



ADMINISTRATIVE BULLETIN

NO. AB-109

- DATE** : DRAFT ~~July 16, 2014~~ August 4, 2014
- SUBJECT** : Seismic Evaluation of Private School Facilities
- TITLE** : Application of Engineering Criteria in SFBC Section 3428
- PURPOSE** : The purpose of this Bulletin is to establish acceptable evaluation criteria and reporting standards for complying with Section 3428 of the 2013 San Francisco Building Code, as amended by Ordinance No. XX-XX.
- REFERENCE** : Chapter 34, 2013 San Francisco Building Code
ASCE 41-13, Seismic Evaluation and Retrofit of Existing Buildings
- ATTACHMENTS** : Template Scope Report, available at sfdbi.org
Template Evaluation Report, available at sfdbi.org
- DISCUSSION** : SFBC Section 3428, created with Ordinance XX-XX, mandates the seismic evaluation of certain existing buildings and non-building structures used by ~~elementary and secondary (K-12)~~ schools that are not ~~schools~~ under the jurisdiction of the Division of the State Architect's Structural Safety section.
- SCOPE** : Part A of this Bulletin provides regulations to implement the general requirements of SFBC Section 3428, as well as background commentary. Part B of this Bulletin provides interpretation and additional guidance regarding the application of technical provisions in ASCE 41-13, referenced by SFBC Section 3428.

Part A. Regulations and Commentary for SFBC Section 3428

Part A of this Bulletin restates the provisions of Section 3428 and provides corresponding interpretations and background commentary. Commentary is shown in italic font. Section numbers refer to SFBC Section 3428.

Submittal schedule

SFBC Sections 3428.3 and 3428.4 provide two submittal deadlines:

The Evaluation Scope document for each school is to be submitted within one year of the effective date of Section 3428.

The Evaluation Report for each school building and non-building structure is to be submitted within three years of the effective date of Section 3428.

Report templates for each submittal are provided as attachments to this Bulletin.

3428.1 General.

~~The intent of Section 3428.1 is to cover certain E-occupancy buildings used primarily for the education or care of children or school administration of elementary and secondary schools (K-12) that are not under the jurisdiction of the Division of State Architect's Structural safety section and non-building structures associated accessory to with those buildings.~~

~~The intent of Section 3428.1 is to cover all the buildings and non-building structures on the school campus that are used primarily for school purposes, as further described in Section 3428.2. "Other facilities" include:~~

- ~~• Athletic facilities~~
- ~~• Parking structures~~
- ~~• Other buildings and non-building structures considered part of the school.~~

~~Per Exception 2, Section 3428.1 applies only to buildings whose occupancy is classified as Educational Group E and non-building structures accessory to those buildings. Note that SFBC Section 305.1 does not give an exhaustive list of E occupancy facilities and allows that portions of buildings may be classified as E occupancy. Thus, some Department judgment is expected to apply during review of the Evaluation Scope document.~~

~~For purposes of Section 3428, a "non-building structure" is defined in SFBC Chapter 2 as a structure that does not support or shelter any use or occupancy and is also defined in ASCE 7-10 Chapter 15. The intent of Section 3428.1 is to include non-building structures such as retaining walls, covered walkways, patio covers, and other structures that are prone to earthquake damage, but only when these non-building structures serve buildings subject to Section 3428. It is not the intent of Section 3428.1 to include lightweight structures with no history of poor earthquake performance, such as well-anchored playground equipment or light wood or metal fences. Some Department judgment is expected to apply during review of the Evaluation Scope document.~~

It is not the intent of Section 3428.1 to cover:

- Buildings off of the school's campus, even if used by students or faculty.
- Buildings on the school's campus that are used primarily for non-school purposes, such as churches or convents, including such buildings occupied by 25 or more persons for less than 12 hours per week or four hours in any given day. SFBC Section 305.1.1 applies to spaces associated with the functions of the place of religious worship to which they are accessory. It is the intent of SFBC Section 3428.1 that classrooms in buildings used for religious worship are within the scope of Section 3428.1 if they are used for educational purposes for an amount of time that exceeds the time restrictions listed in 3428.1 Exception 1.
- Buildings occupied by 25 or more persons for less than 12 hours per week or four hours in any given day.
- Schools where the average enrollment of the past three years is 25 or fewer students.

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In accordance with SFBC Section 303.1.3, school gyms, auditoriums, and other spaces or structures used for assembly purposes that are nevertheless assigned an E occupancy and are thus within the scope of Section 3428.1.

Evaluations shall be conducted under the supervision of a licensed structural engineer. Department reviews and approvals, however, do not require a licensed structural engineer. In addition to the explicit exceptions for small buildings and for homeschooling facilities, it is not the intent of this section to cover:

- ~~Buildings off of the school's campus, even if used by students or faculty~~
- ~~Buildings on the school's campus that are used primarily for non-school purposes, such as churches or convents, unless those buildings also contain spaces essential to school operations, such as classrooms or school offices.~~

~~Other buildings or non-building structures posing minimal risk might be exempted as well; see Section 3428.3.~~

3428.2 Scope and Criteria

For purposes of Section 3428, previous versions of ASCE 41, specifically ASCE 31-03 and ASCE 41-06, are not acceptable as alternatives to ASCE 41-13. See Part B of this Bulletin for modifications and interpretations of ASCE 41-13 criteria.

Commentary: *The intent of the evaluation is to identify hazards known to be associated with earthquake-related severe injury or death*

In addition to the tabulated scope, voluntary mitigation of contents hazards is encouraged. Such mitigation could include bracing, restraint, or removal of supplies, stored items, or furnishings prone to hazardous tipping or sliding. It might also include nonstructural mitigation that is not required by Section 3428. References regarding contents bracing have been developed by FEMA, the Division of the State Architect, and others. For example, see "Guide and Checklist for Nonstructural Earthquake Hazards in California Schools," available at <http://www.documents.dgs.ca.gov/dsa/pubs/SB1122.pdf>.

Subject to Department approval, lightweight fences, shelters, play structures, etc. need not be evaluated. The intent of Section 3428.2 is to include non-building structures that are relatively heavy (generally of concrete or masonry construction) or prone to earthquake damage.

Table 3428.2 shows that each building or non-building structure will be subject to one of two evaluation types: Safety Evaluation or Recovery Evaluation.

Commentary: *The organization and content of ASCE 41-13 is such that the criteria for Recovery Evaluation include the criteria for Safety Evaluation. Thus, "buildings subject to a Recovery Evaluation" will automatically receive a Safety Evaluation as well.*

Table 3428.2. ASCE 41-13 Evaluation Objectives and Scopes¹

Evaluation type	Evaluation Objective/Scope
Safety Evaluation	Structural Life Safety with the BSE-1E hazard Nonstructural Life Safety with the BSE-1E hazard
Recovery Evaluation	Structural Immediate Occupancy with the BSE-1E hazard Nonstructural Position Retention with the BSE-1E hazard

¹As modified and interpreted by an Administrative Bulletin that shall be adopted by the Department.

For purposes of Section 3428, previous versions of ASCE 41, specifically ASCE 31-03 and ASCE 41-06, are not acceptable as alternatives to ASCE 41-13. See Part B of this Bulletin for modifications and interpretations of ASCE 41-13 criteria.

Commentary: *The intent of the Safety Evaluation is to identify hazards known to be associated with earthquake-related severe injury or death. The evaluation objective is selected to match, approximately, the safety-related criteria for existing public school buildings implied by programs of the California Division of the State Architect and the San Francisco Unified School District.*

The intent of the Recovery Evaluation (which includes a Safety Evaluation) is to collect information that the city, the schools, and others can use to plan emergency preparedness, response, and recovery. The evaluation objective involves a comprehensive review of conditions that can reasonably be expected to delay the reopening of a school following a damaging earthquake.

In addition to the tabulated scope, voluntary mitigation of contents hazards is encouraged. Such mitigation could include bracing, restraint, or removal of supplies, stored items, or furnishings prone to hazardous tipping or sliding. It might also include nonstructural mitigation that is not required by Section 3428. References regarding contents bracing have been developed by FEMA, the Division of the State Architect, and others. For example, see "Guide and Checklist for Nonstructural Earthquake Hazards in California Schools," available at <http://www.documents.dgs.ca.gov/dsa/pubs/SB1122.pdf>.

3428.2.2 Recovery Evaluation

In general, if a school is subject to Recovery Evaluation, each building and non-building structure at that school should be evaluated with the Recovery Evaluation criteria. See Section 3428.3 for regarding building-specific exemptions.

Commentary: The enrollment threshold of 225 students is not related to occupant load thresholds for individual buildings otherwise given in CBC/SFBC Table 1604.5. It is rather intended to focus on the largest schools, where delayed re-occupancy is expected to have a more significant effect on citywide recovery.

3428.5 Voluntary Minimum Life-Safety Retrofit Voluntary Seismic Strengthening

Commentary: Section 3428 requires evaluation only. Section 3428.5, however, anticipates that some schools will perform voluntary mitigation or retrofit either before or after completing their evaluation. To encourage this work and to relieve these schools from unknown future requirements, Section 3428.5 provides, for a period of 20 years after the effective date of Section 3428, that any building or non-building structure within the scope of Section 3428 for which voluntary seismic strengthening is performed to meet or exceed the criteria of ASCE 41-13, S-3 N-C with the BSE-1E hazard shall not be identified as a seismic hazard pursuant to any local building standards adopted after the effective date of Section 3428 unless the building incurred disproportionate damage, or otherwise has been damaged or altered so that it no longer meets the engineering criteria under which it was retrofitted. Match those intended for code-triggered retrofit of public schools regulated by DSA, given in SFBC Section 3417.5.

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Comment [MH1]: ASCE 41-13 S-3 N-C

The criteria in SFBC Section 3417.5 are different from the evaluation criteria in SFBC Section 3428. The difference between evaluation and retrofit criteria is common in earthquake engineering and has long-standing precedents in risk reduction policy. The evaluation required by Section 3428 is intended to find only severe potential deficiencies in a cost-effective way; this avoids listing marginal deficiencies and non-conformance related to changes in building codes over the years. A safety-based retrofit such as that contemplated by SFBC Section 3417.5, however, will typically use more conservative criteria to address a more comprehensive list of deficiencies in a cost-beneficial way.

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Comment [MH3]: Potentially needs restatement

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~~**Commentary:** Section 3428 requires evaluation only. While voluntary mitigation is encouraged, Section 3428 does not require it and therefore does not provide objectives or criteria for retrofit design. In particular, Section 3428 does not provide criteria that, if applied through voluntary retrofit, would relieve an owner from future retrofit requirements. Nevertheless, voluntary retrofit following the criteria in 2013 California Building Code Sections 3417 through 3423 (intended for code-triggered retrofit of schools regulated by DSA) would be expected to satisfy most or all of the requirements of near-future San Francisco regulations for school facilities not expected to support post-earthquake recovery functions.~~

~~The criteria in CBC Sections 3417 through 3423 are different from the evaluation criteria in SFBC Section 3428. The difference between evaluation and retrofit criteria is common in earthquake engineering and has long-standing precedents in risk reduction policy. For example, the Safety Evaluation required by Section 3428 is intended to find only the most severe potential deficiencies in a cost-effective way; this avoids listing marginal deficiencies and non-conformance related to changes in building codes over the years. A safety-based retrofit, however, might want to use more conservative criteria to address a more comprehensive list of deficiencies in a cost-beneficial way. Similarly, the more thorough Recovery Evaluation required by Section 3428 for some schools is intended to address issues beyond safety in order to support recovery planning. A voluntary retrofit, especially one intended to address urgent safety issues, might reasonably choose to ignore some of the potential deficiencies this thorough evaluation might find.~~

Part B. APPLICATION OF ASCE 41-13 TO EVALUATION

Part B of this Bulletin makes modifications to and interpretations of ASCE 41-13 as they relate to compliance with SFBC Section 3428. The section numbers refer to section numbers in ASCE 41-13.

1.4 Seismic Evaluation Process

With reference to Figure C1-1, Tier 3 Systematic evaluation is required for certain buildings, subject to Bulletin modifications to Section 3.3. Where Tier 3 Systematic evaluation is not required, Tier 1 Screening is required for all evaluations, and Tier 2 Deficiency-Based Evaluation is optional.

1.4.1 Selection of Performance Objective

~~Omit. The~~ ~~Omit. The~~ evaluation objective is given in SFBC ~~Table-Section~~ 3428.2.

1.4.2 Level of Seismicity

Replace with the following:

The level of seismicity shall be taken as High for all schools subject to SFBC Section 3428.

1.4.4 Evaluation Procedures

Replace with the following:

Tier 3 Systematic evaluation is required for certain buildings, subject to Bulletin modifications to Section 3.3. Where Tier 3 Systematic evaluation is not required, Tier 1 Screening is required for all evaluations, and Tier 2 Deficiency-Based Evaluation is optional.

1.4.5 Evaluation Report

Omit. Evaluation reports should use the attached Template Evaluation Report.

1.5 Seismic Retrofit Process

Omit. Retrofit is beyond the scope of SFBC Section 3428.

2.1 Scope – 2.3 Target Building Performance Levels

~~Omit.~~ Evaluation objectives are given in SFBC ~~Table-Section~~ 3428.2.

2.4 Seismic Hazard

~~Per SFBC~~ ~~Table-Section~~ 3428.2, all evaluations are required to consider only the BSE-1E hazard.

For purposes of compliance with SFBC Section 3428, the Site-Specific Procedure of Section 2.4.2 need not be used.

2.4.1 General Procedure for Hazard Due to Ground Shaking

~~Per SFBC~~ ~~Table-Section~~ 3428.2, all evaluations are required to consider only the BSE-1E hazard.

Seismicity parameters for the BSE-1E hazard may be obtained using the USGS tool available at <http://geohazards.usgs.gov/designmaps/us/application.php>. From the Design

Code Reference Document menu, select "2013 ASCE 41." From the Earthquake Hazard Level menu, select "BSE-1E".

For purposes of calculating seismicity parameters with the USGS tool, Site Class F need not be assumed.

2.4.1.6.1 Site Classes

Where the Site Class is known from available documents, the known Site Class should be used. Where the Site Class is not known, for purposes of compliance with SFBC Section 3428, the Site Class may be estimated from the USGS map available at <http://earthquake.usgs.gov/regional/nca/soiltype/map/>.

Unless site-specific investigations indicate otherwise, Site Class F shall be assumed for any site located within a zone of required investigation for liquefaction on the 2000 Department of Conservation map available at http://gmw.consrv.ca.gov/SHMP/download/pdf/ozn_sf.pdf.

Otherwise, Site Class F need not be assumed.

For purposes of compliance with SFBC Section 3428, site-specific investigation of potential Site Class F sites is not required as long as potential liquefaction is noted on the Deficiency List in the seismic evaluation report.

2.5 Level of Seismicity

Replace with the following:

The level of seismicity shall be taken as High for all schools subject to SFBC Section 3428.

3.2.4 Site and Foundation Information

For purposes of compliance with SFBC Section 3428, any requirement in ASCE41-13 for site-specific soils or geotechnical investigation is waived. Owners may perform and report the results of such investigations voluntarily.

3.3.1 Limitations on the Use of the Tier 1 and 2 Evaluation and Retrofit Procedures

For purposes of compliance with SFBC Section 3428, Tier 3 evaluation is not required. However, if ASCE 41-13 Section 3.3.1 would require Tier 3 evaluation, each Tier 1 checklist item subject to that requirement (which in some cases might be only those on Immediate Occupancy but not Life Safety checklists) shall be listed in the Deficiency List with a note indicating potential non-compliance subject to Tier 3 analysis.

16.17 Nonstructural checklist

~~The following Tier 1 nonstructural checklist items are normally required by ASCE 41-13 for Life Safety evaluation. For purposes of compliance with the Safety Evaluation criteria of SFBC Section 3428, the following items are not required. Where applicable, this variation from the ASCE 41-13 standard shall be noted in the Evaluation Report.~~

~~Ceilings~~

~~—— Suspended Gypsum Board~~

Light Fixtures

—— Independent Support

Stairs

—— Stair Details

Contents and Furnishings

—— Industrial Storage Racks

Mechanical and Electrical Equipment

—— Fall-Prone Equipment

—— In-Line Equipment

Elevators

—— Retainer Guards

—— Retainer Plate

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Date

Approved by Building Inspection Commission on _____