

***Regular Meeting
of the
Building Inspection Commission***

October 15, 2025

Agenda Item 5



October 14, 2025

Building Inspection Commission
49 South Van Ness Avenue
San Francisco, CA 94103

Re: Post-Earthquake Inspection, Evaluation, Repair and Retrofit Requirements for Pre-Northridge Welded Moment Frame Buildings

Honorable Members of the Commission:

On October 8, 2025, the full Code Advisory Committee (CAC) met to consider adoption of a New Administrative Bulletin (AB) for, Post-Earthquake Inspection, Evaluation, Repair and Retrofit Requirements for Pre-Northridge Welded Steel Moment Frame Buildings. Jim Malley, Degenkolb Engineers on behalf of Applied Technology Council (ATC – 151), provided a presentation describing the proposed AB. They used the same rules found in AB-099, so engineers can follow the same logic when performing inspections and evaluating the level repair and retrofit required in steel moment frame buildings after an earthquake.

The CAC went on to vote unanimously, with one abstention, to recommend the Building Inspection Commission approve the New AB as written.

Respectfully submitted,

Thomas Fessler
DBI Technical Services
Secretary to the Code Advisory Committee

cc. Patrick O'Riordan, C.B.O. Director
David Kane, Deputy Director
Mary Wilkinson-Church, Permit Services Manager
Christine Gasparac, Assistant Director
Tate Hanna, Legislative Affairs Manager
J. Edgar Fennie, Chair, Code Advisory Committee

Attach. AB - XXX

ADMINISTRATIVE BULLETIN

NO. AB-0XX**DATE** : Effective Month, Day, 2026**SUBJECT** : Permit Review and Operations**TITLE** : **Post-Earthquake Inspection, Evaluation, Repair and Retrofit Requirements for Pre-Northridge Welded Steel Moment Frame Buildings**

PURPOSE : The purpose of this bulletin is to establish policies for interpreting the San Francisco Existing Building Code requirements for post-earthquake damage evaluation and retrofit triggers for Pre-Northridge Welded Steel Moment Frame (NWSMF) and to detail the scope and criteria for such triggered retrofits and other repairs.

REFERENCE : San Francisco Existing Building Code, Current edition

- Section 202, Definition of disproportionate earthquake damage
- Section 202, Definition of substantial structural damage
- Section 304.4 Minimum Lateral Force for Existing Buildings
- Chapter 4 Repairs
- Section 502 Additions
- Section 503 Alterations

California Historical Building Code, CCR Title Part 8, Current edition

ASCE/SEI 41, Seismic Evaluation and Retrofit of Existing Buildings, Current edition

California Health and Safety Code, Section 17920.3

FEMA 352, Recommended Postearthquake Evaluation and Repair Criteria for Welded Steel Moment-Frame Buildings, 2000

FEMA P-2335, Guidelines for Post-Earthquake Repair and Retrofit of Buildings Based on Assessment of Performance-Critical Damage, 2025

AISC 341, Seismic Provisions for Structural Steel Buildings, American Institute of Steel Construction, 2022.

AISC 342, Seismic Provisions for Evaluation and Retrofit of Existing Structural Steel Buildings, American Institute of Steel Construction, 2022

AWS D1.8/D1.8M:2021, Structural Welding Code - Seismic Supplement, 2021

DISCUSSION:

San Francisco Existing Building Code (SFEBC), Sections 405.2.3 and 405.2.4 triggers seismic evaluation, and possibly retrofit, of buildings when earthquake-related damage reaches the level of substantial structural damage to gravity load-carrying components or substantial structural damage to vertical elements of the lateral-force-resisting system. For the latter, substantial structural damage is defined in SFEBC Section 202 as a loss of lateral load-carrying capacity of more than 33 percent of any story in any horizontal direction from its predamage condition.

In addition to substantial structural damage, SFEBC Section 405.2.2 triggers seismic evaluation, and possibly retrofit, when earthquake-related damage reaches the level of disproportionate earthquake damage. It is defined in SFEBC Section 202 as a loss of lateral load-carrying capacity of more than 10 percent of any story in any horizontal direction from its predamage condition in an earthquake of low intensity. The low earthquake intensity is when the 0.3-second spectral acceleration ($S_{a0.3}$) at the building site for the earthquake in question, as estimated by the United States Geological Survey's (USGS) algorithm for the data point closest to the site, or as determined from peer-reviewed seismograph records from the site or from locations closer to the site than the nearest USGS data points, is less than 30 percent of the mapped acceleration parameter S_s .

The code gives no specific rules for identifying this capacity loss or guidance as to how to calculate capacity loss, so implementation of these code provisions relies on interpretation by the Department of Building Inspection (DBI). This bulletin presents the DBI's interpretation of how to calculate lateral load-carrying capacity loss for Pre-Northridge Welded Steel Moment Frame (NWSMF) buildings.

For NWSMF buildings, the procedures provided in FEMA P-2335 and FEMA 352, as modified in Appendix A of this bulletin, shall be used to determine whether a building with substantial structural damage or disproportionate earthquake damage needs to be restored to its pre-earthquake capacity (repaired) or retrofitted.

The process for determining whether repair or retrofit is triggered for a damaged NWSMF building begins with a determination of whether the building, including its foundation, if repaired to its pre-earthquake state, would comply with Section 304.4 of the SFEBC. If this is satisfied, then the building need not be retrofitted regardless of the level of damage, and restoration (repair) of the building to its pre-earthquake condition shall be undertaken in accordance with Section 405.2 of the SFEBC.

Any damage to structural components shall, at minimum, be repaired in accordance with Section 405.2 of the SFEBC and the Repair section of this bulletin. Retrofit may also be triggered, as discussed in the Repair section.

Residential buildings that incur substantial structural damage or disproportionate earthquake damage as detailed in this bulletin are considered to be substandard per California Health and Safety Code Section 17920.3(b) Structural hazards and (o) Inadequate structural resistance to horizontal forces.

APPLICABILITY:

The interpretations and provisions of this bulletin shall apply to a building if all of the following criteria are met:

- A. The building has steel moment-frames for lateral-load resistance, and

- B. Strong axis beam-column moment connections consist of complete-penetration welds between the beam and column flanges do not conform with the 2002 or later AISC 341 Seismic Provisions requirements, and
- C. Weak axis beam-column moment connections consist of complete-penetration welds between the beam and connecting plates to the column do not conform with the 2002 or later AISC 341 Seismic Provisions requirements, and
- D. Moment frame column splices do not conform with the 2002 or later AISC 341 Seismic Provisions requirements.

Buildings of other construction types may apply the provisions of this bulletin on a case-by-case basis when approved by the director of the Department of Building Inspection. Other methods of determining capacity loss based on analysis, testing, or other objective data may also be allowed at the discretion of the director.

Qualified buildings may be permitted to be evaluated or retrofitted using the provisions in the California Historical Building Code, provided that such standards do not result in seismic performance less than the evaluation and retrofit engineering criteria detailed in this bulletin.

EXCLUDED SYSTEMS:

The following steel frame systems are excluded from the scope of this bulletin:

- A. Steel moment frames with riveted or bolted beam-to-column moment connections¹
- B. Steel moment frames with infilled walls of unreinforced masonry¹
- C. Steel braced frames¹

Notes:

- 1. These systems are not included in the scope of FEMA 352.

DEFINITIONS:

For the purpose of this bulletin, the following definitions shall apply:

- **STEEL MOMENT FRAME:** A steel building frame system that provides resistance to lateral loads and provides stability to the structural system, primarily by shear and flexure of the framing members and their connections.
- **PRE-NORTHRIDGE WELDED STEEL MOMENT FRAME (NWSMF):** A steel moment frame system as described in the Applicability section of this bulletin.

INSPECTION, EVALUATION PROCEDURE AND RETROFIT SCOPE:

Pre-Northridge Welded Steel Moment Frame (NWSMF)

NWSMF buildings shall be inspected, evaluated and repaired in accordance with FEMA 352, as modified in Appendix A of this bulletin. Substantial structural damage to elements of the lateral force-resisting system shall be deemed to exist when the results of an evaluation in accordance with this bulletin shows that capacity loss exceeds 33 percent at any story in any horizontal direction, or if substantial damage to gravity-essential components is observed under the conditions outlined in Section 4.4.3 of FEMA P-2335. Disproportionate earthquake damage shall be deemed to exist when an evaluation in accordance with this bulletin shows a capacity loss exceeding 10 percent at any

story in any horizontal direction in an earthquake of low intensity, as defined by the SFEBC, under the conditions outlined in Section 4.4.2 of FEMA P-2335.

A. Inspection

Inspection and classification of damage shall be in accordance with Chapter 2 of FEMA 352, except as modified by this bulletin in Appendix A. Inspections are also addressed in Chapters 3 and 4 of FEMA 352, except as modified by this bulletin in Appendix A.

B. Evaluation

Determine whether the building has sufficient pre-earthquake capacity to satisfy SFEBC Section 304.4. SFEBC Table 304.4.1 references dates of design required to demonstrate compliance with the SFEBC Section 304.4, as modified by this bulletin. ASCE 41 will be the primary document used to perform this pre-earthquake assessment.

The determination of substantial structural damage or disproportionate earthquake damage shall be in accordance with Chapter 4 of FEMA P-2335 and Chapters 3 through 5 of FEMA 352, as modified by this bulletin in Appendix A.

C. Repair

Repair of structural damage shall be in accordance with the guidance and methods provided in Chapter 6 of FEMA 352, as modified by this bulletin in Appendix A, where the FEMA 352 individual connection damage index, d_j , is greater than or equal to 1.0.

If the building in its pre-damaged condition complies with the requirements of SFEBC Section 304.4, then the building need not be retrofitted regardless of the level of damage, and repair (restoration) to pre-earthquake capacity is sufficient. Alternatively, if a FEMA 352 evaluation, as modified in Appendix A of this bulletin, shows a capacity loss of less than five percent, repair shall be performed to where the FEMA 352 individual connection damage index, d_j , is greater than or equal to 1.0.

If the building does not satisfy SFEBC Section 304.4 requirements, then a FEMA 352 evaluation as modified in Appendix A is required. Repair (restoration) to pre-earthquake capacity shall be performed where the FEMA 352 individual connection damage index, d_j , is greater than or equal to 1.0. Retrofit requirements per ASCE 41 may be triggered if either substantial structural damage or disproportionate earthquake damage has occurred.

Repairs shall satisfy the requirements of SFEBC Sections 405.2, 502 (Additions) and 503 (Alterations). Other repair methods may be permitted, subject to the approval of the director.

Where retrofit is triggered, due to substantial structural damage or disproportionate earthquake damage, the retrofit shall comply with the Retrofit requirements of this bulletin.

D. Reporting

A report documenting the inspection and evaluation outcomes, including recommendations for repair or retrofit, shall be prepared in accordance with Chapter 2 of FEMA P-2335. The report shall be submitted to the Department of Building Inspection for review within 90 days of a triggering earthquake.

RETROFIT ENGINEERING CRITERIA

When retrofit is triggered by this bulletin or otherwise by the SFEBC, the retrofit shall comply with the minimum requirements of Section 304.4 of the SFEBC. Retrofit of buildings that have sustained disproportionate earthquake damage shall also comply with the requirements of Section 405.2.2 of the SFEBC.

_____	_____
Name	Date
Director	
Department of Building Inspection	

Approved by the Building Inspection Commission on ____

Administrative Bulletins: Post-earthquake Inspection and Repair *for Concrete and Welded Steel Moment Frame Buildings*

City and County of San Francisco
Building Inspection Commission
October 15, 2025

Summary

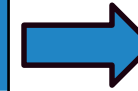
We are asking this commission to approve and publish two Administrative Bulletins:

1. Update to existing AB-099: Post-Earthquake Inspection, Evaluation, Repair and Retrofit Requirements for **Concrete Buildings**
2. New AB: Post-Earthquake Inspection, Evaluation, Repair and Retrofit Requirements for Pre-Northridge Welded **Steel Moment Frame Buildings** (and Appendix A: Modifications to FEMA 352 for Application of this Bulletin)

Both Administrative Bulletins have been recommended for approval by the Code Advisory Committee and Structural Subcommittee.

Goal: Support safe, rapid downtown recovery after an earthquake

	1. Rapid Evaluation	2. Detailed Evaluation	3. Engineering Evaluation
Key questions	Can this building be safely occupied?	What types of damage are present?	How badly is the structure's capacity degraded?
Relevant docs	ATC-20 form, CalOES SAP program	Simple buildings: ATC-20 form Complex buildings: ASCE, FEMA, and international guidance	ASCE, FEMA, and international guidance documents Local administrative bulletins



4. Repair, retrofit, reconstruction

Gap and solution

Gap: The code requires capacity loss to be calculated in some cases – but does not define how.

Solution: Develop standardized procedures through Administrative Bulletins.

- Past bulletins (AB-098, 099, 100) address other building types.
- The proposed ABs focus on two high-impact, complex systems where clear guidance is essential.

Scope

Update to AB-099: Concrete Buildings

- Aligns with the 2025 California and SF Existing Building Codes
- Incorporates new FEMA guidance (FEMA P-2335)
- Expands applicability to concrete buildings of all ages
- Made minor updates to the section of the AB on infill frames for CEBC/SFEBC compatibility

New AB: Pre-Northridge Welded Steel Moment Frame Buildings

- Modeled after AB-099
- Includes a modified and updated version of FEMA 352 as an Appendix
 - Incorporates newer guidance like ASCE-41 and Stanford research
 - One minor correction expected to appendix: 30% -> 33% capacity loss to align with the AB and with modern code definitions of substantial structural damage

Why these two building types?



Downtown Christchurch with demolished buildings after the 2011 earthquake

Concrete Buildings:

- Brittle behavior, known seismic risk
- Lessons from New Zealand's Canterbury earthquake
- New national guidance: FEMA P-2335



A cracked weld identified after the Northridge earthquake in 1994

Pre-Northridge Welded Steel Moment Frame Buildings:

- Risk of damage to welds after an earthquake
- Guidance document: FEMA 352

Outcomes

If published, these Administrative Bulletins will:

- Provide consistent procedures for post-earthquake damage assessment.
- Ensure use of up-to-date national standards (FEMA P-2335, FEMA 352, ASCE 41).
- Identify efficiencies where possible.
- Support safe, rapid downtown recovery after a major earthquake.

Thank you

Questions?