

## LEGAL RUMBLINGS IN CALIFORNIA HIGH-RISES: EMERGING LIABILITY PATTERNS WHEN FIELD PERFORMANCE FALLS SHORT OF DESIGN PREDICTIONS

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### Abstract

In order to obtain permit approval for construction of many new high-rises in California urban centers after the 1989 Loma Prieta earthquake, project designers were required to demonstrate that the as-built facility would meet certain seismic performance targets. For instance, in San Francisco, the lateral force resisting systems for many new high-rises were “required to demonstrate acceptable, *essentially elastic seismic performance*” during “service level” earthquakes (that is, one with a 50% probability of exceedance in 30 years; Administrative Bulletin 083: 83-4). What types of legal exposure can the project owner and design team face if one of these new high-rises sustains major damage during a service level earthquake and falls short of elastic performance or other required targets?

Liability patterns that will arise when the field performance of new high-rises fall short of design predictions will be shaped by two sets of legal developments that emerged after Loma Prieta. The first set is officially reported legal decisions in California, principally the *Myrick* and *Beacon* cases. Among the lessons learned are: that owners are not automatically immune even if their facility meets minimum code requirements during an earthquake; and that design professionals can owe duties to avoid foreseeable harm to third parties with whom they have no contract. The second set is litigation developments in lawsuits brought when field performance falls short of quantified design predictions, such as the massive *Millennium* litigation now pending in San Francisco, arising from sinking (more than 17 inches) of a high-rise that exceeds by more than twice that predicted.

### Introduction

In San Francisco, dozens of high-rises were designed and built after the 1989 Loma Prieta earthquake. Most are located north of Interstate Highway 80 and east of Highway 101, principally in the The East Cut, Rincon Hill and Financial District neighborhoods. Building permits for most of these high-rises required a showing that the as-built facility would manifest “*essentially elastic seismic performance*” during “service level” earthquakes (that is, one with a 50% probability of exceedance in 30 years) (Administrative Bulletin 083: 83-4) [1]. This performance target includes a prediction of no worse than “minor yielding of ductile elements of the primary structural system, provided such results do not suggest appreciable permanent deformation in the elements, strength degradation, or significant damage to the elements requiring more than minor repair” (AB-083 Commentary 83-5). It is axiomatic that the owners of these high-rises (the focus of this paper) took on certain risks based on the possible failure of their high-rise to demonstrate “essentially elastic seismic performance” during a “service level earthquake.” For the owner, the legal consequences can be onerous when its San Francisco high-rise fails to meet design performance targets during a service level earthquake. Similar onerous burdens will often be shared by members of the project design team.

For purposes of this paper, the failure of a high-rise to meet performance targets (which have been specified by the design team) in real-world operation will be referred to as the “*performance gap*.” As will be explained below, legal patterns have emerged after Loma Prieta which compel modifications to

the best practices of design professionals to deal with the performance gap problem, including mastery of sworn testimony long before the owner's high-rise is tested by a real-world service level or more severe earthquake.

**Legal immunity will not automatically protect the design professional who testifies that the high-rise met minimum design requirements: Lessons of the *Myrick* and *Beacon* cases.** Design professionals frequently misapprehend their legal exposure (as well as that of the owner) when they conclude that their high-rise meets minimum building code design requirements. Controlling California legal precedent that emerged after Loma Prieta demonstrates that third parties who have been injured as a result of inadequate performance of a facility during a foreseeable earthquake may recover damages even when the facility met code minimum standards when it was built and when its operation was in compliance with local laws and ordinances. The better interpretation of California law is that neither the owner nor members of the design team are automatically immunized from legal exposure simply because their facility met minimum code requirements. One significant ramification of this legal development is that each design professional should be able, before commencement of structural work, to specify what his or her testimony will be concerning the seismic performance targets adopted on the project and how the facility will perform during foreseeable operational scenarios, including service level and MCE earthquakes.

The single most important example of legal developments after Loma Prieta is the *Myrick* litigation. In the published court opinion denominated *Myrick v. Mastagni* (2nd District 2010) 185 Cal. App. 4th 1082, the trial judge, the jury and the court of appeal all found that a building owner can have legal liability for the poor seismic performance of a structure even if its management and use is in accordance with the minimum standards of local ordinances and building codes. Two women died when the roof assembly of a commercial building detached and crushed them during an earthquake which subjected the facility to peak ground acceleration on the order of 0.25 gravity. Testimony at trial tended to prove that the owner was aware of the seismic vulnerability of the facility and that several years remained for the owner to comply with local ordinances requiring remediation. One structural consultant previously warned the owner that the facility would perform poorly in most foreseeable earthquake scenarios; another testified the expected performance was hard to predict because information was incomplete. In the end, the jury found the owner to have acted unreasonably in operating the facility in a manner which put the two decedents at existential risk. Despite operating the building in accordance with local ordinances, the owner was held liable for two million dollars in damages for the two fatalities (separately, the owner was also found liable to commercial tenants whose property was damaged as a result of the poor performance of the facility).

The underlying legal reasoning of the *Myrick* case tells us what issues will be litigated when San Francisco high-rises experience a performance gap during real-world operations. In California, the basic rule of tort liability for property owners (including an owner of a high-rise) is that ordinary care must be used in the management of the property to prevent injury to another. California Civil Code, section 1714. In California the "general rule is that statutory compliance is not a complete defense in a tort action." Among other things, "a statute, ordinance or regulation defines a minimum standard of conduct" and mere adherence to that minimum standard "does not preclude a finding that a reasonable person would have taken additional precautions under the circumstances." Moreover, when it comes down to the economic interests of the owner in opposition to the risk imposed on third parties, legal duties will be defined with primary adherence to protection of third parties. *Myrick*, supra, 185 Cal.App.4<sup>th</sup> at 1087-1090.

As a practical matter, this means that, before the commencement of structural work, the design professional must be ready to testify as to: what seismic vulnerabilities are inherent in the design and as-

built construction of the facility; what seismic performance targets were recommended to and adopted or rejected by the owner; what the owner was told concerning predictions of performance during service level and more severe earthquake scenarios; what the owner was aware of concerning harm to third parties arising from seismic vulnerabilities; and how owner's decisions concerning structural seismic capacity satisfied owner's duty to manage reasonably the risks to third parties created by construction, operation and maintenance of the particular facility in question, taking into account its unique location and its unique role in the community.

When considering this array of topics for sworn testimony, most design professionals "take pause." Testifying on each topic may seem daunting. Seeking to avoid the burdens of sworn testimony, some invoke the time-honored (but increasingly disregarded) platitude that a design professional's duties run only to those who have contractual rights vis-à-vis the designer. In California, this is no longer the prevailing view. After Loma Prieta, the better view is that a design professional can have a legal duty to third parties who may foreseeably be harmed by the professional's design choices.

Put differently, we ask, as a matter of law, is a design professional who contracts directly with the project developer automatically immune from legal liability when a party with whom it has no contractual relationship claims that it is entitled to damages for the poor seismic performance of the facility? In California courts and those in other states facing seismic hazards, the answer most likely will be in the negative. In a published California Supreme Court opinion filed July 3, 2014 and entitled ***Beacon Residential Community Association v. Skidmore, Owings & Merrill LLP et al.*** (2014) 59 Cal. 4<sup>th</sup> 568 ("**Beacon**"), the California Supreme Court held that the architects who had directly contracted with the developer owed a non-statutory duty of care to follow-on purchasers of project units despite the absence of any contractual relationship with the follow-on purchasers and despite language in the architects' contracts that attempted to limit their liability to future follow-on purchasers. Most American courts would apply similar reasoning and reach the same conclusion if follow-on purchasers pursued claims for poor performance of project units during an earthquake against the structural engineers of record who had contracted directly with the developer. The same outcome is likely when bystanders sue design team members for the harmful performance of their high-rise during a service level earthquake.

**High-rise performance gaps during service level earthquakes and legal progeny of the *Myrick* and *Beacon* cases.** What legal exposure patterns should emerge when post-Loma Prieta high-rises in San Francisco experience a performance gap during a foreseeable service-level earthquake? The following hypothetical high-rise project will illustrate a few of the more prominent patterns. Assume that the facility has the following characteristics:

- Structural design and submittal documents for building permit purposes specify that the project will employ non-prescriptive seismic design procedures. They are submitted on July 1, 2019, six months after entitlement is granted by the San Francisco Planning Commission.
- The intended use is residential (rentals for a ten-year period followed by condominium conversion). The useful life of the structure is projected to exceed 50 years. It is not an essential facility (e.g., not a hospital).
- The height is 350 feet (*hn* as defined in San Francisco's Building Code), including a tower of 35 stories over a one story basement. ***The principal seismic force-resisting system of the tower is comprised of a special reinforced concrete shear wall core, a common design approach of many post-Loma Prieta residential high-rises.*** The structural consultant explains to the owner the cost benefits of the concrete shear wall core design approach, as well as vulnerabilities inherent in that approach, such as sliding shear failures and the peculiar difficulties of post-earthquake repair.

- The tower foundation consists of a pile cap supported by several hundred precast concrete piles.
- When the structure is under nonlinear lateral deformation, the structural design contemplates ductile yielding mechanisms.
- The tower is clad in a glass and aluminum curtain wall.
- Because of its proximity to essential facilities in downtown San Francisco, the structural consultant considers the adoption of Risk Category III for the facility, as suggested by both ASCE 7-10 and ASCE 7-16. [2] The developer argues that owner can save 4% on construction costs if Risk Category II is followed instead. The owner accepts the additional risk and chooses Risk Category II in order to save money.
- The structural consultant demonstrates to San Francisco's Structural Design Reviewer (aka "Peer Reviewers" selected by San Francisco's Department of Building Inspection; see Administrative Bulletin 082 (December 2016) [3]) that its non-prescriptive "service-level evaluation" demonstrates that, during a service level earthquake and if built as designed: the tower will sustain no more than "minor yielding of ductile elements of the primary structural system," without permanent deformation in the elements, strength degradation, or significant damage requiring more than minor repair; the curtain wall system will remain undamaged; and the tower doors to the outside will not be impeded. This is consistent with the requirements of AB-083, which states that "it is expected that the building cladding will remain undamaged and that egress from the building will not be impeded when the building is subjected to the service-level ground motion." AB-083 Commentary 83-5. "The evaluation shall demonstrate that the elements being evaluated exhibit serviceable behavior." AB-083 83-5.
- The Structural Design Reviewer accepts the proposal to abide by the requirements of Risk Category II of ASCE 7 and approves the proposed structural design, with mutually agreeable modifications. The developer understands that the risk of collapse of the tower is less than ten percent during an MCE and agrees to modify the project budget to satisfy the "finalized" structural design.

Let us further assume that construction of the hypothetical high-rise is completed by January 1, 2022 and that it experiences a service level earthquake (peak horizontal ground acceleration of 0.25g and a spectral acceleration of 0.13g) on July 1, 2022. Assume further that during the service level earthquake, ductile elements of the core sustain more than minor yielding and repair costs are on the order of \$7.5 million. Assume as well that the curtain wall separates, injures three passers-by and the building is red-tagged for three months, resulting in many millions of lost revenues. Curtain wall repairs are another \$2.5 million. Following the legal principles of *Myrick*, *Beacon* and other like-kind legal authorities, the following claims are asserted in San Francisco Superior Court.

- The three injured passers-by sue the developer, the structural consultant and the owner for failing to protect them from foreseeable physical injuries caused by unsatisfactory performance of the high-rise during the earthquake. The essence of the claim is that there was an actionable performance gap: in a real-world service-level earthquake, the facility failed to meet the performance predictions upon which the building permits and occupancy permits were predicated. It is unlikely that the structural consultant will obtain automatic immunity from liability to the third parties; it is likely that he or she will need to defend on the merits. It is highly probable that the owner will sue the structural consultant for indemnity against the claims of the passers-by.
- Residential and commercial tenants in the facility sue the developer, the structural consultant and the owner for their property damage and inability to use their respective tenancies during the period of remediation. Again, the essence of the claim is that there was an actionable performance gap: in a real-world service-level earthquake, the facility failed to meet the performance predictions upon

which the building permits and occupancy permits were predicated. Moreover, the tenants claim, they would never have signed their leases if they had been told that the developer and the owner preferred Risk Category II over III in order to reduce construction expense. For the same reasons stated above, it is unlikely that the structural consultant will obtain automatic immunity from liability and he or she will almost certainly be sued for indemnity by both the owner and developer.

- The City of San Francisco (through its Department of Building Inspection) requires either (a) demolition of the facility, at the owner's expense or (b) remediation in full conformity with AB-083 and Risk Category III of ASCE 7. If either outcome is ordered by the court (or agreed to by the parties), the burden on owner and its indemnitors will be onerous.

**The Millennium litigation: Harbinger of seismic performance gap litigation.** A precursor of such hypothetical earthquake-driven litigation is currently being played out in San Francisco Superior Court. Several pending lawsuits arose from unexpected settlement experienced by the Millennium Tower (a 58-story, 605-foot tall structure over a one story basement) located at 301 Mission Street in San Francisco. One lawsuit is being pursued on behalf of the homeowner's association for the Millennium and seeks more than \$200,000,000 against developer entities and members of the design team, the general contractor, the developer of a nearby high-rise (the Sales Force Tower), as well as the public entity developing a transit center nearby. *Millennium Tower Association v. Mission Street Development LLC, et al* (S.F. Sup. Ct.) Case No. CGC-17-557830. None of these entities have been able to establish automatic immunity from claims by the association. Similarly, many lawsuits have been filed on behalf of individual owners of Millennium Tower units, including *Butterly et al v. Millennium Partners Management LLC, et al* (S.F. Sup. Ct.) Case No. CGC 17-556292. The gist of the charging allegations of these cases is that since commencement of construction, the amount of settlement sustained by the Millennium Tower far exceeds that predicted by members of the project design team and that such information was wrongfully concealed from both the association and unit purchasers (among others) before sales of individual units took place. The actionable situation is a settlement performance gap: settlement in the field far exceeds that predicted by members of the design team before structural construction commenced.

Based on current, publicly available information, it is expected that some experts in the *Millennium* litigation will testify along the following lines:

- The original design anticipated one inch of settlement under Millennium Tower by the time of construction completion, and additional long-term settlement due to compression of the underlying clay layers of five inches. Settlement was expected to be uniform over the Tower foundation area. See, e.g., G. Deierlein; M. Schotanus; C. Shields, *Structural Safety Review of the Millennium Tower* (July 29, 2017) p. 2. [4]
- Contrary to the predicted performance, it appears that the Millennium Tower settled six inches at the time of construction completion, instead of one inch. And, as of July 2017, settlement was on the order of 17 inches instead of the five predicted for the long-term. Moreover, settlement has not been uniform and the Tower leans to the west on the order of 14 inches and leans to the north on the order of six inches as of July 2017. This is roughly twice what would be considered acceptable construction tolerance for out-of-plumb. *Id.* at pp. 1, 5, 11.

Because the Tower has experienced unexpected and excessive settlement and tilt, and lack of stabilization of the settlements, in-depth investigation was undertaken to determine whether it meets the minimum structural and seismic safety requirements expected under San Francisco and California building codes. *Id.* at pp. 2 and 11.

## Conclusion

The still-developing *Millenium* case history reveals a pattern that unfolded in the *Myrick* case and will unfold in future cases arising from unsatisfactory high-rise performance during foreseeable earthquakes: before unacceptable performance, the developer/owner becomes aware of a troublesome mechanism in structural components and before that flaw is corrected, others are harmed by it, leading to litigation which requires uncovering evidence of performance targets implicitly or explicitly adopted by the facility stakeholder. In the case of the Millennium Tower, the parties will delve into what the selling entities knew about the depth of settlement upon completion of construction and whether that information, along with projections of additional settlement, was shared with prospective purchasers, among others. In future litigation arising from unacceptable high-rise performance during foreseeable earthquakes, the developer/owner will be required to testify whether he or she was aware of the failure mechanism(s) at issue when construction was completed, and what tangible steps were taken to control those vulnerabilities and thereby avoid foreseeable harm to third parties. Among other things, what performance targets were selected in order to address potential harm inherent in the structural design? It is better practice to know the answer to that question, and related questions, before the earthquake than to reveal it for the first time afterward.

## References

- [1] City and County of San Francisco, Department of Building Inspection, 2014, Administrative Bulletin 083, *Requirements and Guidelines for the Seismic Design of New Tall Buildings using Non-Prescriptive Seismic-Design Procedures*, 7 pages
- [2] American Society of Civil Engineers and Structural Engineering Institute, 2013 and 2017, ASCE/SEI 7-10 and 7-16, *Minimum Design Loads for Buildings and Other Structures*
- [3] City and County of San Francisco, Department of Building Inspection, 2016, Administrative Bulletin 082, *Guidelines and Procedures for Structural Design Review*, 3 pages. *See also*, City and County of San Francisco, Department of Building Inspection, 2017, Information Sheet 18, *Interim Guidelines and Procdures for Structural, Geotechnical, and Seismic Hazard Engineering Design Review for new Tall Buildings*, 2 pages
- [4] Deierlein, Gregory G. *et al.*, 2017, *Structural Safety Review of the Millennium Tower* 14 pages (delivered to Naomi N. Kelly, City Administrator, City and County of San Francisco on July 28, 2017)