



Practice Considerations
for the
San Francisco Wood-Frame
“Soft Story”
Seismic Retrofit Ordinance

Prepared by

SEAONC Professional Practice Committee
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Preface

This document was developed by the Structural Engineers Association of Northern California (SEAONC) Professional Practice Committee. The purpose of this document is to raise awareness and to serve as a resource to structural engineers that are involved with buildings subjected to the San Francisco ordinance.

The material in this document is for informational purposes only and is not intended to serve as legal advice, establish a standard of care, or to contradict any Code requirements. If legal advice is required or if any of the sample contract language is used, it is recommended that the reader consult an attorney.



Practice Considerations for the San Francisco Wood-Frame “Soft Story” Seismic Retrofit Ordinance

Introduction

This document has been created to address professional practice considerations related to San Francisco’s wood-framed, soft story seismic retrofit ordinance.

San Francisco adopted a mandatory seismic retrofit program in 2013 for wood-framed, "soft story" buildings with 3 or more stories and 5 or more dwelling units through the implementation of San Francisco Building Code (SFBC) Chapter 34B, AB-106, and AB-107. According to SFBC Section 3401B, the mandatory retrofit program is intended to "reduce the collapse risk of residential buildings with critically vulnerable stories" and to improve "building performance while limiting retrofit costs and impacts." However, it is not intended to bring the building up to current building code requirements. As with any retrofit design, the engineer should explain that a building upgraded to comply with the requirements of Chapter 34B could be significantly damaged during an earthquake.

SFBC Chapter 34B presents professional practice concerns for structural engineers including some that are unique to this mandatory retrofit program. One such concern is that because the scope of the work is primarily structural in nature the structural engineer may be the prime consultant and may be the only licensed professional involved in the retrofit project, a role the engineer may not be accustomed to filling. Additionally the engineer may face challenges in educating the client as to the value to the client of the retrofit especially if the client is unhappy about the mandatory nature of the retrofit program.

One of the challenges of the engineer being the prime design professional is the need to identify when other consultants are needed and effectively communicating this to the client. This is of particular concern when the client is not familiar with the permitting and construction processes. The structural engineer’s scope of work commonly excludes many aspects of a project traditionally addressed by an architect, such as the general architectural requirements, the contractor's general conditions, and the project administration during the construction phase. Thus the owner might need to obtain the assistance of specialists to resolve portions of the work that are beyond the scope of services offered by the structural engineer. Related to this issue is the need for the engineer to clearly explain to the client the limitation of the engineer's scope of work and role in the project, especially with respect to non-structural issues.

While it may be tempting for the engineer to act as an informal advisor and attempt to educate the client as the project proceeds this is not always successful. In such situations the client may not recognize the need to consult with the engineer and the engineer may have no ability to take steps to mitigate any problems that may occur. In these situations the engineer should consider adding services such as managing the permitting process and acting as the client’s representative when dealing with the contractor. Another strategy would be for the engineer to help the client find appropriate advisors or consultants.



The Professional Practice Committee has identified several specific aspects of these types of projects that warrant extra consideration:

1. Educating the Client

- a. The engineering definition of a "soft story" building may not be familiar terminology to the typical building owner. Explain to the client why soft story buildings are potential hazards and describe the benefits and limitations of performing a retrofit.
- b. Multiple design standards are available to demonstrate compliance with the ordinance (FEMA P-807, ASCE 41-13, ASCE 41-06, 2013 CBC, and 2012 IEBC Chapter A4). It is appropriate for the engineer to discuss the appropriate standards and document the client's acknowledgement of the agreed upon compliance approach. The emphasis here is on getting agreement from the client regarding the approach that will be taken. It is recognized that some engineers may prefer a given approach while other engineers may desire to explore other options.
- c. The mandatory retrofit ordinance allows conditions that would not comply with Code requirements for similar new buildings. The following two provisions are examples of where the ordinance establishes a level of compliance less than that for new construction.
 - First, Chapter 34B of the ordinance generally requires strengthening at the ground story only, where the soft story is present.
 - Second, there is a maximum limit for the required design story shear strength based upon the expected shear strength of the existing upper stories.

The engineer should consider discussing with the Owner, the relative benefits of performing additional retrofit work beyond the minimum requirements of Chapter 34B and providing a notice in the client agreement regarding the expected seismic performance, such as the following:

Notice to Client on the Limitations of San Francisco Building Code Chapter 34B

Under this agreement, Engineer will design a limited seismic upgrade intended to comply with Chapter 34B of the San Francisco Building Code. The City of San Francisco implemented Chapter 34B because it recognized that certain wood buildings with weak lower floors ("soft stories") are in danger of collapsing or being otherwise significantly damaged during an earthquake. To expand the acceptance of the mandatory retrofit program by making it more cost effective and less disruptive to building occupants, some of the soft story ordinance requirements are intended to be less stringent than the building code requirements for new buildings or those of other seismic retrofit standards. An ordinance compliant, soft story seismic upgrade is intended to reduce, but not eliminate, the risk of collapse during an earthquake. The Client should understand that even after this proposed seismic upgrade is constructed, Client's building could still be significantly damaged in an earthquake and could be uninhabitable afterward.

- d. Make an effort to understand the client's expectations regarding building performance after an earthquake so they can be managed. For example, the owner might expect that a building upgraded to comply with Chapter 34B would be "green-tagged" after any future earthquake. While the intent of the ordinance is to increase the overall resiliency of the building stock in San Francisco, many building owners might not understand that significant structural deficiencies beyond the scope of the ordinance may remain unresolved in their buildings. As a consequence, a percentage of buildings that have been retrofitted to comply with SFBC Chapter 34B may suffer significant damaged during an earthquake and be uninhabitable afterward. If the client's expectations regarding building performance exceed what can be expected by compliance with the minimum requirements of Chapter 34B the engineer should explore alternate approaches that will address the client's expectations.



- e. Preconstruction investigation and materials testing will likely be required to determine the existing structural framing and foundation conditions. Discuss areas where additional preconstruction investigations will likely reduce the likelihood and magnitude of design changes. An informed owner might be more understanding of potential cost increases and schedule delays resulting from unforeseen conditions.

2. Contractual Relationship with the Client

- a. With limited exceptions, State law requires engineers to have signed written contracts that include specific terms and conditions. Refer to California Business and Professions Code Section 6749 for the specific requirements.
- b. Clearly state in writing the purpose and limitations of site visits associated with completing the Department of Building Inspection's (DBI) Wood-Frame Retrofit Screening Form or Sections 2 and 3 of the Optional Evaluation Form. Provide a notice in the client agreement regarding the completion of the DBI screening form, such as the following:

Engineer's scope is limited to completion of the Department of Building Inspection's Wood-Frame Retrofit Screening Form. Engineer's observations do not constitute a building evaluation. A detailed engineering analysis may provide insight into the building's expected earthquake performance, but such an analysis is not included in the Services provided under this Agreement. A building determined to be exempt from the retrofit requirements of San Francisco Building Code Chapter 34B could be significantly damaged by an earthquake and be uninhabitable or irreparable after an earthquake.

- c. If the engineer is not communicating directly with the owner, verify the level of authority of the owner's representative to make decisions on the owner's behalf. Many buildings are owned or managed by limited liability companies, condominium associations, and tenancy-in-commons. Decision making authority may be reserved to a board, committee, or other individuals.
- d. Make an effort to understand the client's expectations because owners who have unrealistic expectations are more likely to be dissatisfied. One of the "basic means of reducing liability is to select reasonable clients and to discuss openly with them the benefits and limitations"¹ of a mitigation strategy. "Not only are well informed clients less likely to sue but they are less likely to claim that they did not get what they were expecting."² The discussions and agreements made during these conversations should be documented and confirmed in writing with the client.
- e. The engineer should consider listing potential additional services in the agreement when portions of the scope of work are difficult to anticipate. For retrofit projects, the extent of preconstruction assessments, the amount of construction phase support, the extent and type of unanticipated field conditions, and the number of change orders are particularly difficult to estimate in advance. In addition, there is uncertainty concerning how plan checkers will interpret the ordinance.

3. Non-Structural Design Concerns

- a. The client should consider employing an architect when there are exterior alterations, changes to parking, work involving fire-rated assemblies, egress changes, or if the building is considered

¹"Contractual Provisions to Address the Engineer's Liability When Using Performance-Based Seismic Design"; by SEAONC Professional Practice Committee; April 29 1999

²Ibid.



historic. These items may require additional Planning Department, Fire Department, and Department of Building Inspection review. Additionally, an architect's services might be needed when energy conservation, waterproofing, or accessibility improvements are required.

- b. If the proposed retrofit solution alters the building's mechanical, electrical, or plumbing (MEP) systems or compromises clearances for equipment, the engineer should consider recommending that the Owner retain a licensed engineer or a specialty contractor to consult regarding any needed modifications to the MEP systems.
- c. Consideration should be given to making the owner aware that older buildings in San Francisco commonly contain hazardous materials, such as lead paint and asbestos. Where retrofit work will likely disturb existing hazardous materials, the building owner should consider the need to hire a hazardous materials consultant to identify hazardous materials and help develop remediation strategies. If hazardous materials are encountered, the Owner will likely need to retain a specialty contractor to abate hazardous materials before the general contractor can begin work.
- d. When the Department of Building Inspection requires the engineer's documents include non-structural information such as a site plan and room labels, the engineer should reference the source of this information. If information has not been independently verified by the engineer, this should be noted in the engineer's documents.

4. Construction Phase

- a. Owners should be made aware of the nature and limitations of structural observations provided by the engineer. Owners might otherwise erroneously consider structural observations to be inspections and might expect that the engineer will certify all of the construction work. The structural observation provisions in the California Building Code are consistent with SEAOC's position that structural observations do not constitute a thorough inspection program. Depending on the Owner's expectations, it may be appropriate to suggest the Owner consider authorizing additional inspections to help ensure that the retrofit is completed in accordance with the design intent. It may also be desirable to emphasize that the City's building inspectors should not be relied upon to confirm the construction is in compliance with the engineer's design intent.
- b. Owners should be made aware that they will likely need to hire a testing and inspection agency to perform third party special inspections and/or testing as required by the Code. While Contractors are prohibited from hiring the special inspector, Owners should understand that scheduling of the inspector's site visits will still need to be coordinated with the Contractor.
- c. The engineer may need to help educate an Owner who is inexperienced with construction projects, in order to help prevent misunderstandings and problems during and after the project. When an Owner requests assistance from the engineer with selecting a General Contractor, the Engineer should consider recommending that the Owner review the proposed construction contract with an attorney.
- d. Owners who have not been fully involved in prior construction projects may not have adequate knowledge or experience to self-perform a successful retrofit project. In cases where Owners are considering serving as their own general contractor, engineers should carefully consider the Owner's experience and construction expertise before committing to the project.

Addressing the above concerns will not prevent all problems, but it is hoped that the suggestions provided will be helpful to engineers as they begin working on soft story retrofit projects.



Appendix - A

Edited Version of San Francisco's Application Completeness Control Sheet

This appendix is a revised version of the City and County of San Francisco's Application Completeness Control Sheet (ACCS) and reflects an understanding of the Department of Building Inspection's submittal requirements for soft story mitigation permit applications.



APPLICATION COMPLETENESS CONTROL SHEET

Please provide the checked items for filing of your permit application. The Department of Building Inspection (DBI) may find it necessary to request other information after further analysis of the application prior to completing its review. Check with other review stations (Planning, SFFD, etc.) for their specific requirements. Bring this sheet back when resubmitting.

FORM NUMBER (CIRCLE ONE)	3/8	4/7	5	6
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JOB ADDRESS: _____

- Initial screening by: _____ Date: _____
- Notes (Plans, no plans, etc): _____

A. GENERAL

1. Complete appropriate permit application in its entirety. Leave no blanks except for Filing Fee Receipt No., Permit No., and Revised Cost. Verify information on the application before submitting.
2. Two sets of plans on minimum 11" x 17" paper, no pencil, no grid paper, good contrast and reproducible.
3. Preparer's wet signature on all plan sheets.
4. Preparer's wet signature on supporting documents:
 - Cover sheet of calculations and specs.
 - Signature blocks on forms.
5. Architect or engineer seal and wet signature required on documents (expiration date shown).
6. Job address and floor (if applicable) on documents.
7. A copy of the City "approved" permit application, plans and related documents for reference (1 set). If not the City "approved" plans, 2 sets, wet signed and stamped.
8. Other _____

B. PLANS

1. General: Plans shall be drawn to scale (minimum 1/8" to 1 foot, larger if unclear or illegible) and reproduced on substantial paper and shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of all codes, relevant laws, ordinances, rules and regulations. Label existing and proposed spaces. No stick/single line drawings. Include a cover sheet with a list of Index sheets and the scope of proposed work.

Vicinity
2. ~~Plot plan and Key Plan (Identify area of work. Indicate property lines, street and adjacent spaces). Plot plans may be drawn to 1/8" scale.~~
3. ~~Architectural Floor Plans:~~
 - ~~The following floors/levels (circle): 1st 2nd 3rd Other: _____~~
 - ~~Separate existing and proposed floor plans.~~
 - ~~Exiting scheme from the area of remodel to the public way (street). Include occupant load calcs., exit separation distances, etc.~~
 - Path of travel from the public way to the area of remodel and from the area of remodel to the restrooms that serve the area of remodel (see Disabled Access Requirements section for more details). (this is required only for commercial buildings.)
4. ~~Roof Plan (mechanical ducts, skylights, exhaust ducts, etc.)~~
5. Structural Foundation/Framing Plans relating to target story and floor above it, only.

only if new spaces are being added

First sheet shall include seismic design criteria used for retrofit, including but not limited to design loading, information (design dead and live load, seismic coefficient, base shear, etc.), standard used for seismic retrofit, plot plan, requirements for special inspection and structural observation.

Note: For special inspection, required to use DBI format.

Foundation plan shall identify the new footings, and relationship between the new and existing footings.

Structural framing plans, shall identify the new and existing lateral load carrying system in the target story and the floor above it, only.

Other sections, details and elevations, as required to provide adequate information for construction.

APPLICATION COMPLETENESS CONTROL SHEET
For From 3/8, 4/7, 5, 6

- 6. ~~Plumbing and Mechanical Floor Plans relating to architectural floor plans. Include weights and heights of mechanical units and anchorage of equipments.~~
- 7. ~~Electrical Floor Plans relating to architectural floor plans. (Reflected ceiling plane, lighting, exit signs, plug heights, electrical box separation, etc.)~~
- 8. ~~Sufficient Construction Details. Typical partition details, fire-rated construction details (include fastener specifications and source, i.e. UBC tables, UL, Gyp Assoc., etc.), drop ceiling details, etc.~~
- 9. ~~Exterior Elevations:~~
 - ~~Front~~ ~~Right (facing building front)~~
 - ~~Rear~~ ~~Left (facing building front)~~
- 10. ~~Building Sections.~~
- 11. Other _____

only required for commercial buildings. A Disable check list form (D.A. Checklist) needs to be filled out.

C. DISABLED ACCESS REQUIREMENTS

- Information to be included ON THE PLANS demonstrating compliance with Disabled Access Provisions of Title-24, Part 2, California Code Regulations (CCR):
 - Entrance and Path of Travel. Indicate door sizes, strike width and lever hardware, threshold, landings, door pressure, kick plate, push and pull clearances.
 - Stairs and Handrails.
 - Elevators/Lifts (Cab size, elevator phone, call buttons, rails, etc.)
 - Ramps and Handrails.
 - Parking Stalls/Walkways and path of travel from parking stalls to area of remodel.
 - Sanitary Facilities (plan, interior elevations and dimensions) and path of travel to facilities from area of remodel.
 - Public (pay) telephone (if provided), T.D.D.
 - Drinking Fountain (if provided).
 - Signage.
 - Visual alarms.
 - D.A. Checklist (P.1 and P.2).
 - Disabled Access 20% Rule.
 - Unreasonable Hardship Request.
 - Reference plans showing existing conditions for accessibility (2 sets wet signed [and stamped if required] by preparer or person certifying or one copy of the original City "approved" set that has all the City approval stamps).
 - Other _____

D. SUPPORTING DOCUMENTS

- 1. Structural Calculations.
- 2. ~~Energy Calculations and Compliance Forms. Check with MECH for exact forms required to be reproduced on the plans.~~
- 3. ~~Transit Impact Development Fee (TIDF) for new offices only.~~
- 4. Product Literature with Approval Geotech report is required if the construction involves deep foundation.
- 5. Geotechnical / Soils Report. ? copies
- 6. Notice of Violations (NOVs). Engineers should remind owners that the inspector may catch them while performing construction inspection, if they have non-permitted structure.
- 7. Pre-application letter (to be reproduced on the plans).
- 8. Special inspection form (in the required DBI format).
- 9. BAAQMD Asbestos Demolition/Renovation Notification Form, J#. (this form shall be filled out by the contractor.)
- 10. BAAQMD Permit Inquiry Cards.
- 11. Notice of Applicant – Sign Posting.
- 12. Affidavit for Lobby Sign.
- 13. ~~Sprinkler Hydraulic Calculations~~
- 14. ~~Declaration of Use Limitation.~~
- 15. ~~SFUSD Certification of Payment.~~
- 16. Street Space Permit Waiver. if required
- 17. ~~Service Request Form (Water Department)~~
- 18. State Industrial Safety Permit. (only if work requires trenching, as required by OSHA)
- 19. Other _____