Independent Structural Engineering and Architectural Commentary: Seismic Retrofit Study Update on Lafayette Reservoir Outlet Tower

as Presented on November 28, 2023 by EBMUD/AECOM

February 6, 2024

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Introduction

This commentary contains the technical response by an independent Citizens Advisory Committee (the Committee), comprising the above-listed individuals, to the update presented by representatives of EBMUD and their consultant, AECOM, to representatives of the City of Lafayette on 11/28/2023 regarding EBMUD's ongoing study of seismic retrofit options for the Lafayette Reservoir Outlet Tower (the Tower). The current commentary represents the consensus technical opinion of the Committee. The Committee members bring to bear their broad experience and expertise in the areas of seismic structural retrofit design and analysis as well as architecture on EBMUD's Outlet Tower seismic analyses and retrofit design studies.

This commentary follows incremental developmental work performed by EBMUD in response to the Committee's review of EBMUD's documentation of previous developmental work presented to the City of Lafayette in July of 2023.

The current commentary specifically addresses the material presented by EBMUD to the City of Lafayette representatives and the Committee in a PowerPoint presentation during a remotely attended meeting on November 28, 2023. That material was provided to the Committee members as a PDF following the remote meeting. The material provided was presented verbally and was not accompanied by any detailed supplemental documentation. Consequently, the Committee's current response references previously provided study material where applicable, including the California Division of Safety of Dams (DSOD) seismic evaluation protocol as well as project-specific information developed by DSOD, EBMUD, and AECOM.

Executive Summary

The Citizens Advisory Committee (the *Committee*) for the Lafayette Reservoir Outlet Tower (the *Tower*) seismic retrofit evaluation has reviewed the statement of progress presented by EBMUD in a virtual meeting on 11/28/2023. At that meeting, the speakers discussed the status of EBMUD's ongoing evaluation of a retrofit option that would maintain the historic height and appearance of the tower, rather than truncating approximately half or more of the visually exposed portion of the original tower height, as EBMUD had proposed in July 2023.

The status report discussed the presenters' progress on the analytical evaluation of the full-height alternate but did not discuss the corresponding retrofit design or associated cost comparisons, which EBMUD stated were still in development.

Based on the analysis information provided to date by EBMUD, the Committee maintains that the Tower can be cost-effectively retrofitted to comply with DSOD criteria using only a modest addition of mild steel reinforcement in the upper half of the Tower. Correspondingly, it is the opinion of the Committee that the extent of retrofit work that EBMUD has put forth as necessary to safely preserve the historic height of the Tower is excessive and would result in a needlessly high construction cost. Furthermore, the extent of work described by EBMUD is based on the results of a "traditional" analytical approach that, in the consensus opinion of the Committee, is no longer current, is inappropriately conservative, and which does not follow current analytical DSOD protocol for the evaluation of outlet towers, such as the Lafayette Reservoir Outlet Tower, where post-elastic behavior is anticipated.

The Committee does not disagree with the need for conservatism in the seismic evaluation of the Tower, which serves a critical purpose; rather, it is the unnecessary *compounding of conservatism* that the Committee believes is excessive and unsupported.

The Committee's finding is that EBMUD's retrofit decision process compounds several "conservatisms" to make the Tower's seismic condition appear worse than it is. Specifically, the tower evaluation is done for the highest percentile DSOD ground motion criteria usually reserved for the most critical structures, using an unnecessarily conservative and over-simplified analysis method. The results of that analysis have been compared with an underestimated structural capacity to justify the assertion that the only practical retrofit alternative is to simply truncate the tower.

In the Committee's consensus opinion, reliance on a more appropriate analytical model would produce more representative and less intense demands on the Tower. Also, accurate use of the available materials testing information would result in more realistic structural capacity and significantly less retrofit.

The Committee consequently disagrees with both EBMUD's evaluation process and the resulting assertion that safely retrofitting the tower to maintain its historic height would entail prestressing that extends the full height of the Tower and well into bedrock.

The following is an itemized summary of the Committee's consensus opinions and questions on the 11/28/2023 presentation. Each of the following items is addressed in more detail in subsections A through H of this report, following this executive summary.:

1. **The analysis method relied upon for design evaluation does not represent the current state of practice for seismic analysis of a complex system of soil and structure such as the Tower.** The analytical evaluation and the resulting findings are based on a linear-elastic response spectrum (LERS) analysis model. The Committee stated in July 2023 that LERS is considered an outdated analytical method that was originally developed as a simplified way to analyze conventional building structures and tends to produce overly conservative results. More advanced and representative analytical models for the Tower have already been developed and used to evaluate its nonlinear seismic behavior, such as AECOM's FLAC 3D model, and DSOD's LS-DYNA model; however, the results from these more representative models have seemingly been ignored in EBMUD's conclusions about retrofit.

2. **The presentation appears to ignore the Committee's earlier observation that the only so-called "brittle failure mode" (in this case, the flexural mode) affecting the tower capacity can be resolved relatively simply by the addition of a modest amount of mild reinforcement in the upper portion of the tower height.** Slide 15 of the 11/28/2023 presentation refers to a "brittle failure mode above EL 440 feet," and the FLAC 3D results table on Slide 20 presents demand/capacity limits corresponding to such brittleness to support the presenters' argument against the full-height retrofit option.

3. **The shear capacity of the lower portion of the tower has been understated.** Slide 17 implies that there is a shear strength deficit in the lower portion of the tower, assuming a value of f'c of 4,000 psi. The Committee believes that the LERS analysis results already overestimate the shear and bending forces in the Tower. However, even if it were assumed that the tabulated shear values were applicable, the concrete strength has been under-represented in the DCR calculation based on the core test results reported in the 2019 Alternative Selection Report.

4. **The stated effect of the tower on the buried conduit assembly is questionable.** The Committee questions the validity of the assertion that a full-height tower significantly increases the bending moment in the buried conduit assembly. The information presented by EBMUD on 11/28/2023 implies that the *toe of the dam* is the main feature driving the bending moment values, rather than the relationship of the conduit to the tower.

5. **The possibility of "added cost" of increased reinforcement of the buried conduit assembly due to a full-height tower has been exaggerated.** The retrofit of the conduit assembly is necessary *regardless* of the height of the tower. Most of the cost to retrofit the conduit assembly will be in *providing safe construction access* to the conduit, which must occur in any case, rather than due to the additional cost of furnishing and installing reinforcement. In other words, even if the quantity of retrofit materials were increased due to the interaction of the conduit and the tower, which is questionable, the resulting incremental cost of the added material would be relatively insignificant.

6. **The "challenge" of installing reinforcement in the existing tower wall has been overstated.** The second bullet of Slide 24 states that "drilling holes to install PT and

reinforcement in a 100-year-old tower poses a construction challenge and is likely to cause issues for the tower walls." This type of coring (known as "center-coring" or "center-core drilling") is more common than implied by the above statement and is almost always used on historic structures that have walls of more fragile materials than the relatively robust reinforced concrete of the Tower.

7. **The added seismic risk to the existing Tower to allow time to analyze and obtain approval for a full-height retrofit would be insignificant relative to the 600-plus year return period envisioned for the criterion-level seismic event.** The last bullet of Slide 24 implies that the incremental time required to obtain approval for - and to analyze - the full-height option would significantly increase the seismic risk to the Tower. However, it is evident from the presentation material that modeling of the full-height option has already been largely developed, and a full-height retrofit option was introduced to DSOD as part of the 2019 *Alternative Selection Report.*

In synopsis:

The *Citizens Advisory Committee* greatly appreciates EBMUD's willingness to share the engineering reports generated by AECOM and discuss the City's desire to retain the existing scale and proportion of the Tower, rather than EBMUD's current proposal to reduce the Tower's height by 40 feet, leaving only a truncated remnant of the iconic structure.

Over the past nine months, the Committee members have analyzed, in significant depth, the technical data, reports, and references cited by both EBMUD's structural design consultant (AECOM) and the Division of Safety of Dams (DSOD).

The Committee's primary objectives for the ultimate retrofit design of the Tower are that:

1) The selected design and construction approach addresses the seismic risk to the safety of the community of Lafayette;
2) The retrofit be undertaken cost-effectively; and,
3) The retrofit design respects the significant historic and community stature of the iconic Tower.

For reasons noted herein, we maintain our earlier finding that the Tower can be safely and cost-effectively retrofitted by the addition of a modest amount of mild steel reinforcement in approximately the upper half of the Tower. The Committee believes that this approach can be shown to comply cost-effectively with DSOD seismic requirements using an appropriate state-of-the-art analysis and will respect the architecture of the Tower and the environment of the Reservoir. Consequently, the Committee seeks EBMUD's serious re-consideration of the above-described retrofit option.

Contents of This Commentary

The Committee commentary covers the following important subject areas of the EBMUD presentation material:

A. **Architectural and Community Significance**
B. **Analytical Approach**
C. **Appropriate Scope of Full-Height Seismic Retrofit**
D. **Tower Wall Shear Capacity**
E. **Tower/Conduit Interaction**
F. **Reported Impact of Full-Height Tower on Conduit Construction Cost**
G. **Full-Height Tower Construction "Challenge"**
H. **"Incremental" Seismic Risk Due to Retrofit Design Duration**

Appendix – Committee Member Resumes

A. Architectural and Community Significance of the Lafayette Reservoir Tower

"MORE THAN A TOWER"

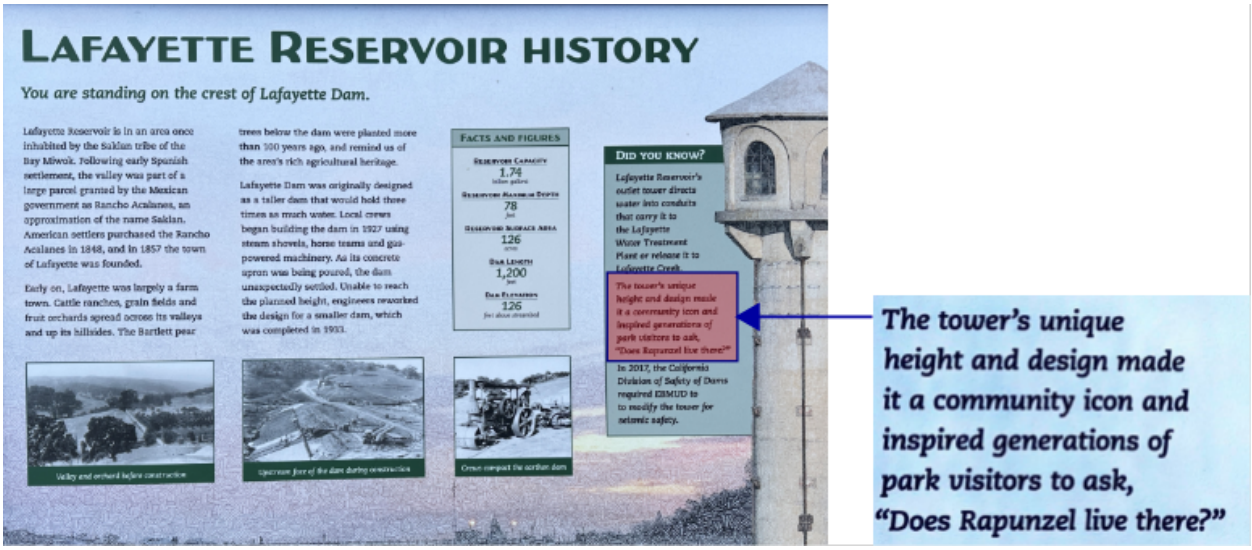
The members of the Citizens Advisory Committee are all Professional Engineers and Architects as well as residents of Lafayette. Having dedicated our careers and led our professions, we are first and foremost committed to structural engineering design and construction standards that address life safety and would not sacrifice that ethic, especially in our own community.

That said, as important as seismic safety is, the Committee believes that the structural design of the tower can be approached with sensitivity and from a "macro" perspective where the tower is acknowledged as a significant contributor to a larger civic context… *it is more than a tower.*

While not certified as a Historic Landmark, the 96-year-old Tower and its surrounding environment clearly represent an important regional, cultural, and civic resource deserving of careful design and construction approaches equal to our concerns for seismic safety. Evidenced by EBMUD's own website description, the importance of this civic resource should, by State policy, warrant comparable consideration despite its lack of historic certification.

We do not doubt that EBMUD understands that the citizens of Lafayette - and the *entire East Bay community* - cherish the historic Tower as an essential element of the Lafayette Reservoir environment. In fact, EBMUD's own public *"Lafayette Reservoir History"* placard, located at the crest of the dam and looking out to the Tower and the Reservoir characterizes the Tower's community significance in simple terms:

> *"The tower's unique height and design made it a community icon and inspired generations of park visitors to ask, "Does Rapunzel live there?"*



As Loring Wyllie, a Member of the Committee, as well as Past Chair and long-time member of the State Historic Building Safety Board, reminds us, the State Historical Commission and other agencies, including CEQA, support policies which endorse guidelines where the "*replacement of intact or repairable historic material or alteration of features, spaces and spatial relationships that characterize a property be avoided."* In addition to its own design guidelines, the State also subscribes to *The Secretary of Interior's Standards* for the treatment of historic properties.

These guidelines "*encourage preliminary measures to protect and stabilize properties before rehabilitation"* as well as codifying, in significant detail, all existing conditions to be replaced; this would include elements such as the top of the Tower, which may be removed and reconstructed. The guidelines recommend maximizing the retention of distinctive scale, proportion, and spatial relationships to surrounding landscapes and topography. This approach is distinctively contrary to the EBMUD proposal which attempts to provide substitute "architectural features" that would not be spatially or architecturally relevant since they can neither compensate for the change in tower proportion (removing 40 feet in height) nor be seen from trailways and anywhere within 100 yards between the tower and where people congregate.

In addition to minimizing the impact on and replacing the existing architecture, our structural proposal is to minimally impact the historical context of the tower while addressing its most pressing seismic deficiencies. Again, we believe that this is in keeping with State guidelines of how older, even if not historic, resources can be environmentally and sensitively rehabilitated both structurally and architecturally. In this case, less *is* more; our motive is akin to that of the "Hippocratic Oath:" that is, to "do no harm."

B. Analytical Approach

EBMUD's proposed seismic retrofit design alternatives are based on the results of a linear-elastic response spectrum analysis. It is the consensus opinion of the Committee that this approach is outdated and inappropriate for the application at hand, especially given that more accurate dynamic analysis methods are available using commonly available software programs.

The elastic model representation of the Tower, which is embedded far into the mud and bedrock beneath, starts only at the mud line and attempts to represent the highly complex interactive behavior of the Tower base embedment in the mud and bedrock using a set of elastic spring elements, such as might be used for an approximate analysis of a non-embedded foundation for a non-embedded pier, such as a building column. In our opinion, this over-simplified approach is an inaccurate and highly approximate representation of the Tower/foundation system and does not seem suitable as a basis of design for the Tower, or as a basis for decisions between seismic retrofit options.

Given the anticipated complexity of the interaction of the soil-structure system of the Lafayette Reservoir Tower, it is the opinion of the Committee that the approach used not only leads to overly conservative results and excessive retrofit scope, but it also does not represent the current state of practice for dynamic seismic analysis.

AECOM has already reported on their use of the FLAC 3D nonlinear dynamic analysis tool to evaluate the Tower. The resulting model provides an explicit representation of the soil and rock material that the Tower is embedded in. The results of the FLAC 3D model reflect significantly less retrofit demand than the less accurate response spectrum model does. We believe such a nonlinear model would be more appropriate as a design basis tool than the linear-elastic model that was used.

The Committee is surprised that the results from nonlinear modeling seem to have been ignored in EBMUD's conclusions about retrofitting the Tower. Specifically, Slide 19 of EBMUD's presentation shows a very developed FLAC 3D nonlinear model that includes both the tower and the soil. However, the results used to justify the type and extent of retrofitting have been derived from the less representative and more simplified LERS model.

Furthermore, DSOD's own protocol documentation (refer to the following link) implies that nonlinear dynamic analysis is recommended for evaluation of outlet towers such as the one at Lafayette Reservoir, where structural damage is anticipated:

> https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Division-of-Safety-of-Dams/Files/Publications/DSOD-Inspection-and-Reevaluation-Protocols_a_y19.pdf

The following is an excerpt from article VII B (subtitled *Outlet Towers*), starting on page 27 of the above-linked document. The excerpt pertains to the proper choice of analytical approach for an outlet tower where structural damage is anticipated. "Traditional" techniques include the approach used by EBMUD to justify their retrofit selection; these techniques are characterized by DSOD as "…simplified…," "…conservative…," and as not providing "…extensive insight into tower performance…"

> ***Traditional Analysis Techniques***
>
> *In cases where extensive damage is not anticipated, DSOD relies on traditional techniques, which are based on simplified analysis methods. These types of analyses may provide conservative results and generally do not provide extensive insight into tower performance, concrete damage, or post-earthquake stability. This approach considers an elastic material model and, therefore, tower reinforcement is ignored. The analysis process is based on a user-defined response spectrum and the superposition of modal analysis results. Reservoir effects are simulated using added mass while the tower-foundation interaction is either modeled as fixed or estimated using soil springs to simulate foundation impedances. Section demands are compared to section capacities in the form of demand-capacity ratios (DCRs), which are indirect*

approximations of the energy ratio (total energy dissipated/elastic energy dissipated). DCRs are evaluated based on allowable ductility criteria, which is typically a function of reinforcement and the quality of detailing.

In certain cases when elastic analyses produce section demands that are several times greater than their respective calculated capacities, further insight provided by more advanced analyses is needed.

Advanced Numerical Analyses

When extensive structural damage is expected, more sophisticated analyses need to be completed. These analyses model the tower shell explicitly, along with intakes, ducts, decks, etc. The foundation is developed to accurately characterize tower embedment and the reservoir model is developed to include water surrounding the tower, inside of the ports, and within the tower interior as needed. Nonlinear behavior of concrete is characterized using a constitutive material model that allows for a pressure versus volumetric strain relationship, damage accumulation, and progressive changes in properties during the analysis. Because the material model is based on realistic concrete behavior, all longitudinal and transverse reinforcement is explicitly included.

This approach produces the most realistic mathematical representation of the physical problems, and the model is capable of tracking and responding to damage as it accumulates. The model can be subjected to an earthquake time history and will track energy dissipation, concrete damage, and changes in concrete behavior as the structure is subjected to repeated cycles of earthquake loading. Softening and changes in structural period are also captured and tracked in real-time. As the concrete begins to accumulate damage, the structural period increases and the model progressively captures this transformation. The progressive formation of cracks and energy dissipation associated with crack formation is modeled accordingly. Ultimately, energy is dissipated more realistically, and results do not have to be based on an envelope of elastic model results that consider cracked and uncracked section properties.

These results are interpreted rather differently in the sense that they are not based on extrapolated elastic demands that approximate nonlinear behavior. Instead, the sections yield at their design load, and stresses are redistributed. Additional earthquake energy dissipation is achieved through inelastic deformation, so duration and the amount of energy being input into a system become relevant. The results provide a more direct measure of structural performance, which can be better assessed by reviewing deformation results and levels of material damage.

In summary, it is the Committee's opinion that the analysis should be done using an explicit nonlinear response-history modeling of the entire soil-structure system and that the LERS model should not be relied upon in determining the retrofit approach or scope. This is particularly appropriate since the selected intensity of the ground motion criteria is already at the highest possible level (84th percentile).

C. Appropriate Scope of Full-Height Seismic Retrofit

Regarding the EBMUD 11/28/2023 presentation Slide 20, which tabulates flexural demands in the tower against demand/capacity limits, the Committee demonstrated in their July 17, 2023, observations that the flexural capacity deficit in the Tower, which is limited to the upper portion of the height of the Tower, is readily resolvable by the modest addition of center cored reinforcement. This is because the applicable demand/capacity ratio (DCR) limit, which currently corresponds to "brittle" behavior due to a deficit of reinforcement in the upper reaches

of the Tower, can be easily doubled by adding a modest amount of steel reinforcement inside the concrete wall of the Tower. The EBMUD presentation on 11/28/2023 implicitly ignores the above finding of the Committee, despite it being recognized and understood by AECOM in our discussions with them in July 2023. Based on the DCR values tabulated on Slide 20, this observation remains valid and should be recognized and incorporated into the findings of the evaluation. In that case, the "brittle" status noted in the reported summary could be eliminated.

D. Tower Wall Shear Capacity

The Committee believes that the concrete strength in the lower portion of the Tower has been under-represented in the EBMUD calculation of the shear demand/capacity ratio. This opinion is based on the core test results reported in the 2019 *Alternative Selection Report*. The table on page 327 of that document indicates that the average f'c value of the concrete in the lower portion of the tower is 6,950 psi, which is significantly higher than the f'c value of 4,000 psi that was used for the DCR calculation. The shear strength evaluation should acknowledge the higher concrete strength where possible to avoid undue conservatism in assessing shear capacity, which could result in unnecessary retrofit construction effort and corresponding retrofitting costs.

Compressive Strength of Concrete Cores

Core	Sample Elevation (ft)	Compressive Strength (psi)	Average Compressive Strength per EL (psi)
A	444	*	6,950
B	444	6,790	
C	444	7,110	
D	464	3,850	3,770
E	464	3,840	
F	464	3,610	
G	484	5,380	4,630
H	484	4,390	
I	484	4,110	

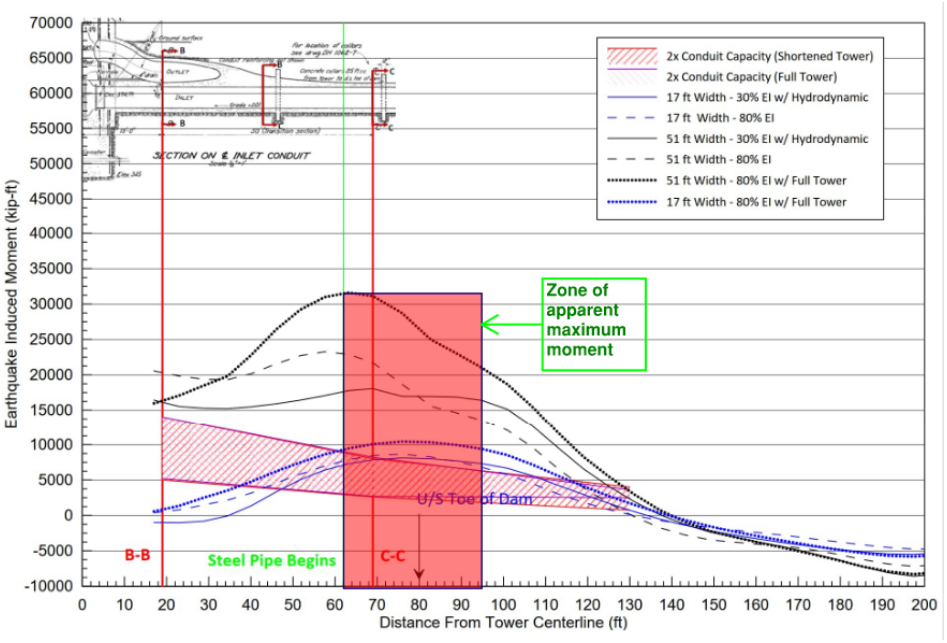
Actual tested compressive strength in lower portion of tower

Excerpt from Page 327 of the 2019 Alternative Selection Report
Concrete Material Testing Tabulation

E. Tower/Conduit Interaction

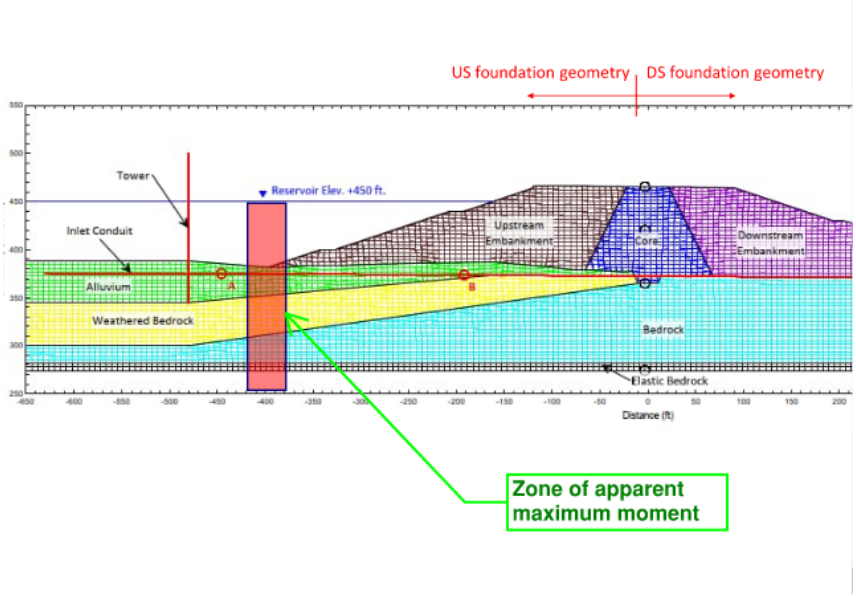
The stated effect of the tower on the buried conduit assembly is questionable. The Committee questions the validity of the assertion that a full-height tower significantly increases the bending moment in the buried conduit assembly. Slide 23 (excerpt below, followed by an excerpt from Slide 22 showing the dam cross section) indicates that the flexural demands in the conduit reach their maximum values between approximately 42 and 75 feet away from the Tower centerline. This implies that the *toe of the dam* is the main feature driving the bending

values, rather than the relationship of the conduit to the Tower. If the Tower were the cause of the maximum moment in the conduit assembly, it seems more reasonable that the conduit moment would be maximized near the *tower-conduit connection*.



Excerpt from Slide 23:

The vertical red line on the left represents the centerline of the tower vertical axis, and the red shaded area represents the range of implied maximum bending moments in the conduit assembly.



Excerpt from Slide 22:

Showing relationship of range of maximum conduit bending moment relative to tower centerline and the toe of the dam.

F. Reported Impact of Full-Height Tower on Conduit Construction Cost

The first of the second group of bullets on Slide 25 of EBMUD's 11/28/2023 presentation implies that the retrofit of the buried conduit would need to account for higher demands exerted by the full-height Tower. As stated in article E above, the Committee questions EBMUD's finding that conduit demands would be significantly increased by the tower. However, even assuming the existence of higher conduit demands, the Committee does not agree that the cost of the conduit retrofit would increase significantly. It is understood that the retrofit of the conduit assembly is necessary *regardless* of the height of the tower. Most of the cost to retrofit the conduit assembly will be in *providing safe construction access* to the conduit, which must occur in any case, rather than due to the additional cost of furnishing and installing reinforcement. In other words, even if the quantities of retrofit materials were increased incrementally due to the interaction of the conduit and the tower, which is questionable, the resulting incremental cost of the added material would be relatively insignificant.

G. Full-Height Tower Construction "Challenge"

The second bullet of Slide 24 of EBMUD's 11/28/2023 presentation refers to coring in the Tower wall as "challenging" and "likely to cause issues" for the Tower walls. The Committee believes that these assumptions are due to the overstated extent of coring assumed to be required by EBMUD for the full-height retrofit. Referring to article C above, the Committee's consensus opinion is that, at most, only the upper half of the tower requires reinforcement, and that such reinforcement could be accommodated with less than 15 vertically cored holes in the center third of the wall thickness. The opportunity for vertical alignment of these cores is afforded by the gentle tapering of the tower wall, which occurs on the outer surface only. Such a modest extent of *vertical* center coring is considered conventional for this type of reinforcement work. The following excerpt from Article 7.3 of the 2019 *Alternative Selection Report* indicates that, even with EBMUD's assumption of a far more extensive drilling depth than the Committee believes is warranted, the drilling process was vetted with two specialty contractors and the authors were confident regarding constructability:

> **7.3 Constructability Considerations**
>
> Constructing this alternative would require a specialty subcontractor with expertise in precision drilling and installation of post-tensioned grouted anchors or tendons. This technique has been implemented in past projects, including projects designed by AECOM (or AECOM predecessor firms), and therefore there is reasonable confidence in constructability.

H. "Incremental" Seismic Risk Due to Retrofit Design Duration

The final bullet of Slide 24 refers to the incremental time required for analysis and DSOD approval for a full-height retrofit of the Tower. This bullet further implies that this incremental duration would significantly increase the seismic risk to the Tower. In the Committee's opinion, this is misleading and nonsensical. Consider that a Hayward criterion-level (84th percentile) ground motion, which would be a large and infrequent event that has a postulated return period exceeding 300 years, is not expected to cause a failure of the as-is Tower structure. According to EBMUD's reported information, it would take the even more infrequent (600+ year return

period) Moraga 84th percentile ground motion to actually cause serious damage to the un-retrofitted full-height Tower. Based on the above observations and EBMUD's reported information, the likelihood of a damaging earthquake occurring in the incremental duration required for approval and analysis is minuscule. Furthermore, it is evident from the presentation material that a significant degree of advanced analysis modeling of the full-height option with embedded conduit has already been largely developed, and a full-height retrofit option was introduced to DSOD as part of the 2019 *Alternative Selection Report.*

Mason Walters, SE
Senior Principal

Mason Walters is a Senior Principal at Forell Elsesser and has been with the firm since 1984. With 44 years of experience in structural analysis and design with emphases on seismic protection of new and historic buildings, seismic design of reinforced concrete and steel structures, single- and multi-building seismic evaluation, peer review, as well as bridge and infrastructure design. Many of Mr. Walters' projects have gained special recognition for their unique and innovative structural solutions. For instance, the historic Salt Lake City and County Building was the first building in the United States to be retrofitted using seismic isolation.

In 1999 Mason developed an innovative seismic protection system for the EBMUD Mokelumne Aqueduct No. 3 between the towns of Holt and Bixler, California. This retrofit system used lead-rubber seismic isolation bearings as transverse seismic energy dissipators to improve the seismic resilience of the aqueduct without the addition of deep foundation elements in the environmentally sensitive wetlands that support the aqueduct's original foundation system.

Mason Walters excels at developing rational performance criteria for unusual projects, as well as the design, analysis, testing, and independent peer review for projects that fall outside the scope of traditional building codes. In the early 1990's, he developed specifications and testing requirements for various types of seismic isolation devices. These specifications were first used for the competitive bid package for the U.S. Court of Appeals seismic retrofit in San Francisco; the first federally funded isolation project. Mason is also the structural engineer of record for the first seismically isolated building constructed by the state of California (Caltrans Traffic Operations/CHP Communications Center, San Diego, CA), and provided independent peer review services for the first isolated building in Canada, the historic Strathcona School in Vancouver B.C.

Mason has also participated in post-earthquake reconnaissance, evaluation, emergency inspection, and retrofit for numerous seismic events, including:

- Loma Prieta Earthquake, 1989
- Northridge Earthquake, 1994
- Kobe Earthquake, 1995
- Nisqually Earthquake, 2001

Mason is past Chair and a current member of the University of U.C. Systemwide Seismic Advisory Board of the University of California Office of the President, and is also a current member of the Caltrans Seismic Advisory Board.

EXAMPLES OF NEW CONSTRUCTION / DESIGN PROJECTS:

UCSF Parnassus, Ray & Dagmar Dolby Regeneration Medicine Building, San Francisco, CA - Mason was Consulting Principal for this new design/build, 68,500 sq.ft. stem cell research building. The program included wet laboratories, laboratory support, offices, a 50-seat conference room, and green roofs. The structure is situated on a steeply sloped site and terraces vertically through a series of steps along the building length. The structure is steel-framed with triple friction pendulum isolators that protect the structure and the sensitive equipment and research it houses from the effects of a major seismic event. The building is seismically designed to move laterally a maximum of 26 inches during an earthquake of magnitude 7.8 with minimal structural damage. This is a LEED Gold Certified building.

UC Berkeley, Memorial Stadium, Berkeley, CA - Seismic strengthening and renovation of this 406,000 sq.ft., 63,000-seat stadium, which also houses several administrative offices and serves as the headquarters for football operations. The retrofit design for the stadium, which straddles the active Hayward fault running approximately from end zone to end zone, features innovative "seismic blocks" and a newly installed 375-foot long press box that can sway up to 12-inches in a major earthquake. The suspended concrete stadium was originally built in 1923 and designed by John Galen Howard. This project was delivered via CM-at-Risk and is LEED Gold Certified.

UC Berkeley, Simpson Training Center, Berkeley - This new, state-of-the art, 142,200 sq.ft., 95 ft. tall athletic facility

for the University of California Bears' sports program included a two-level concrete structure which is largely subterranean and abuts against the historic Memorial Stadium with the roof forming an exterior plaza and concourse area. The facility includes office space for thirteen varsity sports, locker rooms, coaches' spaces, equipment rooms and laundry, team meeting and training facilities, study centers, Olympic sports offices, stadium management and operations facilities. Included is a dining hall which accommodates 120 people and a commercial kitchen which supplies food for the athletes and the Field, Stadium & University club game-day events.

UC Berkeley, Jacobs Hall, Berkeley, CA – Mason is Project Principal for this new 3-story, steel framed structure which will provide additional studio instruction space, faculty office and classroom space for the School of Engineering. The 23,000 sq.ft. structure will utilize buckling restrained braced frames as the lateral force resisting system in conjunction with special concrete reinforced shear walls due to story height soil retaining conditions at the first floor. The long-span steel floor framing creates a column-free studio space, and includes cantilever floor framing up to 15 feet over the adjacent existing building to maximize building square footage. The clerestory roof framing will support PV arrays and incorporates large roof framing cantilevers to maximize available space for PV arrays. The building will be supported on a drilled pier foundation system to avoid surcharging the adjacent building basement levels.

UCSF, Genetics, Development and Behavioral Sciences Building (19B), San Francisco, CA - This 5-story, 165,000 sf structure that consists of structural steel floors with metal deck diaphragm and concrete topping. The superstructure sits on concrete pile caps and deep pre-stressed, pre-cast concrete piles. Buckling restrained braced frames function as the primary lateral load-resisting element, which will yield and dissipate seismic energy during large earthquakes. Mr. Walters implemented special bolted beam-column connection details for the BRBF that accelerated steel erection by two months.

UC Berkeley, CITRIS Headquarters Building, Berkeley, CA – Mason was Project Principal for this new complex which includes 115,000 sq.ft. of flexible research space, dry labs, distance learning classroom production suites, a visitor's center, and administrative and support space, which also includes an auditorium and cafe. The seismic load resisting system is buckling restrained braced frames. A seismic joint separates the buildings above a shared basement. The adjacent Microfabrication building houses two production floors designed to meet stringent vibration criteria and H6 occupancy.

Confidential U.S. Government Project, San Francisco, CA – Mason is serving as Project Principal and Forell Elsesser is currently the prime consultant providing design and construction documents to seismically upgrade the 109,000 sq.ft. existing building to meet ASCE-41 Basic Safety Objective performance. F/E is very familiar with the project and provided forensic analysis, seismic evaluation, structural analysis, structural design, construction administration services and studies in 1989 and 1999. This building comprises a full city block in the Upper Market district.

Laguna Honda Hospital & Rehabilitation Center, San Francisco, CA – Forell Elsesser provided structural engineering services for the replacement "essential facility" hospital. The project scope included a new, 140,000 sq.ft. 4-story pavilion building, and the seismic strengthening and remodeling of additional existing wings totaling 80,000 sq.ft.. The pavilion building is steel framed with eccentric braced frames that provide the lateral system for the structure. The pavilion creates a link to the hospital's new residential towers, and the original 1920's hospital buildings. This LEED Silver project is the first LEED Certified hospital in the state.

San Francisco International Airport Concourse H – BART Station, San Francisco, CA - The new 300,000 sq. ft. Airport Rapid Transit Station design criteria is among the most stringent anywhere. Functions of the structure includes BART and ART stations, and connection of the new, elevated roadway system with the new adjoining public parking structure. The complex interconnection of the Concourse H with elevated rail guideways was solved innovatively by using large passive viscous dampers.

San Francisco International Airport North/South/Rental Car Parking Garages, San Francisco Two new 1,260,000 sq. ft., 9-story reinforced concrete public parking structures with spaces for 3,154 cars. The new Airport Public Parking Garage is integrated with the Airport Rapid Transit System (ART) and designed to stringent codes. The North garage is adjacent to Concourse H and designed to the 1991 UBC. The Rental Parking Garage is 1,500,000 sq. ft., 5-stories.

Caltrans Traffic Operations/CHP Communications Center, San Diego, CA - Complete structural and seismic engineering services for this new 40,000 sq.ft. base isolated "essential" facility; this steel frame seismically isolated building has 2-stories and has been designed to remain fully operational following a major seismic event; designed to OSHPD Base Isolation Criteria, and required approval by the Office of the State Architect.

San Francisco 911 Emergency Communications Center, San Francisco, CA - Forell Elsesser provided structural engineering for the base isolation system in this new 64,000 sq.ft. facility which is used by several City agencies. The project houses 911 Call Taking, Police Dispatch, Fire Dispatch, Emergency Communications Center, and Emergency Medical Services Dispatch. The 2-story steel braced frame “essential facility” has one-level of underground parking with isolators located at the top of the basement columns, a very economical configuration.

Hiram W. Johnson State Office Building + Earl Warren Building, San Francisco, CA - Forell Elsesser provided complete structural engineering services under a design/build contract for this 1,050,000 sq.ft., two building complex which included a new 850,000 sq.ft., 14-story office building and the seismic rehabilitation and renovation of the adjacent 200,000 sq.ft., 7-story historic San Francisco State Supreme Court Building. The new State Office building utilized a welded steel moment frame with test-proven welded connections, in conjunction with 292 high-tech supplemental "passive dampers" which act as structural shock absorbers. The supplemental dampers reduce seismic accelerations by 50% and seismic deformations by 30%. Both effects will result in minimal post-earthquake damage and repair. The State Supreme Court Building, a steel framed masonry infill structure, was completely renovated and expanded by in-filling existing courtyards. The seismic retrofit incorporated concrete shear walls and diaphragm reinforcement to protect the structure during a large seismic event.

345 Brannan, San Francisco, CA – Mason is Consulting Principal and F/E is Engineer of Record for this new, 121,000 SF, 5-story office building with basement parking located near South Park in the SOMA district. The concrete shear wall building is conventional and post-tensioned flat plate construction founded on spread footings. The ground floor will house restaurant and retail space.

Facebook West Campus, Menlo Park, CA – Mason was Consulting Principal for the recently opened Facebook West Campus project. The building includes an on-grade open parking area for approximately 1500 automobiles, a second story open office space with an enclosed area of approximately 430,000 square feet, and a 9 acre fully landscaped green roof. The landscape design includes over 300 trees and a variety of shrubs, plants, and grasses planted in a 24” deep soil profile. The design also includes 20 unique exterior stairs, a large access ramp, and 3 dramatic lobby stairs. The project was designed and coordinated in Catia Digital Project and completed under an aggressive permitting and construction schedule.

EXAMPLES OF RENOVATION / SEISMIC RETROFIT PROJECTS (PARTIAL LIST):

Main Temple of the Church of Jesus Christ of Latter-Day Saints – Temple Square, Salt Lake City, Utah – Seismic Isolation of the historic unreinforced stone Temple structure. This iconic project required the development of completely new underpinning and superstructure retrofit methodologies, and three-dimensional nonlinear response history structural analysis to verify the adequacy of the retrofit to respond with minimal damage to the 85th-percentile MCE ground motion that included unusually high levels of vertical ground acceleration. Project is currently under construction and expected to re-open in 2026.

California Memorial Stadium, University of California, Berkeley, Berkeley, CA - Seismic strengthening and renovation of this 70,000 seat, 700,000 gsf stadium, which also houses several administrative offices and serves as the headquarters for football operations. This project creates an unusual challenge of strengthening since the structure straddles the active Hayward fault, approximately running from end zone to end zone.

San Francisco General Hospital Services Building SPC-5 Upgrade, San Francisco, CA – Forell Elsesser served as the executive prime consultant for this 50,000 sq.ft. 1970’s vintage post-tensioned concrete “essential” facility that was upgraded from SPC-1 to SPC-5, the highest seismic performance level defined for California hospitals. The project

includes steel braced frames that will maintain the open appearance of the existing building and the unprecedented use of composite fiber reinforcement to reinforce the existing roof slab. The design included a non-linear “push-over” analysis and an extensive plan-check, seismic anchorage of equipment and systems, and load testing of existing framing.

Oregon State Capitol Seismic Retrofit, Salem, OR - Forell Elsesser is providing a seismic evaluation and structural retrofit for the 233,750 sq.ft. historic building constructed from 1936-1938.

San Francisco City Hall, San Francisco, CA - Seismic evaluation and rehabilitation of the historic City Hall, which is a national landmark built in 1915 and damaged by the 1989 earthquake. The steel framed, masonry clad building is now protected with a state-of-the-art seismic isolation system, with a total of 530 isolators installed under the building.

Oakland City Hall, Oakland, CA - Listed on the National Register of Historic Places, the Oakland City Hall is a landmark historic 18-story steel framed structure with terra cota and stone perimeter cladding. The structure was damaged in the 1989 Loma Prieta earthquake and repaired using an innovative seismic isolation retrofit and complete strengthening design, utilizing 113 isolators.

Salt Lake City and County Building, Salt Lake City, UT - The use of base isolation for the seismic upgrading of this monumental 1894 unreinforced masonry building was unique, and was the first use of base isolation for an existing historic structure in the world. 447 isolators were installed under the 5-story building with its 240-foot tower. The building interior was also restored and the exterior rehabilitated. Mr. Walters was the structural consultant responsible for the isolation, detailing, and installation concepts and for the seismic analysis of the base isolation system.

Utah State Capitol Building, Salt Lake City, UT - Consulting for the base isolation and seismic upgrade of this 283,000 sq.ft. historic landmark building. The 4-story reinforced concrete frame building originally constructed in 1912 required an upgrade to current seismic codes. This major renovation includes the installation of 265 base isolators, to protect the building from a major seismic event.

UC Berkeley, Hildebrand Hall Seismic Upgrade, Berkeley, CA – Mason was Project Manager for the seismic upgrade to this 138,000 sq.ft., five-story reinforced and cast-in-place concrete structure. Built in 1963 utilizing unbonded braced frames and cast-in-place concrete shear walls to protect the structure from a major seismic event, the seismic retrofit design was the first use of buckling restrained braced frames (BRBF's) in an existing building. This project was delivered via the CM-at-Risk delivery method.

UC Berkeley, Barker Hall Seismic Upgrade, Berkeley, CA – Mason was Project Manager for the seismic evaluation, seismic upgrade and many laboratory renovations to this existing 83,000 SF, 6-story biochemistry building. Laboratory renovations occurred while the building was occupied during construction. The structural scope involved the addition of new exterior concrete shear walls supported by an innovative continuous "belt" foundation. The foundation avoided the need for a more conventional, but expensive drilled pier solution. The seismic work upgraded the building from a "Poor" to "Good" rating and represents the first architecturally exposed High Volume Fly Ash sustainable concrete mix application in California. It has been noted that Forell Elsesser's well-designed and constructed exterior shear walls and collector bands actually improve the appearance of the building. The six full-height shear walls caused the closure of only two window openings on the entire perimeter of the building. This project was delivered via the CM-at-Risk delivery method and is LEED Certified. The add-service for additional laboratory renovations totaled $14 million.

UC Berkeley, Latimer Hall Seismic Upgrade, Berkeley, CA – Mason was Project Manager for the seismic strengthening of this 184,000 sq.ft., 11-story concrete structure which houses the University's College of Chemistry. The building consists of nine stories above ground and two basement levels. The existing building was reinforced concrete construction, flat slabs and perimeter box columns. After a non-linear push-over analysis, the upgrade design was a combination of concrete shear walls along with exterior concrete moment frames. The structure remained occupied during the seismic upgrade.

EBMUD Mokelumne Aqueduct No. 3 – Seismic Protection between Holt and Bixler – Seismic retrofit using elastomeric (lead-rubber) seismic isolation bearings as transverse seismic energy dissipators to improve the seismic resilience of the aqueduct without the addition of deep foundation elements in the environmentally sensitive wetlands that support the aqueduct’s original foundation system.

STRUCTURAL PEER REVIEW EXPERIENCE:

Apple Campus 2, Structural Peer Review Services, Cupertino, CA – Mason provided peer review services for this 3 million sq.ft., four-story doughnut-shaped building with a plan diameter of nearly 1,500 feet which is supported on seismically isolated friction-pendulum bearings. The occupancy of the building is anticipated to be nearly 12,000 employees and one of the restaurants can serve up to 8,000 people at once. F/E was commissioned by Apple to conduct a special structural engineering peer review of the design of the main office building. For this highly visible project, F/E retained the services of three well-known university professors who are experts in the field of seismic isolation and earthquake ground motion. The review included observation of isolation bearing testing, review of the seismic isolation design and isolator test plan, review of the nonlinear dynamic structural analysis of the entire building together with the structural design of the lateral force resisting system. F/E also reviewed the nearby seismically-isolated Apple theater entry structure, which will be a round transparent structural glass pavilion topped by a fiber reinforced polymer long span roof system.

UC Berkeley, Zellerbach Hall Seismic Study, Berkeley, CA – Mason performed an extensive seismic study of this multi-venue performance facility with 2,015-seat Zellerbach Auditorium and the 500-seat Zellerbach Playhouse. F/E also performed a structural peer review of the design documents for the proposed pedestrian bridge for the Lobby Mezzanine improvements.

City of San Francisco, Transbay Transit Center Terminal Peer Review, San Francisco, CA
Mason Walters is providing structural peer review services, which was mandated by the City, since this structure is unique and uniquely important, and is being designed using performance based design procedures in lieu of a single building code. The scope of peer review covers both the station foundation, subgrade train box, and above-grade superstructure, as well as the bridges for the bus connector ramp from the SF-Oakland Bay Bridge (I-80).

California Academy of Sciences, Peer Review, San Francisco, CA
Forell Elsesser provided the Peer Review services of the structural design for this new museum, which is a visually-striking building that features an undulating 2.5 acre living roof with a perimeter steel canopy supporting photovoltaic cells, a large glass skylight supported by a tensile net structure, a freestanding 90-foot diameter planetarium dome, as well as five separate aquarium tanks and a 90-foot diameter glazed dome housing a rainforest exhibit.

U.C. Berkeley, Li Ka-Shing Center for Biomedical & Health Sciences, Peer Review, Berkeley, CA
Mason Walters provided structural peer review services for this 200,000 sq.ft., 6-story structure that consists of composite steel floor framing and buckling restrained braced frames, as well as an extensive steel framed roof penthouse and screen wall system. The building houses laboratory, research, office, administration and other support spaces for the advancement of biomedical and health science research and treatment.

U.C. Berkeley, Wurster Hall Seismic Retrofit Peer Review, Berkeley, CA
Mr. Walters performed a structural engineering peer review of a seismic retrofit design of this ten-story, 216,000 square feet concrete frame structure, constructed in the 1964, which houses the University's College of Environmental Design.

U.C. Berkeley, Campbell Hall, Seismic Retrofit, Peer Review, Berkeley, CA
Forell Elsesser provided Structural Peer review services for the seismic upgrade design of this building.

GSA, San Ysidro U.S. Border Crossing Inspection Station Peer Review, San Ysidro, CA
As part of our GSA IDIQ contract, Forell Elsesser provided the seismic evaluation and development upgrade concepts for this one- and two-story, unreinforced masonry building built in 1933 as a border crossing and inspection facility at the border.

GSA, U.S. Customs House Seismic Upgrade Peer Review, San Francisco, CA
The U.S. Custom House was listed in the National Register of Historic Places in 1975. After the 1989 Loma Prieta Earthquake, seismic and other upgrades were made from 1993 to 1997. While the building continues to serve many of its original purposes, the U.S. Customs Service is now the U.S. Customs and Border Protection, part of the Department of Homeland Security

GSA, U.S. Court of Appeals & Post Office Seismic Upgrade Peer Review, San Francisco, CA
Forell Elsesser was retained by GSA to provide Peer Reviewer services and evaluate the seismic capacity of the U.S. Court of Appeals and Post Office Building and to develop upgrade and renovation concepts for this landmark historic building. F/E developed a courtyard infill concept with 114,000 sq.ft. of new space as well as the base isolation details and bid documents for the competitive procurement of isolation devices.

GSA, Pioneer Courthouse Structural Peer Review, Portland, OR
Mason Walters provided the structural peer review services for the seismic retrofit of this historic building. The GSA went above and beyond the minimum required codes to protect this historically significant courthouse from future earthquake damage. The restoration work also included upgrades to protect the historic nature and contents of the building for posterity.

Stanford University, Crothers Hall, Peer Review, Palo Alto, CA
Forell Elsesser provided Structural Peer review services for the seismic upgrade design of this building.

State of Utah, Capitol Building Seismic Rehabilitation, Salt Lake City, UT
Forell Elsesser provided structural engineering consulting and peer review services for the base isolation and seismic upgrade of this 320,000 sq.ft. historic landmark building located just a few hundred feet from the Wasatch fault line. The 4-story reinforced concrete frame building originally constructed in 1912 required an upgrade to bring it up-to-date with current seismic codes.

Church of Latter Day Saints, Mormon Tabernacle Seismic Retrofit Peer Review, Salt Lake City, UT
Mason Walters reviewed the seismic retrofit evaluation and design of a voluntary seismic retrofit of this unique, monumental religious building, constructed in 1867. The original framing system utilized long-span arched timber trusses supported on masonry piers.

McKay Dee Hospital Peer Review, Ogden, UT
Forell Elsesser provided peer review services for the new construction of this hospital building.

New Zealand Parliament House Peer Review, Wellington, New Zealand, CA
Forell Elsesser provided the Structural Peer Review services for the base isolation designs of this historic URM parliament building.

Hewlett Packard, Big Foot Building Evaluation, Peer Review, Cupertino, CA
Forell Elsesser Engineers provided structural engineering peer review services of a seismic evaluation and proposed retrofit design for two 1970's-era two-story steel-frame office structures approx. 600 feet in length.

LLNL Master Task Agreement (MTA B588217), Computations Directorate, Livermore, CA - Mason is currently serving as Project Principal for this 3-year as needed contract. This IDIQ provided structural engineering services including new construction, renovations, and remodels to buildings and structures. This three-year contract is being completed with RMW Architecture + Interiors.

LLNL Master Task Agreement (MTA B592344), NIF Directorate, Livermore, CA – Mason is currently serving as Project Principal for this 2-year as needed contract which was renewed twice for a total duration of five years. This IDIQ provides structural engineering services and has included renovations, demolitions, and remodels to buildings and structures that support the National Ignition Facility (NIF), the preeminent laser research and development facility in the field of High Energy Density Laser physics.

BRIDGE ENGINEERING AND DESIGN REVIEW EXPERIENCE:

UCSF Parnassus, Ray & Dagmar Dolby Regeneration Medicine Pedestrian Bridge, San Francisco, CA Forell Elsesser continuously reviews our projects to improve the cost and constructability of our designs. At the Ray & Dagmar Dolby Regeneration Medicine building, one area of focus was the bridge structure connecting the building to the main Parnassus Campus. Originally conceived as an all steel structure in the bridging documents, F/E was able to realize $750,000 in savings and improved seismic performance for the University by revising the main vertical support from steel to vertically post-tensioned concrete. This also reduced the construction time of this 90-foot tall support by several weeks

as a result of the decrease in field labor required for construction.

(GSA), Federal Building and U.S. Courthouse, Pedestrian Bridge, San Diego, CA - Seismic renovation that included the design and new construction of a replacement bridge structure (16' wide by 80' long pedestrian bridge) that connects Level 6 of the Federal Office Building to Level 5 of the US Courthouse Building. It is constructed of structural steel trusses spanning 80 feet to bridge bearings, with steel deck and concrete fill at the floor and steel decking plus roofing at the bridge roof. There is GFRC cladding on each side and at the bridge soffit. Seismic joints were designed to accommodate earthquake ground motion between the bridge and the two buildings; scope included construction administration.

UC Berkeley, La Loma-Foothill Pedestrian Bridge, Berkeley, CA - The Foothill Housing Pedestrian Bridge will provide students with a safe link over busy Hearst Avenue between the residential and common facilities. The bridge is located over the expected rupture zone of the North Hayward fault, and has been conceived with seismic isolation to reduce lateral forces, protect the supporting piers, and allow for differential horizontal movement of the pier foundations at each end of the bridge. The bridge is 300 ft from the active Hayward fault.

UC Berkeley, Richard Newton Pedestrian Bridge, Berkeley, CA - Structural design services for new pedestrian bridge connecting the existing Cory Hall to the new CITRIS Headquarters, being designed by Forell Elsesser. The pedestrian bridge is steel framed and is 60’ long. The pedestrian bridge structure is a low-profile, architecturally exposed three-dimensional harped “bowstring” truss that was constructed with pipe elements. The bridge, which has a transparent glass railing, rests on an innovative articulated support and suspension system to safely accommodate large relative movements between the supporting buildings in the event of a large earthquake. The bridge was fabricated in a single piece, and erected in approximately three hours.

Briceburg Suspension Bridge, Yosemite, CA - Post-flood damage investigation and repair recommendations for historic single lane suspension bridge. Forell Elsesser was also finally retained to collaborate in a design-build repair project to restore the structural capacity of the 160' span Briceburg Bridge following extensive flood damage incurred in 1997. Additionally, performed seismic evaluation and truck load analysis for purposes of load rating.

Caltrans Independent Design Check of Freeway Upgrades, San Francisco, CA
Forell Elsesser provided the Independent plan check of the seismic repairs and retrofit for the San Francisco Central Viaduct (Frames 1,3,4,5,10, 11,14,15, CU14, CU15, OL33, FL33) on U.S. 101 which were damaged in the 1989 Loma Prieta earthquake.

Bonner’s Ferry Crossing over the Kootenai River in Northern Idaho, 1981-1982: The applicant was the project engineer working with the Senior Engineer in the office of TY Lin International in San Francisco. The bridge is a multi-span composite steel plate girder structure on reinforced concrete piers, some founded on steel H-pile foundations/pile caps, and others founded on spread footings on rock. Applicant developed all project structural design calculations and multi-span analysis using AASHTO provisions. The design live loading was for HS20-44 truck loading. Design purview included transversely post-tensioned concrete bridge deck slab, longitudinal composite steel plate girder stringers, abutments at each end of bridge designed to retain soil pressures and traffic surcharges, and intermediate piers. This bridge was the first-ever longitudinally post-tensioned plate girder highway bridge, and was constructed in 1982-83.

I-85/I285 Interchange, Atlanta, GA – Six multi-span, post-tensioned concrete box girder highway bridges, with clear spans up to 240 feet. These bridges comprise all major overcrossing structures for the I-85/I-285 interchange, located immediately northeast of Atlanta, Georgia.

Jamestown Replacement Bridge, Narragansett Bay, RI - Post-tensioned segmental cantilever box girder, with a clear span of 650 feet over ship channel in Narragansett Bay.

Metro Railway Bridges, Washington, DC - Three post-tensioned concrete, multi-span curved post-tensioned box girder overcrossing.

Bogota Overcrossing Viaducts, Bogota, Colombia - Longitudinal post-tensioned concrete spine with highly efficient transverse pre-cast concrete “wing slab” elements.

SEISMIC EVALUATIONS

Administrative Office of the Courts (AOC), Court Building, Seismic Assessment Program, Statewide, CA - Seismic assessment of numerous existing courts buildings in 12 counties from Humboldt to San Diego to determine seismic safety and develop defensible risk level assessments in preparation for the transfer of ownership and management responsibility from the counties to the State.

Stanford University Seismic Evaluations, Stanford, CA - Mason was Project Principal and provided the seismic evaluations of six buildings on campus including Encina Commons, Crothers Hall, Math Corner, Meyer Library, Cubberley Education Building, and the Tresidder Memorial Union. The studies utilized ASCE 31/FEMA-310 guidelines and included several seismic rehabilitation design alternatives and relative costs to bring each building up to seismic code to withstand a major earthquake. This evaluation comprised a 3-D non-linear static analysis in association with the provisions of ASCE 41-06, and included a comprehensive, prioritized list of seismic deficiencies, together with a proposed conceptual retrofit scheme and construction cost estimate.

UC Berkeley, Multiple Building Seismic Evaluations, Berkeley, CA – Mason was Project Manager and served as part of a team that performed 40 seismic evaluations out of 120 buildings and categorized each building's expected performance in an earthquake in accordance with the University's rating system. These evaluations were based roughly on the provisions of FEMA 178. These evaluations rated each building "Good, Fair, Poor, and Very Poor". The buildings that obtained Poor and Very Poor seismic performance ratings applied to buildings and other structures whose performance during a major seismic disturbance is anticipated to result in extensive structural and nonstructural damage, potential structural collapse, and/or falling hazards that would represent high life hazards. Such buildings or structures would either be given the highest priority for expenditures to improve their seismic resistance and/or reduce falling hazards so that the building could be reclassified GOOD, or would be considered for other abatement programs such as reduction of occupancy.

SLAC National Accelerator Laboratory, 10 Year Seismic Evaluation Studies, Phases I and II, Menlo Park, CA - Mason was Project Principal and performed seismic evaluations as part of an ongoing program to evaluate and rate buildings and structures on the SLAC campus every 10 years. The most recent review was of 58 buildings and non-building structures that range in size from 400-26,000 sq.ft. and included office, laboratory, support, electrical substations and cooling tower structures. Non-structural systems as well as egress issues were evaluated and rated. The evaluation methodology was based on ASCE-31-03, and included detailed report on each building that addresses structural deficiencies along with retrofit recommendations and approximate costs for each upgrade alternatives. A concise summary of the buildings and structures evaluated was assembled to help SLAC facilities management to prioritize ongoing seismic upgrade projects.

Smithsonian Institution Building, Base Isolation Study, Washington, DC – Mason is serving as Project Principal and is providing a complete an expedited master plan-level conceptual, technical and cost validation study for the possible seismically-isolated retrofit of the unreinforced masonry SIB structure. RSA would review the limited existing documentation on the SIB structure, and would perform supplemental visual survey, then develop a linear elastic SAP or ETABS analytical model for the superstructure of the building. F/E would work with that model to evaluate the application of seismic isolation in conjunction with RSA's structural study of the proposed basement deepening.

UCSF Parnassus, UC Hall and Clinical Sciences Building Options Study, San Francisco, CA - Mason provided a comprehensive re-purposing options study for these two adjacent, interconnected, 147,000 sq.ft. and 107,000 sq.ft. concrete and steel buildings. As part of this study, F/E developed seismic retrofit solutions for both buildings which were previously rated as "Poor" to meet the 2011 UC Seismic Safety Policy.

GSA Albuquerque Courthouse Seismic Study, Albuquerque, NM – Mason was Project Principal and prepared a detailed seismic evaluation for this 55,000 sq.ft., 6-story reinforced concrete courthouse building constructed in 1931. The study utilized ASCE/SEI 31 criteria in determining the seismic deficiencies of this historic structure. The results of the seismic evaluation indicate that the Albuquerque Courthouse Building is expected to perform poorly in a major earthquake. The evaluation included a FEMA 310 assessment of seismic-related geotechnical hazards, as well as an evaluation of seismic non-structural hazards in accordance with ASCE/SEI 31. In addition, a seismic risk analysis was performed using the ST-RISK software for 5, 10, 20, and 50 year time periods for different levels of Modified Mercalli Intensity for the site. The proposed seismic upgrade is expected to significantly improve the behavior and performance of

the building in a major earthquake. The addition of anchorage for the out-of-plane behavior of the unreinforced masonry walls at the 6th floor is expected to provide a direct load path to the walls and keep them from separating from the floors. The addition of shear capacity at the exterior walls is expected to provide additional strength and minimize damage to the building. The stabilization of the interior hollow gypsum masonry block partitions, lateral bracing of ceilings, and anchorage of MEP equipment and distribution systems are recommended to protect the building occupants from falling hazards. GS-09P-04-KTD-0086, April 16, 2009.

AOC Old Solano Courthouse, Seismic Study, Fairfield, CA - Mason was Project Principal and reviewed the seismic retrofit design for this historic 1911 courthouse building. The study determined that ASCE 41-06 is the most appropriate seismic retrofit criteria. Based on this criteria Forell Elsesser Engineers recommended that the proposed shear wall arrangement shown in the 2003 study be refined to more directly address the high inertia, and consequent seismic effects, of the massive entry colonnade and related granite elements.

St. Louis Courthouse Base Isolation Study, St. Louis, MO – Mason performed a complete seismic isolation design study for this landmark historic structure utilizing FEMA 273 Guidelines for Seismic Upgrade of Existing Buildings. Owned by the National Park Service and restored in 1976 for the Bicentennial, the 105,000 sq.ft. building is a three floor cruciform structure with full basement and a 185-foot tower and rotunda. The facility is headquarters for Gateway Park and serves as a museum of the history of St. Louis and on the history of the historic courthouse itself.

UC Berkeley, Zellerbach Hall Seismic Study, Berkeley, CA – Mason was Project Principal and performed an extensive seismic study of this multi-venue performance facility with 2,015-seat Zellerbach Auditorium and the 500-seat Zellerbach Playhouse. F/E also performed a structural peer review of the design documents for the proposed pedestrian bridge for the Lobby Mezzanine improvements.

USACE Presidio Seismic Evaluation, Monterey, CA – Mason performed seismic evaluations using FEMA 178 and other FEMA documents of various buildings at the former Fort Ord. Evaluations also included buildings at the Presidio at Monterey.

GSA U.S. Border Crossing Inspection Station, Seismic Evaluation, San Ysidro, CA – Mason performed a seismic evaluation and developed upgrade concepts for this one and two story unreinforced masonry building built in 1933 as a border crossing and inspection facility. It served for several decades as the principal crossing and inspection facility at the border. Several alternative upgrade strategies were identified and assessed for their ability to fulfill the GSA's objectives without undue costs, disruption to the building's function, or the impact on the historic fabric of the building. Structural review of drawings and results for wind tunnel testing of the primary canopy over the automobile border crossing entry was also provided. In addition, Forell Elsesser is conducting a Feasibility Study for the relocation of the San Ysidro Border Station. This report is a technical case study on the feasibility of moving the existing structure to three potential locations and includes costs estimates associated with the relocation. The border station is a 20,500 s.f., U-shaped building located at the border crossing between San Diego and Tijuana. Built in 1930 it has become an island between the freeway, which has grown to 26 lanes, the 1970's new border station facility, and the hillside. Presently, there is a desire to relocate the border station to allow for the further expansion of the freeway. The study was completed in July 2008.

Hewlett Packard, Big Foot Building Evaluation, Peer Review, Cupertino, CA – Mason was Project Principal and performed a structural engineering peer review of a seismic evaluation and proposed retrofit design by for two 1970's-era two-story steel-frame office structures that are approximately 600 feet in length. The original lateral force-resisting system of the Big Foot structure is concentric braced frames, and was found to be deficient with respect to H.P. seismic criteria. The engineer's seismic retrofit approach involved the introduction of an intermediate buttress tower near the center of the building's length. A simplified nonlinear analysis was used in the peer review effort to confirm the conclusions of the original structural engineering study.

Marriott Warner Center, Post-Earthquake Evaluation, Woodland Hills, CA – Mason was Project Manager and provided a post-earthquake evaluation and repair of this 300,000 sq.ft., 16-story reinforced concrete shear wall core tower with post-tensioned concrete floor slabs which was damaged in the 1994 Northridge Earthquake. The podium is a ductile steel moment frame and steel truss ballroom/back of house/gym/sports bar/retail complex.

Education
California Polytechnic State University, B.S., Architectural Engineering
University of California, Berkeley, M.Eng, Structural Engineering & Structural Mechanics

Registrations
California, Civil Engineer (C35638)
California, Structural Engineer (S2996)
Hawaii, Professional Engineer (11556)
Idaho, Professional Engineer, Structural & Civil (16399)
Oregon, Structural Engineer (90192)
Florida, Professional Engineer, Structural (83168)
Utah, Structural Engineer (10174342-2203)
Washington D.C., Professional Engineer (907752)
Washington, Structural Engineer (43400)

Awards
- 2019 H.J. Brunnier Lifetime Achievement Award for outstanding achievement in structural engineering
- 2018 University of California, Berkeley – Distinguished Civil Engineering Alumni Award
- 1992 National Endowments for the Arts – Award for Structural Design Excellence – LLNL Building 111 seismic retrofit design using innovative external buttress towers.

Professional Activities
Member, Structural Engineers Association of California (SEAOC)
  Voting Member, SEAOC Solar Photovoltaic Systems Committee (2012- present)
Member, Structural Engineers Association of Northern California (SEAONC)
  Former Director 2003 - 2005
  Former Co-Chair, Convention Technical Committee 1996
  Former Chair, Program Committee 1991-1992
  Former Chair, Research Committee 1983-1984
  Member, Subcommittee on Protective Systems
  Member, Subcommittee on Non-Building Structures
Member, American Society of Civil Engineers (ASCE)
Member, American Concrete Institute (ACI)
Member, Post-Tensioning Institute (PTI)
Member, American Institute of Steel Construction (AISC)
Member, Earthquake Engineering Research Institute (EERI)
  Member, Learning from Earthquakes Committee
Member, Int'l Assoc. of Bridge & Structural Engineers (IABSE)

AUTHOR/SPEAKER EXPERIENCE WITH PROFESSIONAL SOCIETIES AND UNIVERSITIES:

- STRUCTURE Magazine: "Seismic Isolation – The Gold Standard of Seismic Protection," July 2015.
- Co-author, SEAOC 2012 International Building Code (IBC) Structural/Seismic Design Manual (SSDM) – Design Example - Seismic Isolation Using Elastomeric Bearings, August 2014.
- California Polytechnic State University, Presenter, Seismic Isolation Retrofit of the Utah State Capitol Rotunda, February 18, 2012.
- SEAOC Convention, 2012 Santa Fe, co-authored paper entitled Seismic Considerations for "Isolated" Rooftop PV Arrays
- Review Panelist, NEHRP Seismic Design Technical Brief No. 4, Nonlinear Structural Analysis for Seismic Design, National Institute of Standards and Technology (NIST), published October 2010.
- SEAONC Spring Seminar, 2009, presentation entitled Sustainable Design of Concrete
- SEAONC Summer Seminar, 2007, presentation entitled Existing Building Construction
- Workshop for Seismic Protection of Historic Mosques in Istanbul, July 2006.
- SEAOC Convention, 2004, co-authored paper entitled Design for Improved Performance of Buckling-Restrained Braced Frames.

- SEAONC Summer Seminar, August 2002, presentation entitled Rehabilitation of Existing Buildings Using Seismic Isolation.
- EERI, 53rd Annual Meeting, February 2001, Monterey, presentation entitled Issues in the university of California, Berkeley Seismic Rehabilitation Program
- EERI 6th National Conference on Earthquake Engineering, July 1996, Chicago, paper and presentation entitled Analytical Procedures for the Design of Base-Isolated Structures.
- Eleventh World Conference on Earthquake Engineering, June 1996, Acapulco, co-authored paper entitled Applied Concepts for Seismic Isolated Building Structures.
- IABSE Structural Engineering International magazine, January 1995, co-authored article entitled Seismic Retrofit of the Oakland City Hall, Oakland, California
- University of California Berkeley, October 1995, Technical Seminar presentation entitled Seismic Isolation Retrofit of Oakland City Hall.
- California Department of Transportation, September 1995, Technical Seminar presentation entitled Seismic Isolation Applications for New and Retrofit Structures.
- ASME/JSME PVP Conference, July 1995, paper entitled Use of Isolators in New and Retrofit Construction
- NCMEC Third National Conference, 1995, San Francisco, presentation and paper entitled The Complex Structural Systems of Oakland City Hall.
- IFMA, October Meeting Presentation, San Francisco, presentation entitled Seismic Isolation
- EERI 5th National Conference on Earthquake Engineering, July 1994, Chicago, paper and presentation entitled Design and Implementation of Base Isolation for the Seismic Repair and Retrofit of Oakland City Hall.
- U.S. National Parks Service, 1994 Conference on Seismic Retrofit, co-authored paper entitled Repair of Five Historic Buildings Damaged by the Loma Prieta Earthquake.
- SSEC, November 1994 “Steel Tips” article entitled Use of Steel in the Base Isolation Retrofit of Historic Oakland City Hall.
- ATC-17-1 Seminar, March 1993, San Francisco, presentation and paper entitled Procurement Strategies for Seismic Isolation.
- ATC-17-1 Seminar, March 1993, San Francisco, presentation and paper entitled The Seismic Isolation of Oakland City Hall.
- SEAOC Convention, 1993, Scottsdale, co-authored paper entitled Implementation of Base Isolation for the Seismic Retrofit of Oakland City Hall.
- University of California Extension, 1992 Introductory Course on Structural Dynamics, lecture entitled Seismic Isolation.
- ASCE, Spring Conference, April 1991, paper entitled Seismic Isolation: An Emerging Rehabilitation Technique.
- SEAONC, Technical Seminar, Fall 1991, San Francisco, presentation and paper entitled Detailing for Constructibility and Performance in Cast- in Place Reinforced Concrete.
- EERI 4th National Conference on Earthquake Engineering, May 1990, Palm Springs, presentation and paper entitled Seismic Upgrading of a 7-Story Reinforced Concrete Building.
- ACI Fall Convention, October 1989, San Diego, presentation and paper entitled Recent Experience in Seismic Retrofit.
- ASME PVP Conference, June 1987, San Diego, presentation and paper entitled Seismic Base Isolation of Existing Structures with Elastomeric Bearings.
- University of California Berkeley, January 1987, Technical Seminar entitled Seismic Base Isolation of a 92-Year-Old Unreinforced masonry Structure.
- ASCE Special Conference on Base Isolation, February 1986, San Bernardino, presentation and paper entitled Base Isolation of the Existing City and County Building in Salt Lake City.
- ATC-17 Seminar and Workshop, March 1986, San Francisco, presentation and paper entitled Base Isolation of the Existing City and County Building in Salt Lake City.
- ASCE Structures Congress, September 1986, New Orleans, presentation and paper entitled Base Isolation of the City and County Building in Salt Lake City.
- Speaker: AIA Technical Presentation, July 1985, San Francisco, presentation entitled *Base Isolation*.

Jack P. Moehle
Professor of the Graduate School
Ed & Diane Wilson Presidential Professor of Structural Engineering Emeritus
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University of California, Berkeley
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http://www.ce.berkeley.edu/faculty/faculty.php?name=moehle

(a) Professional Preparation

University of Illinois, Urbana-Champaign, Civil Engineering, BS, 1977, MS, 1978; PhD, 1980

(b) Appointments

2016-2021	Ed & Diane Wilson Presidential Professor of Structural Engrg., UC Berkeley
2011-2016	TY and Margaret Lin Professor of Engineering, UC, Berkeley
1990-present	Professor, University of California, Berkeley
1997-2008	Director, Pacific Earthquake Engineering Research Center, UC Berkeley
1991-2001	Director, Earthquake Engineering Research Center, UC Berkeley
1986-1990	Associate Professor, University of California, Berkeley
1980-1986	Assistant Professor, University of California, Berkeley

(c) Awards and Honors

Honorary Member, Architectural Institute of Japan, 2024
Wason Medal for Most Meritorious Paper, ACI, 2023
Member, National Academy of Construction (USA), 2023
Academy of Distinguished Alumni, Honorary Member, CEE, UCB, 2023
Honorary Member, ACI, 2022
Honorary Member, EERI, 2021
George W. Housner Medal, EERI, 2020
Joe W. Kelly Award, ACI 2019
Academia de Ingeniería Mexico, Académico Correspondiente, 2016 election year
Best Journal Paper of the Year, for "Seismic Performance of Reinforced Concrete Core Wall Buildings with and without Moment-Resisting Frames," *The Structural Design of Tall and Special Buildings Journal*, 2015
Exceptional Public- and Private-Sector Research and Development Program, Tall Building Seismic Design Guidelines, ATC/SEI Award, 2015
Fellow, SEI/ASCE 2015
Helmut Krawinkler Award, SEAONC, 2014
National Academy of Engineering, 2014 election year
Top 25 Newsmakers, Engineering News Record, 2012
Best Technical Presentation of the Convention, Structural Engineers Assoc. of California, 2011
Award of Excellence (SEAONC), and Excellence Award (SEAOC) for Tall Buildings Initiative Guidelines on Performance-Based Seismic Design of Tall Buildings, 2011
Outstanding Paper Award, *Earthquake Spectra*, 2009
College of Fellows, SEAOC, 2008
Arthur J. Boase Award, Concrete Research Council, ACI, 2008

Chester Paul Siess Award for Excellence in Structural Research, ACI, 2007
Honorary Member, Structural Engineers Association of Northern California, 2006
Distinguished Alumnus Award, Civil Engineering, U of Illinois, Urbana-Champaign, 2005
The Annual Distinguished Lecture Award, Earthquake Engineering Research Institute, 2005
Delmar E. Bloem Distinguished Service Award, ACI, March 2001
Alfred E. Lindau Award, ACI/Concrete Reinforcing Steel Institute, March 1998
Fellow of the American Concrete Institute (ACI), 1990
Huber Research Prize, ASCE, 1990
University Honors: The Bronze Tablet, UIUC, 1978

(d) Guidelines and Code Development (selected)

Building Code Requirements for Structural Concrete (ACI 318), Member, 1989-present; Chair of Sub H - Seismic Effects, 1995-2014; Chair of Main Committee, 2015-2019.

Guide for Repair of Earthquake Damaged Buildings to Achieve Future Resilience (ATC 145), Project Management Committee, 2018-23.

Seismic Evaluation of Older Concrete Buildings for Collapse Potential (ATC 78), Project Management Committee, 2011-2018.

Recommended Administrative Bulletin on Structural, Geotechnical, and Seismic Hazard Engineering Design Review for the City and County of San Francisco, SEAONC AB-082/083 Task Group, 2017-2018.

Next-Generation Performance-Based Seismic Design Procedures for New and Existing Buildings (ATC 58), Project Management Committee, for FEMA, 2001-2012; (ATC 58-2), Performance Products Team, 2013-2015; Project Management Committee 2015-2018*Guidelines for Performance-Based Seismic Design of Tall Buildings*, Tall Buildings Initiative, PEER, 2010, 2nd edition, 2017.

Seismic Design of Cast-in-Place Concrete Diaphragms, Chords, and Collectors (ATC 76-7), NIST Technical Brief No. 3, Project Director, 2009-2010; 2nd ed. 2016.

Seismic Design of Reinforced Concrete Special Moment Frames, NIST Technical Brief No. 1, Project Director, 2008-2009; 2nd ed. 2016.

Seismic Design of Cast-in-Place Concrete Special Structural Walls and Coupling Beams (ATC 88), NIST Technical Brief No. 6, Project Director, 2010-2011.

Guidelines and Commentary for Seismic Rehabilitation of Buildings (ATC-33/FEMA 273), Senior Technical Committee and Co-Leader of the Concrete Team, 1993-98.

Guidelines for Evaluation and Repair of Masonry and Concrete Walls (ATC 43/FEMA 306-308), 1996-98.

Seismic Evaluation Guidelines for Existing Buildings (FEMA 178), Update for FEMA, Project Oversight Panel, 1996-98.

State of California Proposition 122 Seismic Retrofit Practices Improvement Program (ATC-40), 1994-96.

Improved Seismic Design Guidelines for California Highway Bridges (ATC 32), 1992-95.

Performance-Based Seismic Design: An Action Plan for Future Studies, FEMA, Project Director, 1993-95.

(e) Selected Other Service to the Profession

American Concrete Institute

Board of Direction, 2010-2013
ACI Technical Activities Committee, 1995-2001
Earthquake Engineering Research Institute
Editor, EERI *Earthquake Spectra*, 1993-96
Board of Directors, 2008-2011
Vice President, 2009-2011
American Society of Civil Engineers
Publications Secretary, Committee on Seismic Effects, 1988-93
Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7, 2012-2013
Structural Engineers Association of California
Board of Directors of SEAONC, 1992-94
Various committee assignments, 1982- present
Charles Pankow Foundation, Advisory Committee, 2011-2018
Building Seismic Safety Council (BSSC)
NEHRP Provisions Update Committee, 1998-2004
BSSC/PUC Issue Study on Spine Systems with Articulated Hinges, 2010-2014
San Francisco Bay Conservation and Development Commission, Engineering Criteria Review Board, 2012-2023.
Federation Internationale du Beton (fib)
Various Task Groups, 1999-2011
Technical Advisor, Double Deck Peer Review Panel, Caltrans, 1990-1993
UCBerkeley Seismic Review Committee 2001-present, Chair 2017-present
Before the Disaster Task Force, San Francisco Planning and Urban Research Association, 2007-2012.
San Francisco Public Utilities Commission, Seismic Task Force, 2009-2016
Bay Area Rapid Transit, Structural Peer Review, Chair, 2001-2013

(f) Selected Publications (selected from over 400 publications including 1 book)

Books

Jack Moehle, Seismic Design of Reinforced Concrete Buildings, McGraw-Hill Education, New York, New York, 2015, 760 pp.

Journal Papers

Worsfold, BL, and JP Moehle, "Shear-reinforced concrete breakout design methodology for moment transfer at column-foundation connections," *Engineering Structures*, V. 283, 15 May 2023, https://doi.org/10.1016/j.engstruct.2023.115783.

Worsfold, BL, and JP Moehle, "Moment Transfer at Column0Foundation Connections: Analytical Studies," *ACI Structural Journal*, V. 120, No. 2, 1 March 2023. DOI: 10.14359/51737146

Feinstein, T and JP Moehle, Mechanics Based Numerical Modeling of Floor-Anchored Nonstructural Components, Journal of Structural Engineering, V. 149, No. 1, January 2023. https://doi.org/10.1061/(ASCE)ST.1943-541X.0003496

Arteta, CA, and JP Moehle, "COMPRESSIVE BEHAVIOR OF THIN RECTANGULAR BOUNDARY ELEMENTS, ACI Structural Journal, September 2022. DOI: 10.14359/51737236

Worsfold, BL, JP Moehle, and JF Silva, "Moment Transfer at Column-Foundation Connections: Physical Tests," ACI Structural Journal, V 119, No. 5, pp 95-110, September 2022. doi: 10.14359/51734799

Feinstein, T, Moehle, JP. Seismic response of floor-anchored nonstructural components fastened with yielding elements. Earthquake Engng Struct Dyn. 2021; 1– 19. https://doi.org/10.1002/eqe.3553

Sezen, H, SM Alcocer, and JP Moehle, "EFFECTIVE DEPTH OF RECTANGULAR AND CIRCULAR COLUMNS FOR SHEAR STRENGTH CALCULATIONS," Concrete International, V. 43, No. 7, July 2021.

To, DV, D Sokoli, WM Ghannoum, and JP Moehle, "Seismic Performance of Tall Moment Frames with High-Strength Reinforcement," ACI Structural Journal, V. 118, No. 1, January 2021, DOI: 10.14359/51728180.

Shen, W-C, S-J Hwang, Y-A Li, P-W Weng, and JP Moehle, "Force-Displacement Model for Shear-Critical Reinforced Concrete Columns," ACI Structural Journal, V. 118, No. 1, January 2021, DOI: 10.14359/51728092.

Gaspar, D, and JP Moehle, "Comparative Study of Punching Shear and Concrete Breakout," ACI Structural Journal, V. 118, No. 2, March 2021, DOI: 10.14359/51729345.

Parra, PF, and JP Moehle, "Effects of strain gradients in the onset of global buckling in slender walls due to earthquake loading," Bulletin of Earthquake Engineering, V 18, March 2020, pp. 3205–3221(2020), https://doi.org/10.1007/s10518-020-00821-3.

To, DV, and JP Moehle, "SPECIAL MOMENT FRAMES WITH HIGH-STRENGTH REINFORCEMENT— PART 1: BEAMS," ACI Structural Journal, V. 117, No. 2, pp. 239-252, March 2020, DOI: 10.14359/51702416.

Parra, PF, CA Arteta, and JP Moehle, "Modeling criteria of older non-ductile concrete frame–wall buildings," Bulletin of Earthquake Engineering, V. 17, No. 12, pp. 6591-6620, December 2019, https://doi.org/10.1007/s10518-019-00697-y.

Other

Moehle, J.P., and J.D. Hooper, "Seismic Design of Reinforced Concrete Special Moment Frames: A Guide for Practicing Engineers, 2nd Edition," NEHRP Seismic Design Technical

Brief No. 1, National Institute of Standards and Technology, Gaithersburg, MD, NIST GCR 16-917-40, 2016.

Moehle, J.P., Hooper, J.D. and Meyer, T.R., "Seismic Design of Cast-in-Place Concrete Diaphragms, Chords, and Collectors: A Guide for Practicing Engineers, 2nd Edition" NEHRP Seismic Design Technical Brief No. 3, National Institute of Standards and Technology, Gaithersburg, MD, NIST GCR 16-917-42, 2016.

"Seismic Design of Cast-in-Place Concrete Special Structural Walls and Coupling Beams: A Guide for Practicing Engineers," J.P. Moehle, T. Ghodsi, J.D. Hooper, D.C. Fields, R. Gedhada, *NEHRP Seismic Design Technical Brief No. 6*, National Institute of Standards and Technology, Gaithersburg, MD, NIST GCR 10-917-4, 2011.

Jack Baker, Jonathan Bray, C.B. Crouse, Gregory Deierlein, Ronald O. Hamburger, John Hooper, Marshall Lew, Joe Maffei, Stephen Mahin, James O. Malley, Jack P. Moehle, Farzad Naeim, Jonathan P. Stewart, and John W. Wallace, "Guidelines for Performance- Based Seismic Design of Tall Buildings," Report No. 2017/06, Pacific Earthquake Engineering Research Center, University of California, Berkeley, May, 2017, 144 pp.

Loring A. Wyllie, Jr., SE

Senior Principal

Education

M.S., Civil Engineering,
University of California Berkeley, 1962

B.S., Civil Engineering,
University of California Berkeley, with Highest Honors, 1960

Professional Registration

CA Structural Engineer, License No. 1648

CA Civil Engineer, License No. 17179

TX Professional Engineer, License No. 44520

UT Professional Engineer, License No. 7241

TN Professional Engineer, License No. 114688

Qualifications

Loring A. Wyllie, Jr. has more than fifty years of professional experience. His work has included seismic evaluations, analysis, and design of strengthening measures for improved seismic performance. A number of these buildings are of historical significance. He is a past Chairman of the State Historical Building Safety Board, whose mandate is to evaluate and analyze methods for strengthening buildings that preserve their historic character. Loring is past-President of the Earthquake Engineering Research Institute (EERI). His contributions to the profession of structural engineering were recognized by his election to the National Academy of Engineering in 1990. In 2007, Loring was honored with the prestigious Outstanding Projects and Leaders (OPAL) Lifetime Achievement Award for design by ASCE. He was made an Honorary Member of the Structural Engineers Association of Northern California and Earthquake Engineering Research Institute. In recognition of his expertise in concrete design and performance, the American Concrete Institute named him an Honorary Member in 2000. Loring was elected an Honorary Member of the American Society of Civil Engineers in 2001.

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Professional Affiliations

International Association for Bridge and Structural Engineering: Vice President, 1997 – 2001; Chairman, USA Group, 1987 to present; Chairman, Organizing Committee, Annual Meeting, 1995; Member, Working Commission III, Reinforced Concrete, 1985 - 1993; Honorary Member, 2007.

Earthquake Engineering Research Institute: President, 1995 - 1997; Director, 1986 - 1989, 1994 - 1998; Member, Steering Committee, Eighth World Conference on Earthquake Engineering, 1984; Honorary Member 2005.

State Historic Building Safety Board: State of California, 1976 to present; Chairman, 1993 - 1998; Vice- Chairman, 1990 - 1993.

American Society of Civil Engineers: President, San Francisco Section, 1980 - 1981; Chairman, Committee on Concrete and Masonry Structures, 1981 - 1984; Chairman, Joint ASCE-ACI Committee on Reinforced Concrete Columns; Member, Joint ASCE-ACI Committee on Joints and Connections in Monolithic Concrete Structures; Program Chairman, 1977 ACI Annual Convention; Member, Committee on Convention Policy; Honorary Member, 2001; OPAL Lifetime Achievement Award for Design, 2007.

American Concrete Institute: Director, 1985 - 1988; Member, Technical Activities Committee, 1982 - 1988; Member, Committee 318, Standard Building Code, 1972 to present; Honorary Member, 2000.

Structural Engineers Association of California: President, 1987-1988; Director, 1978 - 1980, 1986 - 1989; Fellow Member, 2000.

Structural Engineers Association of Northern California: President, 1985 - 1986; Director, 1976 - 1978, 1984 - 1987; Chairman, Associates Activities Committee, 1967; Chairman, Building Codes Committee, 1971 - 1972; Chairman, Seismology Committee, 1975 – 1976, Honorary Member, 1998.

Building Seismic Safety Council: Chairman, Provisions Update Committee, 1988 - 1994; Member, 1994 to 2000.

U.S. National Academy of Engineering: Elected to membership, 1990; Chair of Civil Engineering Section, 1999 – 2001; Member, Civil Engineering Peer Committee, 1997 – 2000.

International Association for Earthquake Engineering: Vice President 2000-2008.

Awards

Phi Beta Kappa

Tau Beta Pi

Chi Epsilon

2007 American Society of Civil Engineers (ASCE) Outstanding Projects and Leaders (OPAL) Lifetime Achievement Award

Henry L. Kennedy Award, American Concrete institute,1985

H.J. Brunnier Award, San Francisco Section, American Society of Civil Engineers, 1985

Alfred E. Lindau Award, American Concrete Institute,1999

Distinguished Engineering Alumnus, Engineering Alumni

Society, University of California, Berkeley, 2001

Academy of Distinguished Alumni, Civil and Environmental Engineering, University of California Berkeley, 2012

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Higher Education

Sonoma State University, Environmental Technology Center
Rohnert Park, California
Provided the structural design of the Center using environmentally sensitive materials.

University of California Buildings, Seismic Evaluation
Various Locations in California
In the late 1970s, led a team that visited all nine campuses of the University of California and assigned tentative seismic performance ratings based on a rapid seismic evaluation of all significant buildings. The information was utilized by the system-wide administration in establishing policies and by campuses for planning detailed seismic evaluation programs. Over 44 million square feet of buildings were evaluated to facilitate further studies of seismic vulnerability throughout the University's campuses.

University of California (UC) Santa Barbara, Francisco Torres Towers, Seismic Upgrade
Santa Barbara, California
Designed seismic upgrade measures to improve the University of California Seismic Rating of these two, ten-story reinforced concrete, residential towers to "Good". The seismic corrections and renovations project is a fast - tracked project that is projected to complete construction by Fall 2004.

UC Berkeley, University House, Seismic Upgrade
Berkeley, California
Seismically upgraded this unreinforced masonry historic building on the university campus. Built around the turn of the century in the Beaux Arts style, this three-story structure serves as the Chancellor's residence.

UC Berkeley, Dwinelle Hall, Feasibility Study
Berkeley, California
Conducted a feasibility study to expand Dwinelle Hall. Evaluated the existing structure and determined the capacity of the existing attic slab and typical structure below.

UC Berkeley, University Hall, Renovation
Berkeley, California
Developed an innovative strengthening system for this seven-story, rectangular concrete building. Formerly rated "Very Poor" under the University of California's seismic criteria, this building was strengthened with an exterior steel system of braces, which allowed the building to remain occupied during construction. Its seismic rating has been upgraded to "Good," and won awards from the Consulting Engineers Association of California (CEAC) and the Lincoln Arc Welding Foundation.

UC Berkeley, Bancroft Library, Renovation
Berkeley, California
Developed a retrofit scheme for the Bancroft Library to both increase usable space and provide a seismic resistant system. Bancroft Library is a historical archive of irreplaceable books, manuscripts, papers and other documents. The seismic strengthening approach seeks to protect the contents of the space, as well as its occupants. An increase in usable space is being provided by a complete interior renovation of the structure with thoughtful placement of a lateral force resisting system.

UC Berkeley, Law School Expansion & Renovation
Berkeley, California
Provided structural peer review services for a design/build addition and an independent evaluation of library stacks.

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UC Berkeley, Memorial Stadium, Seismic Evaluation
Berkeley, California
Evaluated Memorial Stadium for seismic deficiencies and effect of the Hayward Fault which passes through the structure. Recommended mitigation approaches to accomplish a fault offset and provide safety to occupants. Then served as peer reviewer for adjacent Student Athlete Training Center and the full renovation of Memorial Stadium.

UC Berkeley, Doe Library, Renovation
Berkeley, California
Reconstructed and strengthened the core of this historic library after the demolition of the central stack area. Conducted a study of the historic North Reading Room and of the Doe Annex to determine seismic strengthening schemes. Seismically strengthened the Reading Room. This library is a steel load-bearing frame with concrete infill designed in the early 1900s by John Galen Howard.

UC Los Angeles, South Parking Structure, Structural Repair
Los Angeles, California
Designed repairs to this post-tensioned concrete parking structure that suffered severe cracking and waterproofing problems. The cracks in the parking slabs were sealed and drains were added.

UC Los Angeles, Chiller/Cogeneration Facility, Peer Review
Los Angeles, California
Peer reviewed for a sizable chiller cogeneration facility and related work on the UCLA campus.

UC Los Angeles, Molecular Life Science Building, Peer Review
Los Angeles, California
Peer reviewed the structural design of this $26 million steel framed building.

UC Los Angeles, Southern Regional Library, Seismic Evaluation
Los Angeles, California
Conducted a thorough review and evaluation of structural calculations, drawings and specifications for a new $15 million structure that included compact shelving facility.

UC Los Angeles Buildings, Seismic Evaluation
Los Angeles, California
Conducted evaluations of potential seismic performance for the following buildings: Moore Hall, Powell Library, Jules Stein Eye Institute, Kerckhoff Hall, Dykstra Hall, Hedrick Hall, Rieber Hall, Sproul Hall, LeConte-Tiverton Garage. The project included providing preliminary reinforcement schemes and cost estimates.

UC Los Angeles, Science & Technology Research Building, Peer Review
Los Angeles, California
Provided structural peer review of the design for this new building located on the southwest campus. Reviewed the structural design and features in accordance with applicable codes, project requirements, and university policy.

UC Irvine, Seismic Evaluation
Irvine, California
Seismically evaluated eight steel frame buildings on the campus using FEMA 178. The evaluations provided a second opinion on the facilities' compliance with University Seismic Criteria. Also performed structural evaluations of Physical Sciences Building Unit 1 (Rowland Hall), Graduate School of Management, and

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Irvine Hall, and developed several seismic strengthening schemes for all of these buildings.

UC Irvine, Library Building, Seismic Strengthening
Irvine, California
Designed the seismic strengthening of this shear wall building. Also, provided construction support to allow all strengthening to be completed during the summer k.-

UC Irvine, Medical Center, Seismic Evaluation
Irvine, California
Seismically evaluated eight steel frame buildings at the medical center using FEMA 178. The evaluations provided a second opinion on the facility's compliance with University Seismic Criteria. Also provided SB 1953 evaluations of an existing hospital constructed in 1960.

UC Irvine, Peer Review & Seismic Review
Irvine, California
Selected structural peer and seismic review consultant for several prominent UC Irvine projects including: Administration Building, Beckman Center, Buildings 31 and 32, Cancer Center, Humanities Building and Fine Arts Facility, Middle Earth Housing, Mesa Court Housing, Student Health Center, and Undergraduate Housing.

UC Irvine, Rowland Hall Seismic Improvement
Irvine, California
Evaluated the building previously and proposed a schematic level exterior buttress retrofit scheme. Also, peer reviewed the retrofit design of the building by another firm which followed Degenkolb's proposed scheme. The construction of the concrete moment frame buttresses is now complete.

UC Santa Cruz, Natural Sciences Two, Peer Review
Santa Cruz, California
Peer reviewed services for the seismic upgrade of a building damaged in the Loma Prieta earthquake.

UC Santa Barbara, Davidson Library 1965 Addition, Structural Peer Review
Santa Barbara, California
Peer reviewed the seismic strengthening design for the eight-story portion of Davidson Library.

UC Santa Barbara, Fault Impact, Santa Catalina
Goleta, California
Reviewed Degenkolb's seismic strengthening work in comparison with current standards and advised the campus of impacts of the fault if it were to offset. Also provided guidance on the proposed new construction on a near fault location.

UC Santa Barbara, Three Residential Properties, Seismic Evaluations
Santa Barbara, California
Peer reviewed the seismic evaluation of two and three story wood framed buildings built in the 1960's. Designed alternative seismic strengthening concepts to meet the UC's GOOD standard.

UC Santa Barbara, Solar PV Project, Structural Peer Review
Santa Barbara, California
Peer reviewed a parking shade canopy on Surface Parking, ballasted roof mounting on Robertson Gym and the Events Center and long span roof top shade canopy on Mesa Parking Structure, Elings Hall Parking Structure and the San Clemente Parking Structure.

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Stanford University, Encina Hall South, Renovation
Stanford, California
Designed renovation and seismic strengthening scheme for a wing of this historic building used originally as the Dining Hall of the men's dormitory.

Stanford University, Encina Hall East, Structural Assessment
Stanford, California
Prepared a structural assessment and seismic strengthening as part of a programming study for housing the Institute for International Studies in this historic building. One of the first buildings on campus when opened in 1891, this unreinforced sandstone masonry building required upgrading to conform with local ordinances and the University's performance criteria.

Stanford University, Lagunita Court, Seismic Strengthening
Stanford, California
Provided the schematic design of seismic strengthening for this historic complex. Built in 1935, the Lagunita Court Buildings consist of several one and two-story buildings linked together to form a housing and dining complex. Developed construction documents to implement the strengthening scheme, which is designed to meet Stanford's seismic strengthening guidelines while having only a minimal impact on the current use of the building.

Stanford University, Linear Accelerator Buildings 005 & 272, General Evaluation
Stanford, California
Designed detailed evaluations and developed strengthening concepts for two buildings at the Stanford Linear Accelerator.

Stanford University, Education Building, Seismic Study
Stanford, California
Performed a seismic study and conceptual retrofit design of an historic 1938 reinforced concrete building at Stanford.

City College of San Francisco, John Adams Campus Modernization, Peer Review
San Francisco, California
Peer reviewed a building that was the old Lowell High School built about 1911 with reconstruction and restoration work done in 1934 and 1935, undoubtedly after the State of California passed the Field Act in 1933.

Peer Review

Pellas Group Corporate Headquarters, Peer Review
Managua, Nicaragua
Selected as consultant and structural peer reviewer for this high rise building. Directed the design towards a building that performed well with minimal damage in future earthquakes. Developed seismic resisting system from conceptual architectural drawings and then peer reviewed the structural design throughout the design and construction progress.

South Fork Tolt River Dam, Peer Review
Washington
Peer reviewed the seismic evaluation and retrofit of the Tolt Spillway and Intake Towers. The project also involved serving on a peer review panel for the Federal Energy Regulatory Commission.

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Dal Grauer & Murrin Substations, BC Hydro, Peer Review
Vancouver, British Columbia
Peer reviewed and seismically evaluated reports with upgrade recommendations for two reinforced concrete substations.

Airport Renovation & Seismic Strengthening
Guam
Peer reviewed seismic strengthening and renovations to add a sterile concourse for international arrival.

University of California (UC) Los Angeles, Southern Regional Library, Peer Review
Los Angeles, California
Conducted a thorough review and evaluation of structural calculations, drawings and specifications for a new $15 million structure which included a compact shelving facility.

UC Los Angeles, Molecular Life Science Building, Peer Review
Los Angeles, California
Peer reviewed the structural design of this $26 million steel framed building.

UC Los Angeles, Science & Technology Research Building, Peer Review
Los Angeles, California
Peer reviewed the design for this new building located on the southwest campus. Reviewed the structural design and features in accordance with applicable codes, project requirements, and university policy.

San Jose Civic Center, Peer Review
San Jose, California
Peer reviewed the San Jose Civic Center, which is the structural design review of a facility containing an 18 story, 400,000 square foot office building, a 13,000 square foot Rotunda dome, 93,000 square foot of council space and 160,000 square foot of parking. The structural systems include concrete and steel framing with steel moment resisting frames, steel eccentrically braced frames and concrete shear walls to resist seismic loads.

San Jose International Airport, Terminal A, Peer Review
San Jose, California
Provided peer review of a three-story 10-gate building (American Airlines and USAir), a pedestrian bridge, baggage claim building, and six-story parking garage. These projects were part of a $125 million improvement project. The scope of services included the critique of the design criteria; a review through all phases of design, including the design calculations; and construction documents.

Transbay Transit Center, Peer Review
San Francisco, California
Served as Chair of the Structural and Seismic Review Panel for the new Transbay Transit Center. Project is over a three block radius and has a deep basement for trains and an elevated bus loading facility, along with a bus ramp bridge connection to the San Francisco - Oakland Bay Bridge.

300 Spear Street, Peer Review
San Francisco, California
Led the peer review of two, 350- to 400-foot-tall reinforced concrete towers located in downtown San Francisco, California. At this height, the building design exceeds the 240 foot height limit mandated by the San Francisco Building Code. Appointed by the City of San Francisco and led by Loring Wyllie, a peer review panel is reviewing the structural design concepts, recommending any additional criteria that should be met and reviewing the design at key stages for compliance with the criteria. The team relied heavily on the FEMA 356 methodology for the verification of the

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adequacy of the design.

45 Lansing Street Condominium, Peer Review
San Francisco, California
Peer Reviewed a 39-story tower for residential units.

Continental Airlines Hangar, Peer Review
Denver, Colorado
Peer reviewed the structural design of a hangar at Denver International Airport.

Boeing Facilities Expansion, Peer Review
Everett and Renton, Washington
Peer reviewed the structural design of various additions and new buildings. These structures are used for the manufacture of airplanes and include clear spans of 300 to 350 feet wide, 90 feet high, and up to 1000 feet long.

Sacramento Wastewater Treatment Plant Expansion, Peer Review
Sacramento, California
Peer review of two expansion projects that included subsurface conduits, tanks and basins, and alterations to structures. Also participated in a Value Engineering Workshop.

Parking Structures

Plaza Parking Structure, Seismic Evaluation
San Jose, California
Reviewed and evaluated remedial strengthening work for a parking structure found to be deficient in earthquake-resisting capacity.

Santa Clara Convention Center Parking Garage, Investigation
Santa Clara, California
Investigated areas of structural distress in this pre-cast concrete parking structure and designed remedial measures.

Custom House Parking Structures, Structural Review
Monterey, California
Provided a structural review of two post-tensioned parking structures with serious cracking in slabs, walls, and staircases. Also prepared plans and specifications for repairs.

University of California (UC) Los Angeles, LeConte-Tiverton Parking Structure, Seismic Strengthening
Los Angeles, California
Designed seismic strengthening measures for an existing three-story parking structure and provided construction support.

UC Los Angeles, Lot 32 Parking Garage, Structural Evaluation
Los Angeles, California
Performed a complete structural evaluation and plan check of a new parking structure prepared for the University by a design-build team.

Mountain View Civic Center Parking Garage, Structural Review
Mountain View, California
Provided a general structural review of drawings, specifications, and calculations for compliance with the Uniform Building Code of a 210-car underground parking garage, a five-story municipal building, and 600-seat theater and rehearsal hall.

Tunneling & Shoring

In his long career, Mr. Wyllie has been involved in over 30 projects involving shoring, underpinning, or tunneling work.

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Following is a selection of the most recent projects.

101 Second Street, Shoring
San Francisco, California
Designed shoring for the excavation of this high rise building.
St. Jerome's Retaining Wall, Investigation
San Francisco, California
Investigated the collapse of this retaining wall in the El Niño winter and designed a replacement wall utilizing an earth beam to minimize costs.

San Francisco Firemen Credit Union, Shoring
San Francisco, California
Designed shoring for a small office building.

Silicon Valley Financial Center, Shoring
San Jose, California
Designed a shoring system for a 40-foot deep excavation adjacent to the Santa Clara County Transit Light Rail System and a historic 100-year old museum building.

Stanford University, Encina Hall East, Shoring
Stanford, California
Designed shoring to enable the contractor to brace walls during demolition and construction on this unreinforced masonry building.

San Francisco Centre Retail Complex, Tunneling
San Francisco, California
Prepared the design of a soldier beam and lagging bulkhead for a 38-foot deep excavation next to the BART Powell Street subway station. The north bulkhead, adjacent to BART, was supported by internal bracing while the remaining bulkheads were supported by tieback anchors. The earth retention system also served as underpinning for three mid-rise buildings located on two sides of the site, including the historic Emporium building.

One Market Plaza, Shoring
San Francisco, California
Designed shoring in deep soft clays, adjacent to the historic Southern Pacific Railroad Building. The design included monitoring systems that permitted evaluation of the bulkhead performance and resulted in cost savings to the owner through modification of the bulkhead design during construction. The design received Honorable Mention in the National Awards for Engineering Excellence competition of the American Consulting Engineers Council.

333 Bush Street, Underpinning
San Francisco, California
Designed the retention system for a 40-foot deep excavation and underpinning for three mid-rise buildings.

Embarcadero Center West Office Tower & Park Hyatt Hotel, Excavation
San Francisco, California
Prepared the design of steel sheet pile bulkheads with internal bracing for twin 50-foot deep excavations in soft clay soils. Each site was situated adjacent to pile supported high-rise buildings.

Metro Rail, Tunnel Work
Los Angeles, California
In connection with consulting engineering services for evaluating the effects of tunneling operations on structures along the proposed tunneling routes, evaluated the effects of this work on Northridge earthquake-damaged buildings along Hollywood Boulevard.

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Metro Rail Blue Line, Underpinning
Pasadena, California
Served as Project Mentor for the design of underpinning of ten historic buildings in downtown Pasadena to allow construction of a 35-foot deep grade separation tunnel.

345 California Street, Excavation
San Francisco, California
Designed a steel sheet pile bulkhead for a 30-foot deep excavation in soft clay soils. Used innovative long-span waler systems on two sides to permit use of only two bracing struts. The site was located in the heart of San Francisco's Financial District, adjacent to four pile-supported high-rise buildings.

Metro Rail Red Line, Tunneling Work
Los Angeles, California
Served as consultant for evaluating the effects on structures of the proposed tunneling operations in the Los Angeles area. The project involved preparation of contract drawings and specifications for protection of buildings immediately above and next to the proposed tunnel driving. Designed permanent underpinning for a two-level parking garage that involved re-supporting building columns on massive grade beams and mini-piles spanning over tunnels.

University of California, San Francisco Medical Center, Mt. Zion Campus Outpatient Cancer Center, Shoring
San Francisco, California
Design a shoring system to support a new space two stories below grade and adjacent to two existing buildings. The shoring scheme consisted of soldier beams, wood lagging, tiebacks and underpinning piers. The shoring system supported an operating hospital and the design was reviewed and approved by OSHPD.

Historic

Walt Disney Family Museum, Seismic Strengthening
San Francisco, California
Degenkolb Engineers, along with prime consultant, Page & Turnbull, had the challenging task of maintaining the historic integrity of the exterior of a 110-year-old unreinforced masonry building while completely transforming the interior. Provided the concrete and steel seismic retrofit, strengthened the floors, and designed bracing and anchorage of all of the exhibits within the museum. To increase space in the museum, the project team altered the building from C-shaped to square-shaped and excavated some 30 feet to add a full sub-basement and auditorium underneath 60 percent of the building.

South San Francisco Carnegie Library, Seismic Evaluation
South San Francisco, California
As prime consultant, seismically evaluated and rehabilitated of this city-owned landmark building. It is an historic unreinforced masonry structure with one-story plus a basement.

City of Napa, Goodman Library & Borreo Building, Seismic Evaluation
Napa, California
Seismic evaluated and prepared construction documents for two City owned buildings to bring them into compliance with the Uniform Code of Building Conservation (UCBC) and the State Historic Building Code (SHBC). The Goodman Library is a two-story unreinforced stone masonry building originally constructed in 1901. Also a two-story unreinforced masonry building, the Borreo Building was originally constructed in 1887. The city of Napa has obtained a FEMA mitigation grant for the Goodman Library and after detailed historic review by FEMA and SHPO construction began in 2004.

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Charles Krug Winery, City of St. Helena, Seismic Evaluation
St. Helena, California
Seismically evaluated and strengthened services for two stone buildings registered as state historic landmarks to comply with the City of St. Helena URM ordinance. Also prepared construction documents.

San Jose Museum of Art, Seismic Strengthening
San Jose, California
As prime consultant, seismically strengthen this historic unreinforced masonry building. This work included coordinating the work of historic architecture consultants who assisted in evaluating the exterior sandstone.

Ferry Building, Seismic Strengthening
San Francisco, California
Implemented a seismic strengthening scheme for this national landmark and symbol of the city. Also provided post-earthquake inspection, designed emergency repairs, and performed a seismic analysis of the structure which has survived both the 1906 and the Loma Prieta earthquakes. The project involved developing alternate seismic strengthening solutions. Recommendations were commended in a letter from the State of California Office of Historic Preservation to FEMA.

Bank of California Building, Post-Earthquake Evaluation
San Francisco, California
Designed repairs for the Loma Prieta earthquake damage of this historic banking hall built in 1908. Load bearing granite columns suffered cracks that were repaired by reinforcing the walls from behind using needle beams to support the cornice, and replacing the damaged granite with exactly matching stone from the original quarry.

Pacific Bell Building, 140 New Montgomery, Seismic Evaluation
San Francisco, California
Seismically evaluated of this 27-story landmark building. Designed methods to rehabilitate exterior surfaces, strengthen the parapet, construct new terra cotta ornamental anchorage details, and new steel framing for replacement of ornamental eagles on top of the building. Also, designed structural support framing for overhanging construction scaffolding and provided construction support and inspection.

Building 1801 Presidio, Seismic Evaluation
San Francisco, California
Seismic and structurally evaluated this building including any Loma Prieta earthquake damage. This large six-story building, originally built in 1929 of steel and brick with a concrete addition constructed in the 1950s, was formerly a military hospital. Also provided structural support for the asbestos abatement design.

Fort Mason Officer's Club, Structural Assessment
San Francisco, California
Structurally and seismically assessed this historic stone masonry and wooden structure.

Camel Barn Warehouse, Distressed Structure
Benicia, California
Designed and detailed the repair of rot damaged wood flooring in this historic building. In addition, underfloor ventilation schemes were developed to allow air circulation of the crawl space to prevent future moisture buildup and rot damage. All aspects of the design were sensitive to the historic nature of the building. The building is now utilized as concert hall, reception venue, and meeting space as well as housing the Museum on

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the upper level.

Greystone Cellars, The Gatehouse Building, Renovation
St. Helena, California
The Gatehouse building at Greystone Cellars was converted for use as a teaching location for the Culinary Institute of America. The existing rough stone perimeter walls are strengthened with a thin layer of shotcrete, with the interior structure completely gutted and replaced. A new light-framed kitchen addition was also incorporated into the design.

City Buildings, Surveying
St. Helena, California
As project manager, surveyed the unreinforced masonry buildings in St. Helena and assisted the city in developing an ordinance.

Lewelling Warehouse Building, Seismic Upgrade
St. Helena, California
Designed the seismic upgrade of an unreinforced stone masonry structure built in 1880.

Le Mesnager Barn, Seismic Strengthening
Glendale, California
Evaluated and designed seismic strengthening of this historic stone masonry barn now located in a city park.

Stags Leap Winery, Seismic Strengthening
Napa Valley, California
Provided seismic strengthening details for a stone masonry house used currently for hospitality, a stone masonry winery building and a stone masonry warehouse building which was somewhat damaged by the 2000 Napa earthquake.

Yosemite National Park, The Ahwahnee, Seismic Evaluation
Yosemite Village, California
Designed a detailed seismic evaluation of the historic Ahwahnee Hotel in Yosemite Vally. Recommended seismic improvements to enhance performance on future earthquakes. Also designed new exitway from the fifth and sixth floors to meet fire resistant standards.

Mariposa County Courthouse, Seismic Evaluation
Mariposa, California
Seismically and structurally evaluated the two-story timber courthouse built in 1854, the oldest continually operating courthouse in the U.S west of the Mississippi River. Also designed structural improvements for the building consistent with historic preservations.

Religious Buildings

St. Patrick's Seminary, Seismic Strengthening
Menlo Park, California
A large, historic unreinforced masonry complex constructed around 1900, St. Patrick's Seminary was re-built after sustaining significant damage in the 1906 earthquake. The complex consists of three large wings, used mainly as dormitories, a chapel, and other auxiliary buildings. Using the Uniform Code for Building Conservation, an alternative strengthening scheme that was cost-effective and less disruptive to the historic fabric was developed. The strengthening for two of the wings included the addition of new shotcrete walls, new wall anchorage connections, and some re-pointing of the masonry. The complex strengthening of the chapel and last wing is planned to start in the summer of 2001, and includes adding new shotcrete walls, new steel bracing, new concrete slabs, and new wall anchorage connections.

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St. Thomas Aquinas Cathedral, Seismic Strengthening
Reno, Nevada
Designed the seismic strengthening and additional renovations for a 1907 cathedral of unreinforced stone and brick masonry.

Lafayette-Orinda Presbyterian Church, Sanctuary Building, Seismic Evaluation & Strengthening
Lafayette, California
Defined suitable mitigation strategies and developed construction documents.

St. Patrick's Catholic Church, Seismic Evaluation
San Francisco, California
Provided a seismic evaluation and strengthening scheme for this historic church to bring the building into compliance with the City's URM Ordinance. The project won a California Preservation Foundation Annual Design Award.

St. Peter's Church, Investigation
San Francisco, California
St. Peter's Church was originally constructed in 1867 and was damaged by fire in early 1997. Investigated the fire damage and prepared structural design of repairs. The project is an example of thoughtful restoration and was featured in the January/ February 2001 issue of Traditional Building.

St. Paul's Church, Seismic Retrofit
San Francisco, California
Designed a seismic retrofit to bring the building into conformance with the URM. Previous work included a study and recommendations for strengthening of both the church and convent.

Our Lady of Guadelupe, Seismic Evaluation
San Francisco, California
Project Manager for the evaluation and design of strengthening measures for the San Francisco Archdiocese in connection with the conversion of this church to temporary school occupancy.

St. Vincent de Paul Church, Seismic Evaluation
San Francisco, California
Served as Project Manager for the evaluation of the existing wood trusses to determine their capacity to support new slate roofing. Also, seismically evaluated and strengthened the building to bring it into compliance with the City's URM Building Ordinance.

St. Boniface Church, Structural Evaluation
San Francisco, California
Structurally evaluated the historic unreinforced masonry rectory, church, and school. Also, designed the seismic strengthening with a view to preserving unique architectural features.

Calvary Presbyterian Church, Seismic Evaluation
San Francisco, California
Seismically evaluated and implemented strengthening for this 1901, unreinforced masonry (URM), Sanctuary Building at this historic, San Francisco church. The building consists of two stories plus a basement, and the sanctuary is one tall story with a basement, totaling 31,700 square feet. The strengthening was designed to meet the State Historic Building Code and the Uniform Code for Building Conservation, in order to comply with the San Francisco URM Ordinance. The strengthening scheme creatively fit within the building's historic fabric, virtually invisible following construction. The project also included an elaborate architectural remodel, creating structural

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challenges; the removal of an old staircase and addition of a new one, the extension of the elevator to serve the basement level, and the creation of an exposed brick lobby. The church remained fully operational during construction, and the City's second largest pipe organ remained untouched. The project came in $700,000 under budget.

St. Luke's Episcopal Church, Seismic Evaluation
San Francisco, California
Evaluated and strengthened details for this steel frame church with brick infill and one bearing wall for purposes of compliance with the URM Ordinance. Also, strengthened the parapets.

Third Church of Christ Scientist, Seismic Evaluation
San Francisco, California
Provided a seismic evaluation and strengthening recommendations for this unreinforced masonry building to bring it into conformance with the URM.

Trinity Episcopal Church, Investigation
San Francisco, California
Investigated this 1890 stone and brick mason church and recommended seismic strengthening measurements. Also, prepared construction to strengthen the facility.

St. Francis of Assisi, Seismic Strengthening
San Francisco, California
Provided seismic engineering consultation including strengthening recommendations to bring this Archdiocese of San Francisco church into compliance with the City's URM Ordinance.

Sacred Heart Church, Feasibility Study
San Francisco, California
Performed a study of this unreinforced masonry structure for its conversion into a smaller church and a neighborhood recreation facility.

St. Jarlath's Parish, Seismic Evaluation
Oakland, California
Performed Phase I and II seismic evaluations of the church and the school, convent, and gymnasium complex at this parish. The church is a two-story, reinforced concrete and reinforced masonry structure, and the others are unreinforced masonry buildings. Also, provided the seismic strengthening design and prepared construction documents for the school structure.

Diocese of Oakland, Post-earthquake Evaluation
Oakland, California
Performed post-earthquake evaluations of several churches and buildings. Developed and recommended seismic repair and strengthening measures for each building. Also performed seismic evaluations of numerous buildings to develop strengthening recommendations for repairs.

First Unitarian Church, Post-earthquake Evaluation
Oakland, California
Provided a post-earthquake evaluation and designed repairs of this local, state, and national landmark which was originally built in 1891. Also, developed interim seismic strengthening measures.

San Francisco Theological Seminary, Seismic Evaluation
San Anselmo, California
Serving as project mentor, seismically evaluated and developed a strengthening scheme for Montgomery Hall and Scott Hall, originally constructed in the 1890s with unreinforced stone masonry walls and wood-framed floors. Prepared construction documents for the cost-effective strengthening scheme,

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bringing the buildings into compliance with the State Historic Building Code and the Uniform Code of Building Conservation. The scheme included adding new concrete walls, new seismic wall cores, new plywood sheathing, a new horizontal steel braced diaphragm, new wall anchorage connections, and epoxy injection. In recognition of the scheme's preservation of the historic fabric of the buildings, the project won a 2001 design award in the Rehabilitation/Adaptive Re-use category from the California Preservation Foundation, and a Certificate of Recognition Award from the California Heritage Council.

St. Leo's School, Seismic Upgrade
Oakland, California
Seismically upgraded this cast-in-place reinforced concrete school building.

St. Mary's Cemetery, Seismic Strengthening
Oakland, California
Provided the schematic design for the strengthening of an unreinforced masonry office building and portal. This facility is owned by the Diocese of Oakland.

Diocese of San Jose, Seismic Risk Assessment
San Jose, California
Conducted a seismic risk assessment of about 255 buildings. Also, designed strengthening for the Cathedral House, Sacred Heart Church, and St. Patrick's School. Provided detailed studies of additional buildings and construction documents for selected buildings to correct seismic deficiencies.

St. Frances de Sales Rectory, Structural Evaluation
Oakland, California
Designed the structural evaluation of this wood frame building with brick veneer and made recommendations to mitigate any potential seismic hazards.

St. Augustine's School, Seismic Strengthening
Oakland, California
Designed seismic strengthening for this school owned by the Diocese of Oakland.

St. Mary's Church, Voluntary Seismic Strengthening
Oakland, California
Provided construction documents for the voluntary seismic strengthening to Life Safety standards of a wood church built about 1872.

Sacred Heart Convent & Rectory, Seismic Evaluation
Oakland, California
Prepared an evaluation of these wood frame buildings with brick veneer and made recommendations for strengthening.

St. Cornelius's Parish, Seismic Strengthening
Richmond, California
Designed seismic strengthening for this masonry church and concrete school.

St. Joseph's Cathedral Renovation
San Jose, California
Consultant to the contractor during the complex construction of the seismic strengthening of this massive, brick, bearing wall cathedral built prior to the 1906 San Francisco earthquake.

St. Anne's Church, Seismic Code Upgrade
Walnut Creek, California
Designed the seismic code upgrades and strengthening of the reinforced concrete moment frame church. Also, designed an addition to the parish hall.

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Holliston United Methodist Church, Seismic Strenghtening
Pasadena, California
Evaluated this historic church for seismic resistance and designed a schematic seismic strengthening solution.

Our Savior Lutheran Church, Seismic Evaluation
Livermore, California
Evaluated the Wente Brothers warehouse and recommended strengthening. Also provided schematic design for the conversion of the warehouse into a meeting hall and office space for the Church, as well as the design of a new sanctuary adjacent to the warehouse. The warehouse is of brick masonry construction with some reinforcement and a wood roof with steel trusses.

Corpus Christi Church, Seismic Strengthening
Piedmont, California
Served as consultant for the seismic strengthening of this church constructed of reinforced concrete walls and wood floors and roofs. The strengthening scheme was designed to have a minimal impact on existing aesthetic elements.

Healthcare

St. Luke's Hospital, Seismic Evaluation
San Francisco, California
Performed SB 1953 seismic evaluations for the acute care facilities of this hospital. Developed preliminary strengthening schemes for the Main Hospital Building for both Life Safety and full hospital code compliance including cost estimates to assist the administration in making decisions. Developed and submitted the SB 1953 Seismic Evaluation Report to OSHPD by the deadline. Prepared construction documents for NPC 2 upgrades and worked with the facility to ensure that construction was completed prior to the deadline. Degenkolb was selected and was in the schematic phase of the design of a replacement hospital building, a new medical office building, and strengthening the Main Hospital Building to full hospital code compliance (SPC 5).

St. Luke's Hospital, Replacement Project
San Francisco, California
Provided strengthening for the existing 12-story tower with an exterior strengthening scheme requiring an increase in width of the perimeter footings plus a reevaluation of the hospital's bearing values. A small new elevation core was attached to the tower at the west end requiring new footings. Two new buildings with connecting levels below grade were built to the west of the tower and needed geotechnical recommendations.

UC Irvine, Medical Center, Seismic Evaluation
Irvine, California
Performed seismic evaluations of eight steel frame buildings at this medical center using FEMA 178. The evaluations provided a second opinion on the facility's compliance with university seismic criteria. Also, provided SB 1953 evaluations of an existing hospital constructed in 1960.

University of San Francisco, Phelan & McLaren Halls, Seismic Strengthening
San Francisco, California
Designed the seismic retrofit and major renovation of residential building, Phelan Hall. Built in the 1950's, the main structure is a seven-story reinforced-concrete tower with a "T"-shaped plan. The primary retrofit included the addition of concrete shear walls and a two-story concentric braced frame. The detailed seismic strengthening uses carbon fiber-reinforced-polymers

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Specialized

Los Angeles County & University of Southern California, Marengo Parking Structure, Peer Review
Los Angeles, California
Peer reviewed the design of this parking structure with special regard to the lessons learned from the January 1994 Northridge earthquake.

Markoulis Memorial
San Francisco, California
Provided the structural design of this private mausoleum constructed of concrete and ancient Greek, marble columns. Stainless steel reinforcing and other features, to create resistance to corrosion, were selected for a long life and low maintenance.

690 Market St, Structural Peer Review
San Francisco, California
Peer reviewed. Peer reviewed the current design options prepared a building that consists of the Old Chronicle Building and Annex which survived the 1906 earthquake. Explored and propose alternative structural solutions where they may reduce the construction costs.

Harry Tracy Water Treatment Plant, Fault Displacement Study
Millbrae, California
Evaluated the effects of secondary fault displacement on concrete filter galleys, settling basins, and associated structures. Peer reviewed the design of a new 11MG water storage reinforced concrete tank reservoir with exterior post-tensioned walls.

690 Market St, Shoring, Construction, Means & Engineering
San Francisco, California
Provided construction means and methods engineering services related to partial demolition and adaptive reuse of this historic San Francisco structure. Prepared construction documents for temporary shoring and sequencing to remove all but the facade of this 12 and 16 story structure, excavate a new basement level and mat foundation, and build a modern steel frame building behind the existing facade. This challenging project required close coordination with the design team for the new structure as well as the construction team, and required safe support of both gravity and lateral loads at all stages of demolition and new construction. The project is a 2006 SEAOC award winner.

Altenheim Senior Housing, Structural Design Services
Oakland, California
Designed the seismic retrofit of five historic unreinforced masonry buildings for use as a senior living center. Buildings were one to three stories, built in the early 1900s. The retrofit designs were based on previous evaluations performed by Degenkolb Engineers and other firms.

Pantex, Building 12 - 64, Peer Review
Amarillo, Texas
Independently peer reviewed information and reports prepared for BWXT Building 12 to 64 at the Pantex Facility.

California Theater, Renovation
Pittsburgh, California
Designed the seismic strengthening and renovation of the ground floor and second floor retail spaces.

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Transbay Transit Center, Structural & Seismic Review Committee
San Francisco, California
Lead and coordinated the complex peer review for the New Transbay Transit Center. Involved in helping establish the basis of design and acceptance criteria to ensure that the execution conforms to the basis of design.

U.S. Department of Energy, Support-Office of River Protection, Peer Review
Hanford, Washington
Peer reviewed the Hanford Waste Treatment Plant, which is a $14 billion facility. The duration of this project was 9 years.

Ninth Avenue Terminal Building, Structural Review
Oakland, California
Perform a seismic review of a 1930 terminal building for potential reuse.

Greek Consulate, Structural & Architectural Evaluation
San Francisco, California
Seismically evaluated a three-story wood framed structure. Original portions of the building date to the early 20th century with additions from the mid-century.

Confidential, (Jackson Rancheria) Casino, Renovations
Jackson, California
Designed seismic strengthening, braced frames in the casinos new entrances and installed a fire separation wall in the Hotel.

The Ahwahnee, Comprehensive Rehabilitation Plan
Yosemite National Park, California
Performed a detailed seismic evaluation and develop seismic strengthening concepts for the seismic upgrade of a National Historic Landmark hotel. The hotel was built primarily with structural steel and concrete and has endured over 80 years. The evaluation expands upon the studies commissioned over the past 20 years by utilizing the most recent displacement-based advanced analysis techniques to best understand the inherent strengths and weaknesses in the Ahwahnee. Advanced analysis techniques, including site-specific earthquake ground motion scaling, were instrumental in reducing significantly the required seismic strengthening relative to that recommended in previous studies. A total of four conceptual strengthening alternatives were developed, ranging from code-required upgrades for life safety to mitigation options that protect historic finishes and features from seismic damage.

The Ahwahnee, Fifth & Sixth Floor Egress Project
Yosemite National Park, California
Cut and reinforced a new sixth floor opening, providing stair design to the fourth and fifth floor, walkway in the fifth floor attic, a new exterior stair mezzanine to ground level, and reconstructed a fire escape from the second floor to the mezzanine.

Building K25, Structural Analysis & Preservation Study
Oak Ridge, Tennessee
Evaluated the structural ability and feasibility of preserving a minimal section of the K-25 North Tower Gaseous Diffusion Building at the East Tennessee Technology Park.

Tropicana Properties, Seismic Strengthening
Seismic strengthening of the first floor of the three-story wood framed complex with a partial reinforced concrete basement for parking.

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Moonlight Residence, Structural/Seismic Peer Review
Guacalito, Tola
Structural and seismic peer review to improve the earthquake resistant system.

Travelers Starbuck Center, Post-earthquake Response
Seattle, Washington
Working as the structural engineer representing the major insurance carrier for the Starbucks Center, documented the earthquake damage to the building and provided repair recommendations for the historic building following the magnitude 6.8, February 28, 2001, Nisqually Earthquake. The Center consists of three different structures built between 1914 and the mid-1970s. The oldest structure is the Sears building which is a six-story exterior concrete frame building with interior wood floors. The Starbucks Tower was built in several phases and is a nine-story concrete flat slab structure with exterior masonry infill walls. The parking garage has exterior concrete and masonry walls with interior concrete flat slab floors. The Tower was seismically upgraded in the mid-1990s with a steel eccentrically braced frame system. The Center has over 1.8 million square feet of office, retail, manufacturing, warehouse, and parking space.

Federal Reserve Bank of San Francisco, Seismic Hazard Reduction Program
San Francisco, California
Advised the bank on various issues of earthquake preparedness, including the feasibility of instrumenting the building.

Wells Fargo Bank, General Evaluation
Berkeley, California
Evaluated the brick infill facade of this steel framed office building to meet the requirements of the City of Berkeley Ordinance.

Atlantic LNG Project, Consultation
Trinidad, California
Reviewed specific details and issues regarding the structural design of the Atlantic LNG Project. The project involved design and construction of a large LNG tank and other facilities.

CRSI Proposed Technical Paper
Brea, California
Provided guidance to engineers regarding reinforcing steel design, how to assess congested areas and design so a sound structure can be built.

350 California Street, Renovation
San Francisco, California
Designed the conversion of this former banking hall to commercial retail space, including expansion of mezzanine area.

Seismic Priority Assessment, Seismic Safety Commission
State of California
Various Locations Around California
Established seismic rehabilitation priorities for state-owned buildings (including university buildings), considering construction types, occupancy, size, and cost-benefit ratio.

Guam International Airport Terminal, Retrofit
Guam
Analyzed the airport to determine schemes to seismically retrofit the existing pre-cast concrete exterior cladding. Peer reviewed the selected retrofit scheme. The original airport was built in the 1970's and its exterior pre-cast concrete cladding anchorage had limited deformation capacity and was determined to be a falling hazard. The buildings were originally designed for Zone 3 seismic demands. In the 1997 UBC, Guam

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was upgraded to Zone 4. This project was used to strengthen the airport for the higher seismic forces from the 1997 UBC.

Flor de Cana Plant, Seismic Upgrade
Chichigalpa, Nicaragua
Provided structural services for the seismic upgrade of this 26 building manufacturing complex including two, eight-story distillery towers, a one-story assembly plant, and a two-story process building. Developed a seismic resisting system from conceptual structural design through construction process.

Exxon, Building Evaluations
Yuzhno-Sakhalinsk, Russia
Seismically evaluated numerous reinforced concrete Russian-built buildings being considered for occupancy by Exxon.

Science & Technology

Pacific Gas & Electric Company (PG&E), Post-earthquake Response
San Francisco, California
Degenkolb is the lead engineering firm to provide post-earthquake inspection services and other earthquake preparedness services so that key buildings will remain functional after a major earthquake.

PG&E, Materials Distribution Center, Seismic Strengthening
Fremont, California
Provided evaluation, seismic strengthening design, and construction administration for the seismic strengthening of this distribution center. California Council for Science & Technology Mr. Wyllie was elected to the Council which was formed by the California legislature and sponsored largely by California universities to encourage use of science and technology to provide more jobs in the state. A high level, influential group, the Council meets four times a year.

PG&E, 77 Beale Street, Structural Analysis
San Francisco, California
Served as Project Manager for the seismic structural analysis and identification of expected building behavior following a major earthquake. The project included development of post earthquake response procedures for the building.

PG&E, Headquarters Complex, Structural Review
San Francisco, California
Performed a structural review of four selected buildings of the company's headquarters complex to provide an additional independent evaluation of each building's potential seismic performance. Developed schematic seismic strengthening solutions.

Nuclear Consulting Experience

Salt Waste Processing Facility, Peer Review
Savannah River Site
Provided structural peer review services for this processing facility for nuclear waste.

Los Alamos National Laboratory (LANL), Peer Review
Los Alamos, New Mexico
Peer reviewed various projects, including an incinerator facility seismic upgrade, and evaluated the seismic capacity of the general laboratory and administration building.

LANL, Chemical & Metallurgy Research Building, Peer Review
Los Alamos, New Mexico
Served on the peer review panel to review the structural aspects of the conceptual design report and title design for this

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building.

LANL, 7" Impact Tester Building, Peer Review
Los Alamos, New Mexico
This small building, an addition to the Plutonium facility, was designed by Merrick & Co. Several years after construction, Mr. Wyllie was asked to peer review the design to resolve review comments. Performed dynamic analysis using soil springs and restraint springs for filler between adjacent buildings to determine compliance with DOE standards.

LANL, Plutonium Facility PF- 4, Peer Review
Los Alamos, New Mexico
Served as a peer reviewer of analysis to validate the safety of this 1970's facility for increased seismic hazards. Reviewed several modifications and served on an expert panel to evaluate the difference between two separate studies.

LANL, Building PF-41, TA-55, Evaluation
Los Alamos, New Mexico
Provided a preliminary assessment of the building to verify that the DOE structural standards can be met or what modifications will be necessary for structural compliance so proper cost evaluations can be made by others.

Highly Enriched Uranium Materials Facility, Independent Review
Oak Ridge, Tennessee
Peer reviewed reinforced steel for a uranium materials facility.

Lawrence Livermore National Laboratory, Plutonium Building 332, General Evaluation
Livermore, California
Performed a dynamic analysis of the facility in accordance with Department of Energy seismic criteria and evaluated the capability of the existing structure to comply with it. Discussed members and connections that were over stressed and recommended structural retrofit solutions. Walked down several selected piping and duct systems, determined worst case conditions by judgment, and analyzed these conditions for DOE standards. Developed retrofit solutions that carefully considered all interferences and adjacent systems.

Senior Seismic Review and Advisory Panel (SSRAP)
Consulted and reviewed as part of this panel. Assembled by the Nuclear Regulatory Commission (NRC) and the Seismic Qualification Utility Group to advise them on the seismic evaluation issues associated with equipment in older Nuclear Power Plants, this advisory group included engineers from various disciplines experienced in seismic design. The panel members reviewed data from various sources and developed generic criteria.

Uranium Processing Facility, Seismic Analysis
Oak Ridge, Tennessee
Seismically analyzed and structurally designed a new uranium production facility at the Y-12 nuclear weapons plant. Degenkolb developed complex computer models to analyze the building for gravity and seismic loads, and used the results of the model to design the structural elements of the building. Estimated project cost was range at $4.2 billion to $6.5 billion.

Highly Enriched Uranium Materials Facility, Peer Review
Oak Ridge, Tennessee
Member of peer review team for the conceptual design of the Highly Enriched Uranium Materials Facility at the Oak Ridge National Lab for the Department of Energy. During construction, originally serves as a consultant to the contractor, and later for

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laboratory management on construction issues and further peer review services.

Waste Treatment Plant, Seismic Review Panel
Hanford, Washington
Served on the Seismic Review Panel to peer review the design and construction of their $14 billion plan facility to treat radioactive waste by melting it with silicone to form glass for long term storage.

Peer Review Group, Seismic Margins Evaluation of Maine Yankee Nuclear Power Plant, for Lawrence Livermore National Laboratory (LLNL) for NRC, 1986 to 1987.

Panel Member to Review the EPRI Seismic Margins Methodology, for LLNL for the NRC, 1987.

Panel Member to Review EPRI 5930 on OBE Exceedance Criterion, 1989.
Peer Review Panel, Seismic Margins Evaluation of Hatch Nuclear Power Plant, for Sandia National Laboratory for NRC, 1988-1989.

Review of Selected Systems for Seismic Ruggedness, Savannah River Plant, for Du Pont, 1988.

Panel Member for the Seismic Isolation Study for a New Production Reactor, for Argonne National Laboratory and Department of Energy.
Senior External Events Review Group, for New Production Reactor, for Lawrence Livermore National Laboratory for the Department of Energy, 1991-1993.

Structural Advisory Committee for Westinghouse Savannah River Company at the Savannah River site, 1992-1994.

Senior External Events Review Group, for New Production Reactor, for Lawrence Livermore National Laboratory for the Department of Energy, 1991-1993.

Structural Advisory Committee for Westinghouse Savannah River Company at the Savannah River site, 1992-1994.

Post-Earthquake Reconnaissance

Degenkolb staff have been pioneers in visiting the sites of major earthquakes (since the early 1950s) to see firsthand what works and what does not. Mr. Wyllie's reconnaissance experience overseas includes: Managua, Nicaragua; Lima, Peru;Guatemala; Italy; the Philippines; Chile; Mexico; Armenia, and Kobe, Japan*, and in California: Loma Prieta, Northridge, San Fernando, Livermore, Morgan Hill, Whittier, Coalinga, Santa Rosa, and Oroville.

* Mr. Wyllie was in nearby Osaka at the time of the earthquake and was able to carry out damage inspections by helicopter and car almost immediately.

Litigation Support/Expert Witness

Mr, Wyllie's litigation support work is extensive. He has investigated numerous construction defect cases and provided expert testimony as required. His cases are roughly 50 percent for plaintiff and 50 percent for defendants. He has likely been deposed over 50 times and provided court testimony a number of times. Selected recent cases include:

Attorneys/Clients
Case

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Merrill, Nomura & Molineux, LLP
Jackson Rancheria Casino
Provided full service litigation support related to design and construction defects throughout the campus, including casinos, hotels, and parking garages. What began with the discovery of mold in several exterior walls led to the closure of one-third of the casino due to long span laterally unbraced ceiling support beams. Also, provided a second opinion that the ceiling beams were potentially hazardous and their design was deficient. Degenkolb was subsequently hired to lead the continuing structural investigation discovering numerous construction and design deficiencies. Also, designed services to correct these structural deficiencies along with litigation support services. Some programmatic upgrades were also incorporated to improve casino operations.

Morrison & Foerster Attorneys
Guam International Airport

Long & Levit
Plum Island

Mark Wleklinksi
Woodland Heights, Phase 4

Akama, Chang & Yee
Hacienda Commons

Tarlow Jordan & Schrader
Mentor Graphics

Rutan and Tucker
Los Angeles Furniture Mart

Lossing and Elston
989 Market Street, San Francisco

Industrial Indemnity, Orange County and Zakar and Goeltz
Santiago Hills Reservoir Construction Failure, San Diego

Larson and Burnham
Marriott Hotel

Kindel and Anderson
Hyatt at Fisherman's Wharf

Larson and Burnham
The Gardens, Sunnyvale
Miller Starr Regalia Attorneys
451 Jackson Street, San Francisco

Flynn and Stewart
AC Transit Building
Thelen Marrin Johnson & Bridges
Rowland Plaza Cinema
Hartsell and Caselli
Barnard v. Farmers Union Corporation, et al.

McInerney and Dillon
MJB Pipeline v. City of Pleasanton

Morton, Lulofs and Allen
CCCTA Administration and Maintenance Facility

Nelson & Leighton
Bel Marin Keys, Novato
Thelen Marrin Johnson & Bridges
Rincon Center

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Passalacqua, Mazzoni & Gladden
Rutherford Bench Vineyard v. Shamrock Materials

Long & Levit
Edwards, et. al. v. Centex, et. al.

Nossaman Guthner Knox & Elliot
MTA v. L&R Investments

Bledsoe Cathcart Diestel Livingston & Pedersen
2195 Green Street

Gordon & Rees Carpeteria Office & Warehouse

Project Mentor Role

Every project at Degenkolb is managed by a Principal or Associate of the firm who stays in constant contact with the client and the design activities. Each project is also assigned a Project Mentor whose chief function is to serve as a resource for the design team, an alternate contact for the client, and to provide in-house peer review as part of the firm's quality assurance program. Mr. Wyllie's participation in this capacity takes advantage of his considerable experience on projects of all types.

University of California (UC) Berkeley, LeConte Hall, Structural Analysis
Berkeley, California
As Project Mentor, performed an advanced nonlinear pushover analysis of a four-story plus basement, cast-in-place concrete building built in the early 1920s.

UC Berkeley, Barker Hall, Peer Review
Berkeley, California
As Project Mentor, peer reviewed the six story, reinforced concrete building, with emphasis on the pierced shear walls on the perimeter of the building that serve as the primary lateral force resisting elements.

UC Berkeley, Earth Sciences Building, Seismic Strengthening
Berkeley, California
Serving as Project Mentor for the architectural remodeling of the ground floor, and schematic design of seismic strengthening of existing Earth Sciences Building.

UC Berkeley, Cesar E. Chavez Student Center, Seismic Strengthening
Berkeley, California
Serving as Project Mentor, designed the seismic strengthening of this building on the Berkeley campus. The project involves the replacement of existing concrete walls with new concrete shear walls, designing other modifications, and providing construction administration services.

University of California System Seismic Policy Review Committee
Berkeley, California
In the capacity of Project Mentor, served as a consultant for the Committee. The work involved evaluating the seismic risks in proposed new buildings and strengthening of existing buildings.

Hastings Hotel & Network Autobody Building, Post-earthquake Evaluation
Los Angeles, California
Provided Project Mentor support for consultation regarding

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Northridge earthquake-damaged buildings along the route of proposed tunneling operations. The work involved the design of bracing for walls to remain after partial demolition of the Network Autobody Building.

Metro Rail Eastside
Los Angeles, California
As Project Mentor, performed an independent design review for the Los Angeles River bus-way underpinning.

St. Lawrence Academy, Seismic Retrofit
Santa Clara, California
Prepared revised drawings for the seismic retrofit and repair of settlement damage to the building. Served as Project Mentor.

American Baptist Seminary of the West, Karpe Hall & Johnston Hall, Seismic Strengthening
Berkeley, California
Acting as Project Mentor, seismically strengthened scheme of two reinforced brick, two-story buildings.

Hinson Memorial Baptist Church, Seismic Strengthening
Portland, Oregon
Serving as Project Mentor, prepared a report to determine the seismic strengthening scheme and probable cost of construction of this unreinforced masonry church built in 1908.

Woodland Heights, Renovation
Santa Cruz, California
As Project Mentor, renovated and seismically strengthened scheme for the apartment building with condominiums. The work corrected original design and construction deficiencies discovered as a result of recent litigation.

Pacific Gas & Electric Company (PG&E), 1919 Webster Street, Seismic Evaluation
Oakland, California
Project Mentor for providing a life-safety and functionality evaluation and designing strengthening schemes.

PG&E, Office Buildings, Seismic Evaluation
Marysville & Auburn, California
Preparing a life-safety evaluation and strengthening proposals for these two unreinforced masonry office buildings. Acting as Project Mentor.

Multnomah County Libraries, Seismic Evaluation
Portland, Oregon
As Project Mentor, seismically evaluated 12 libraries within Multnomah County. The scope of services included performing FEMA- 178 evaluations for each facility and providing preliminary cost estimates for strengthening measures. The team is evaluating both structural and nonstructural components of each facility as well as geotechnical issues, mechanical/electrical systems, and architectural features. A final report was submitted to Multnomah County for use in determining which facilities need immediate attention.

Anaheim Stadium, Post-earthquake Evaluation
Anaheim, California
Project Mentor for the evaluation of the failure of framing members supporting the scoreboard and associated signs at the stadium following the 1994 Northridge earthquake.

Kaiser Permanente, Medical Office Building, Metro Rail, Shoring
Los Angeles, California
Serving as Project Mentor, designed a temporary column jacking scheme for a steel frame MOB during excavation for the

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station entrance construction.

Publication & Presentations

Wyllie, Loring. Earthquake. 2006. "Structural Performance. Summary Report on the Great Sumatra Earthquakes and Indian Ocean Tsunamis of 26 December 2004 and 28 March 2005." Engineering Research Institute (EERI), Oakland, California.

Wyllie, Loring and James Jirsa. January 30 - February 4, 2004. "Seismic Rehabilitation of Buildings- Research Accomplishments/Research Needs." In 12th World Conference on Earthquake Engineering. Auckland: New Zealand. Print

Wyllie, Loring and Ronald LaPlante. "The Designer's Responsibility for Rebar Design." The Structural Bulletin Series. CRSI (2003): 1

Wyllie, Loring and James O. Jirsa. February 2000. "Seismic Rehabilitation of Buildings-Research Accomplishments/ Research Needs." In 12WCEE, Auckland: New Zealand. Print.

Wyllie, Loring. May 23-29, 2016. "Evaluation And Strengthening Concrete Structures For Acceptable Seismic Performance". In XIIITH FIP Congress On Challenges For Concrete In The Next Millennium. Amsterdam: Netherlands. Print.

Wyllie Loring. 1998. "Seismic Design in California with the New Millennium. Booth, E., ed." Seismic Design Practice into the Next Century: Research and Application. Rotterdam: A.A. Balkema: (59-62.)

Wyllie, Loring. May 31 - June 4, 1998. "Seismic Strengthening of Historic Churches." In 6th U.S. National Conference on Earthquake Engineering: Seismic Design and Mitigation for the Third Millennium. Seattle: Washington. Print.

Wyllie, Loring. April 14-16, 1997. "Earthquake Reconnaissance Over the Years." In the Structures Congress, Portland: Oregon. Print.

Wyllie, Loring. June 1996. "Strengthening Strategies for Improved Seismic Performance." In Eleventh World Conference on Earthquake Engineering. Acapulco: Mexico. Print

Wyllie, Loring. July 26-28, 1995. "Lessons Learned and Relearned from Northridge and Kobe. In The International Symposium-Lessons Learned in Recent Earthquakes. Santiago: Chile.

Wyllie, Loring. 1995. "Seismic Repair and Strengthening of a Severley Damaged Concrete Frame." ACI Structural Journal. ACI, no. 92(2): 177-187.

Wyllie, Loring. January, 1995. "Realistic Planning for Damage Assessment of a Large Group of Structures". Workshop, Osaka, Japan.

Wyllie, Loring. December 1994. "High Strength Concrete in Seismic Regions." Second United States-Japan-New Zealand-Canada Meeting. Honolulu, Hawaii.

Wyllie, Loring. October 1994. "Earthquake Engineering - Will We Always Be Learning?" Whitman Symposium, MIT. Cambridge, Massachusetts.

Wyllie, Loring and Rafael Alaluf. July 1994. "The Challenge of Repairing and Strengthening San Francisco's Historic Ferry Building". In Fifth National Conference On Earthquake Engineering. Chicago: Illinois.

Wyllie, Loring. "Preserve and Protect Civil Engineering." February,

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1994.

Wyllie, Loring. April 1994. "Changes in the NEHRP Recommended Practices and Maps." Earthquake Engineering Research Institute (EERI) Annual Meeting, Pasadena, California.

Wyllie, Loring and Janiele Maffei. March 1994. "Evaluation of Old Reinforced Concrete Structures for Seismic Resistance." American Concrete Institute, San Francisco. Print.

Wyllie, Loring. September 1993. "Dreams, Expectations and Realities of Seismic Resistant Design." Tom Paulay Symposium. California. Print.

Wyllie, Loring. October 1993. "Realistic Evaluation Procedures For Existing Department Of Energy General Facility Buildings". In the Fourth Department of Energy Conference. Memphis, Tennessee, October 1993.

Wyllie, Loring A., James Malley, Maryann T. Phipps, and Dominic J. Kelly. 1993. "Test Results and Design Implications of Seismic Strengthening Schemes. H.J. Degenkolb Associates. San Francisco, California.

Wyllie, Loring A., John F. Silva, John A. Dal Pino, and Dominic J. Kelly. 1993. "Connections to Existing Concrete for Seismic Rehabilitation." H.J. Degenkolb Associates. San Francisco, California.

Wyllie, Loring A., and James P. Paustian. 1993. "Reinforced Concrete Frame Element Jacketing." H.J. Degenkolb Associates. San Francisco.

Wyllie, Loring A., Raoul Karp, and Iyad Darcazallie. 1993. Retrofit of Short Lap Splices in Columns at the Ends of New Infill Seismic Resisting Shear Walls. H.J. Degenkolb Associates, San Francisco.

Wyllie, Loring A. September 1993. "Strengthening Landmarks for Improved Seismic Performance." In the International Association for Bridge and Structural Engineering (IABSE). Rome, Italy. Print.

Wyllie, Loring A. 1993. "Seismic Strengthening of University Hall, University of California, Berkeley." Earthquake Engineering Research Institute (EERI) seminar on Rehabilitation of Existing Buildings. San Francisco and Los Angeles.

Wyllie, Loring A. July 1992. "Analysis of the Collapsed Armenian Precast Concrete Frame Buildings, In the 10WCEE Conference. Madrid: Spain. Print.

Wyllie, Loring and John A. Dal Pino. June 1992. "Building Protection from Tunneling in Downtown Los Angeles." ASCE Specialty Session on Excavation and Support for the Urban Infrastructure." ASCE New York Meeting.

Wyllie, Loring. November 1991. "The Balance Between Historic Preservation and Seismic Safety - Can We Achieve It?" In the Seismic Retrofit of Historic Buildings Conference. San Francisco, California. Print,

Wyllie, Loring, Thomas Bush and James Jirsa. 1991."Observations on Two Seismic Strengthening Schemes for Concrete Frames." Earthquake Spectra. EERI, no. 7(4):511-527.

Wyllie, Loring. 1989. "Lessons from the Armenian Earthquake." Concrete International. ACI, 11(8): 21-28.

Wyllie, Loring. November 1988. "Evaluation and Strengthening of Concrete Buildings for Improved Seismic Performance." Paper

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presented at the Pacific Concrete Conference. New Zealand. Print

Wyllie, Loring. July 6, 1988. "Long Range Planning Guidelines - 1988/1993,." H.J. Degenkolb Associates Engineers. Presentation, Location Unknown. Print.

Wyllie, Loring, S.C. Liu, Cliff Astill, Sami Masri, Le-Wu Lu, Erik Vanmarcke, James Jirsa, and Mihailo Trifunac. 1987. "Summary of Visit to U.S.S.R. on Seismic Construction: U.S. Delegation Trip Report." Earthquake Spectra. EERI, 3(1): 79-89.

Wyllie, Loring. October 29, November 5 and 12, 1987 "Rehabilitation of Existing Non-Ductile Concrete Buildings and Existing Concrete Shear Wall Buildings." In the Structural Engineers Association of Northern California Fall Seminar-Existing Buildings: Evaluation and Rehabilitation. Print.

Wyllie, Loring and Maryann T. Wagner. October 8-10, 1987. "Implications of Recent Research on the Seismic Strengthening of a Nine-Story Reinforced Concrete Building." Sacramento: CA.

Wyllie, Loring. July 23,1987. "Professional Responsibility." Presentation, U.C. Extension. Talk given at U.C. Extension.

Wyllie, Loring. 1986. "How Structures Will Perform in Los Angeles." Paper Presented at the EERI December Seminar on Earthquake Losses. Los Angeles: California. Print.

Wyllie, Loring. October 12-22, 1986. "Strengthening Buildings Damaged by Earthquakes." Summary of Presentation Given During the U.S. Delegation Visit. Soviet Union: USSR.

Wyllie, Loring. September 25-28, 1986. "Why Buildings Did So Well in the 1985 Chilean Earthquake?" Paper Presented at the 55th Annual Structural Engineers Association of California Convention. Sacramento, California Print.

Wyllie, Loring. 1986. "Terra Cotta." Abstract Only, Regarding 140 New Montgomery Street. San Francisco, CA

Wyllie, Loring, James Malley, Maryann Wagner and Chris Poland. August 24-28, 1986. "Design and Behavior of a Strengthened Reinforced Concrete Frame. In the Third U.S. National Conference on Earthquake Engineering. Charleston: South Carolina. Print.

Wyllie, Loring and Bruce A. Bold. 1986. "The Chile earthquake of March 3, 1985." In Earthquake Engineering Research Institute, El Cerrito: California.

Wyllie, Loring. March 22, 1984. "Understanding Soils Reports (From the Structural Engineer's Point of View)." Presentation. SEONC Continuing Education Seminar - Foundations / Excavations. Location unknown.

Wyllie, Loring. May 14, 1980. "Antiseismic Engineering and Construction Costs." Presentation. Seminar on Tourism Reconstruction. Montenegro. Milocer, Yugoslavia.

Wyllie, Loring, Henry J. Degenkolb and Associates. 1980. Damage at the Lawrence Livermore Laboratory. Observations of Damage Caused by the January 24, 1980, Greenville (Diablo-Livermore) Earthquake. San Francisco, California.

Wyllie, Loring, Ignacio Martin, Robert Park and Lawrence Selna. "Strong and Tough Concrete Columns for Seismic Forces." 1980. Journal of the Structural Division. ASCE, 106(ST8): 1717-1734.

Wyllie, Loring and Chris Poland. August 22-24, 1979. "A

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Documented Vertical Acceleration Failure. In the Second U.S. National Conference on Earthquake Engineering. Stanford: California. Print.
Wyllie, Loring. September 7, 1979. "Good Seismic Codes Do Not Always Mean Good Buil dings." Presentation, Mexico-California Symposium on Earthquake Hazards in the International Border Region, Tijuana, Baja California.

Wyllie, Loring. May 1978. "Repair of Earthquake Damaged Buildings." Presented at Italian Earthquake Symposium, Italy.
Wyllie, Loring. 1977. "Applicability of Earthquake Research from the User's Viewpoint. Workshop on Earthquake-Resistance Reinforced Concrete Building Construction. U.C. Berkeley, Berkeley, California

Wyllie, Loring. 1977. "Comments on Structure-Soil Interactions During Earthquakes." Workshop on Earthquake-Resistance Reinforced Concrete Building Construction. U.C. Berkeley, Berkeley, California

Wyllie, Loring and Henry J. Degenkolb. "Design and Ductility of Shear Walls." (unpublished, 1975).

Wyllie, Loring and R. Gordon Dean. April 14-18, 1975. "Seismic Failures and Subsequent Performance After Repair." In the ASCE National Structural Engineering Convention. New Orleans: Louisiana. Print.

Wyllie, Loring. November 29- 30, 1973. "Performance of the Banco Central Building." In the Earthquake Engineering Research Institute: The Managua, Nicaragua Earthquake of December 23, 1972. San Francisco: California. Print.

Wyllie, Loring and Paul Eratesssa. April 6-10, 1970. "A Design Criteria for Reinforced Concrete Columns Subjected to Earthquake Forces." In the ASCE National Structural Engineering Meeting. Portland: Oregon. Print.

Matthew Bertics, S.E.

EDUCATION

M.S., Structural Engineering, Stanford University, 1986
B.S., Civil Engineering, Duke University, 1985

REGISTRATION

California Registered Structural Engineer
California Registered Civil Engineer
Nevada Registered Civil Engineer
Hawaii Registered Structural Engineer

CAREER EXPERIENCE

MBA Structural Engineers, Inc., President	1998 – present
Simmons Structural Engineering, Associate	1997 – 1998
Rogers/Pacific, Principal Structural Engineer	1996 – 1997
H. D. Rueb, Structural Engineer	1989 – 1996
Paul F. Fratessa Associates, Structural Designer	1986 – 1989

AREAS OF SPECIALIZATION

Timber, steel, concrete, and masonry construction
Seismic strengthening of unreinforced masonry buildings
Post-tensioned concrete and tilt-up concrete construction
Multi-unit, multi-story, wood framed residential construction
Commercial panelized roof construction
Light wood frame construction
Post-earthquake reconnaissance and assessment

PROFESSIONAL ORGANIZATIONS

Structural Engineers Association of Northern California (SEAONC)
American Society of Civil Engineers (ASCE)
International Code Council (ICC)
California Office of Emergency Services Disaster Service Volunteer

Biography

GORDON H. CHONG, F.A.I.A.

PROFESSIONAL EXPERIENCE:

Gordon H. Chong FAIA was the founder of Chong Partners Architecture, a 200 person architectural, urban design and interior design firm with offices in San Francisco, Sacramento, San Diego and London. Chong Partners Architecture was acquired by a 25,000 person International Design firm in September 2007.

Founded by Gordon in 1976 as a sole proprietor, Chong Partners grew over the following 31 years to become recognized by Architectural Record/ENR as the 57th largest firm in the nation in 2007. The firm specialized in the design of Health Care, University /Academic, Civic, Cultural and Urban in fill projects. Clients included:

- **Kaiser Permanente Hospitals** including medical and research campuses at Vacaville, Vallejo, Roseville, Antioch, Sand Canyon and Modesto.
- **Sutter Health Care**
- **The University of California Office of the President** and work on the following Six U.C. Campuses:
    - Berkeley
    - Santa Cruz
    - Davis
    - Irvine
    - San Francisco Mission Bay
    - Riverside
- **Stanford University**
- **The California Academy of Sciences**
- **The City and County of San Francisco** including work at: S.F. Airport, S.F. Port, Municipal Railway, Park and Recreation, Laguna Honda Hospital, S.F. General Hospital, S.F. Redevelopment Agency
- **U.S. Forrest Service** Mono Lake Visitors Center
- **United Airlines**

Gordon was born and raised in Hawaii, received a Bachelor of Architecture degree from the University of Oregon, a Master of Architecture degree from Edinburgh University, Scotland and an Honorary Master of Architecture from The New School, San Diego.

ACHIEVEMENTS, BOARD AND COMMUNITY SERVICE:

In 2002, Gordon served as the National President of the, 95,000 member, American Institute of Architects (AIA) based in Washington D.C.; he was the first Asian American to serve in that role. As National AIA President, Gordon served as the spokesperson for the American profession throughout the world and received Medals of Honor from Japan, Korea, Canada, and Mexico for his vision and leadership to enhance the future of the profession. Prior to his National Presidency he served as President of the AIA at the State of California (Region) and of the AIA San Francisco Chapter.

In addition to his inter-national leadership of the profession, in 2005 Gordon was awarded The Benjamin Latrobe Fellowship, in collaboration with the University of California, Berkeley and Kaiser Permanente to further their research on Evidenced Based Design. The Latrobe Fellowship is the most prestigious research award for the profession and is sponsored by The AIA's College of Fellows.

Gordon served as President of The Academy of Neuroscience for Architecture (ANFA) from 2007- 2009 and served for 15 years on its Board of Directors along with neuroscientists from the Salk Institute, The Neuroscience Institute, and U.C. San Diego. ANFA is a unique organization working to understand the relationship between brain response, human behavior and design.

In 2022, Gordon received the AIA's Lifetime Achievement for Health Care Design where he was cited for "Developing innovative approaches to address the multitude of challenges in this complex building type…"

As an advocate for design, Gordon lectured internationally to audiences in Japan, Sri Lanka, Paris, London, Berlin, Istanbul, Mexico and Canada. He has also led the design discussion as a Juror on major, international Design Competitions.

He has contributed to universities with lectures at Wisconsin, Hawaii, North Carolina, Montana, Alaska, Utah and throughout California.; additionally serving as Commencement Speaker for 3 Universities.

His interest and concern with cities and civic environments led to lectures for corporate, private and public Institutions such as the U.S. Mayor's Institute on Cities, Design Build Institute of American, Corporate Users Round Table and the Association of General Contractors. He is a collaborating author of a book entitled "Deisgn*Informed*…transforming evidence to innovation" which was published in June of 2010 by John Wiley & Sons. He is widely published in news and magazine articles.

Gordon was named a Fellow of The American Institute of Architects (FAIA) in 1983. The award honors approximately 2% of AIA's 95,000 International members in recognition of the award recipient's contribution to the profession.

COMMISSIONER TO PUBLIC AGENCIES:

Gordon and his wife, Dorian, are recent residents of Lafayette, California where he has served as the Chair of The Design Review Commission. Prior to their relocation to Lafayette, the Chongs were long-time residents of Berkeley, California where he has served as:

- Planning Commissioner,
- Chair of Design Review,
- Housing Advisory and Appeals Commissioner
- Redevelopment Agency Commissioner.

STATE OF CALIFORNIA: he served as Vice Chair of the Office of Statewide Hospital Planning and Development (OSHPD) regulating all hospital design and construction and on a Senate Select Committee for Small Business. Gordon was featured as Minority Business Person of The Year by the Federal Small Business Administration.

LOCAL COMMUINITY LEADERSHIP: In addition to his professional affiliations, Gordon has served as a Trustee on Community Boards including:

- Mills College, Oakland, CA
- The Academy of Neuroscience for Architecture, San Diego, CA
- The University of Oregon, School of Architecture and Allied Arts, Eugene, Or
- Geo Hazard International, Palo Alto, CA
- Lamorinda Village, Lafayette, CA