (12)
San Diego, California

Design of a 124,000-ft² three story barracks at the Marine Corps Recruit Depot. The buildings use special reinforced concrete shear walls for lateral support. The gravity systems consist of mild reinforced two way flat plate concrete slabs supported by shear walls and concrete columns.

P926A Life Long Learning Center (12)
29 Palms, California

Design of a 17,000-ft² three story education facility. The building uses a combination of special reinforced masonry shear walls and steel special concentrically braced frames for lateral support. The roof system consists of metal roof deck spanning across open web bar joists.

P104 Communications and Electronics Maintenance Facility (12)
Camp Pendleton, California

Design of a 18,000-ft² single story maintenance facility. The building uses special reinforced masonry shear walls for lateral support. The gravity system consists of metal roof deck spanning across light gage steel trusses.

EXPERIENCE — OFFICE

Qualcomm Building Q Addition (11)
San Diego, California

Design of a 233,000 square foot five-story building with combined office and lab space and a basement level. The building uses special steel moment frames for lateral support at the upper four levels, and special concrete shear walls at the basement level. The gravity system consists of composite concrete on metal deck roof and floor slabs supported by steel beams and girders.

Boeing Seattle Delivery Center (1, 5)
King County, Washington

Design of a three-story building to be used for customer aircraft delivery. The building includes two floors of office space over a ground floor warehouse area. Building also features an event space overlooking the King County Airport. Project also included an addition to an existing building.

Snohomish County Parking Garage and Administration Building (4)
Everett, Washington

Design of a 1,200 car, five-story, underground parking garage with a surface-level public plaza lid and eight-story administration building. The underground garage is long-span, post-tensioned, beam and slab construction, and the administration building is steel framed with concrete core shear walls as the lateral system.

EXPERIENCE – PARKING

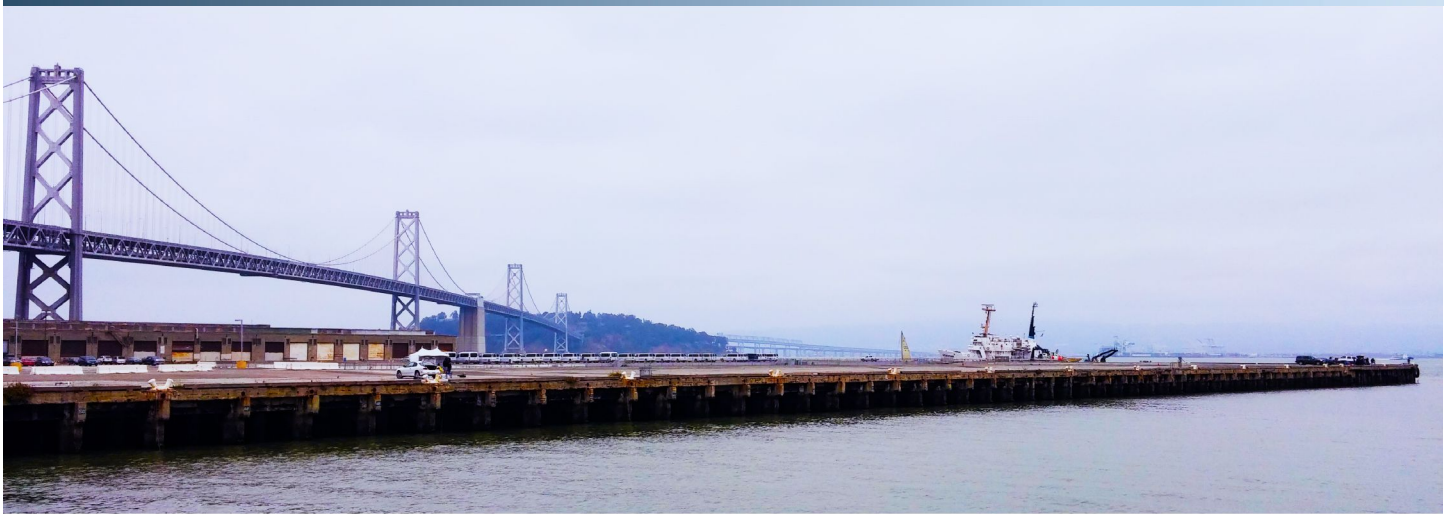
Bellevue Community College Parking Garage (4)
Bellevue, Washington

Design of a four story parking garage located on the Bellevue campus of the College. The garage is a long span (62') post tensioned beam and slab construction with concrete shear walls as the lateral system. The original garage design was designed to accommodate a future top floor which was added within a year after construction was completed.

Goat Hill Parking Garage (2)
Seattle, Washington

Design of nine-story parking garage accommodating up to 700 cars in downtown Seattle. Built into a hillside with 4 levels below grade and 5 levels above grade.

EXPERIENCE – PORT/WATERFRONT



Pier 30/32 Cruise Terminal (5)
San Francisco, California

Design of new cruise terminal project for the Port of San Francisco. Worked with the developer/architect and the Port to develop schematic designs for a future cruise ship terminal/office complex located on Pier 30/32. Design addressed the seismic retrofit and additions to the two piers to accommodate the required program.

Special Purpose Wharf (7)
United States Navy Facility, Washington

Distribution of project details prohibited without prior authorization from the federal agency.

Hood Canal Bridge East Half Closure Mitigation (3)
Sand Point / Lofall, Washington

Design review of steel truss gangways, mooring floats with guide piling and existing timber trestles for the Washington State Department of Transportation

Orcas Ferry Terminal Floating Dolphin Replacement (3)
Orcas Island, Washington

Design review of mooring system for a Washington State Ferries mooring dolphin.

EXPERIENCE – RETAIL

Lexus Dealership Addition (11)
Cerritos, California

Design of a 10,000 square foot addition to an existing dealership. The lateral system consists of a combination of special reinforced masonry shear walls and an ordinary steel moment frame. The roof structure consists of a panelized wood roof.

Dodge Chrysler Dealership Addition (11)
Roseville, California

Design of a 12,000 square foot single story addition to an existing dealership. The roof structure consists of a panelized wood roof supported by interior steel columns and perimeter specially reinforced masonry shear walls. The foundation system consists of conventional reinforced concrete shallow footings.

Honda Dealership Addition (11)
Roseville, California

Design of a 3,800 square foot single story addition to an existing dealership. The roof structure consists of a panelized wood roof supported by interior steel columns and perimeter specially reinforced masonry shear walls. The foundation system consists of conventional reinforced concrete shallow footings.

EXPERIENCE – WAREHOUSE

State Liquor Board Warehouse Expansion (13)
Seattle, Washington

Project consisted of a 60,000 square foot addition to the west side of an existing warehouse. The new addition included enclosed high-bay warehouse space with requirements for a super-flat floor system in order to allow the operation of Very Narrow Aisle (VNA) high lift trucks. The super-flat floor system was post-tensioned in order to meet the stringent levelness and flatness criteria required for the operation of the VNA trucks. Due to highly liquefiable soils in the area, extensive soil mitigation was required in order to stabilize the building site during a seismic event as well as limiting differential settlement between the existing building and expansion. Dynamic rammed aggregate piers in conjunction with earthquake drains were used to meet the required parameters.

Green Mountain Coffee Roasters (8, 9)
Sumner, Washington

Design of building modifications and new equipment structures for a state-of-the-art bulk coffee roasting production facility. Equipment support structures included a foundation and bulk packaging structure designed to support bulk packaging equipment, hoists, and operating personnel; multiple coffee storage and delivery silos; and frames and foundations for coffee distribution systems.

CONTACT

Our office is conveniently located in downtown Seattle in the Norton Building.

We look forward to hearing from you.

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