

A Chronology (1928-1990) of San Francisco Building Code Requirements for Horizontal Live Load Resistance at Railings

Introduction

The very narrow purpose of this research is to compile a history of San Francisco's prescriptive requirements for minimum horizontal live load resistance at balcony and stair railings. This monograph may prove informative and useful to certain construction professionals who – when evaluating the City's many historic buildings – mistakenly assume that the live load values prescribed in past editions of the model Uniform Building Code¹ also were promulgated in the San Francisco Building Laws and successor editions of the San Francisco Building Code.²

Comparative review of the code sections cited below demonstrates the error of any such assumption.

- (Note: because the San Francisco Building Code was extensively rewritten and updated by the Bureau of Building Inspection soon after the end of World War II, the following four-part matrix is presented in two sections that correspond to pre-1948 and post-1948 periods.)

I. Uniform Building Code (1927 to 1946) – Live Loads at Railings

- Section 3501 of **1927 Uniform Building Code**: *"Railings of balconies shall be designed to support a horizontal thrust of not less than twenty (20) pounds per lineal foot of railing uniformly distributed along its length."*
- Section 3501 of **1935 Uniform Building Code**: [same as above]
- Section 3501 of **1937 Uniform Building Code**: [same as above]
- Section 2304 of **1940 Uniform Building Code**: *"All balcony railings shall be designed to withstand a horizontal force of 20 pounds per lineal foot, applied at the top of the railing."*
- Section 2304 of **1943 Uniform Building Code**: [same as above]
- Section 2304 of **1946 Uniform Building Code**: [same as above]

¹ The model Uniform Building Code was first published in 1927 by the International Conference of Building Officials (ICBO), headquartered in Whittier, CA. In the late-1990s, IBCO was merged into the new International Code Council, which authors the model International Building Code. ICBO published its last edition of the Uniform Building Code in 1997.

² It is this writer's experience that many local architects and engineers are unaware of the City and County of San Francisco's decades-long efforts (via its Bureau of Building Inspection) after World War II to maintain "home rule" control of its own building code. While post-War editions of the San Francisco Building Code increasingly contained provisions consistent with the Uniform Building Code, it was not until the Bureau's issuance of the 1984 San Francisco Building Code that the model UBC was adopted by reference. A comprehensive review of BBI's politically charged battles with various State, Federal and local agencies can be downloaded at: <http://www.ravelar.com/articles/SanFranciscoCodesHistory.pdf>.

II. San Francisco Building Laws (1928 to 1934) and 1946 S.F. Building Code

- Section 161 of **San Francisco Building Laws of 1928** (for exit balconies and stairways at theatres): *"Hand rails shall be secured to the walls, three inches therefrom and about three feet above the centers of the treads, and other hand rails shall be placed on the outside of said staircases, about three feet above the centers of the treads, and secured to said staircase so as to resist a pressure of 100 pounds per linear foot, applied horizontally to said rail."*
 - Section 161 of **San Francisco Building Laws of 1930** [same as above]
 - Section 161 of **San Francisco Building Laws of 1934** [same as above]
 - Section 506 of **1946 San Francisco Building Code** [same as above]
- **Discussion (Part I and Part II):** As detailed above, even though successive editions, beginning in 1927, of the model Uniform Building Code had prescribed a 20 pounds per lineal foot minimum horizontal live load resistance at all railings, similar guidance had not been incorporated into the 1946 San Francisco Building Code (or its predecessor building laws), which only addressed exit stairway and balcony railings at potentially crowded theatres.

However, now that the War had ended, the Bureau of Building Inspection (within San Francisco's Department of Public Works) was engaged in the monumental production of an entirely updated and rewritten building code – which eventually became the new 1948 San Francisco Building Code:

- *"In addition to its normal work the Bureau of Building Inspection, during the entire fiscal year, has been engaged in the production of a new Building Code. This code is badly needed since the present code passed in 1909 has long been obsolete. The difficulties of writing a building code are little understood except to those involved in its production. Commercial advantages are sought by many groups and the pressure on code workers is ceaseless and long drawn out."*

"One of the most important tasks performed by the Bureau in the past fiscal year was in connection with the preparation of the proposed new building code. One structural engineer [George S. Hill] devoted full time to this work and made a thorough study of practically all the important building codes in the United States, as well as the National Building Code of Canada."³

- *"The final passage of the Ordinance adopting a new Building Code was a major landmark in the history of the Bureau of Building Inspection of the Department."*

"This ordinance was passed by the Board of Supervisors, signed by the Mayor, and made effective as of September 11, 1947."⁴

³ San Francisco Department of Public Works 'Annual Report for the Fiscal Year Ending June 30, 1946'

⁴ San Francisco Department of Public Works 'Annual Report for the Fiscal Year Ending June 30, 1948'

III. Uniform Building Code (1949 to 1988) – Live Loads at Railings

- Section 2304 of **1949 Uniform Building Code**: *"All balcony railings shall be designed to withstand a horizontal force of 20 pounds per lineal foot, applied at the top of the railing."*
- Section 2304 of **1952 Uniform Building Code**: [same as above]
- Section 2304 of **1955 Uniform Building Code**: [same as above]
- Section 2304 of **1958 Uniform Building Code**: [same as above]
- Section 2304 of **1961 Uniform Building Code**: *"All balcony railings and stair handrails shall be designed to withstand a horizontal force of 20 pounds per lineal foot, applied at the top of the railing."*
- Section 2304 of **1964 Uniform Building Code**: [same as above]
- Section 2304 of **1967 Uniform Building Code**: *"All balcony railings, guardrails and stair handrails shall be designed to withstand a horizontal force of 20 pounds per lineal foot, applied at the top of the railing."*
- Section 2304 of **1970 Uniform Building Code**: [same as above]
- Table 23-C of **1973 Uniform Building Code**: a) for balcony railings, guard rails and handrails at a) *"exit facilities serving an occupant load greater than 50"*: 50 pounds *"per lineal foot to be applied horizontally at right angles to the rails"*; and b) for all other railings: 20 pounds.
- Table 23-B of **1976 Uniform Building Code**: [same as above]
- Table 23-B of **1979 Uniform Building Code**: [same as above]
- Table 23-B of **1982 Uniform Building Code**: [same as above]
- Table 23-B of **1985 Uniform Building Code**: [same as above]
- Table 23-B of **1988 Uniform Building Code**: [same as above]

IV. San Francisco Building Code (1948 to 1990) – Live Loads at Railings

- Section 2211 of **1948 San Francisco Building Code**: *"Railings along the front edges of reviewing stands, bleachers and balconies shall be designed to withstand a horizontal force of fifty pounds per linear foot applied at the top of the railing. Railing along stairways, landings, fire escapes, etc., shall be designed to withstand a horizontal force of one hundred pounds concentrated at any point, in each 8 feet of length."*
- Section 2212 of **1956 San Francisco Building Code**: *"Railings along all edges of reviewing stands, bleachers and in balconies shall be designed to withstand a horizontal force of 50 pounds per linear foot applied at the top of the railing. Railing along residential stairways, landings and residential balconies shall similarly be designed to withstand a horizontal load of 25 pounds per lineal foot."*

- Table 23-A.1 of **1969 San Francisco Building Code**:
 - Guardrails at residential occupancies = 20 pounds "per foot of rail" ("load to be applied at railing height")
 - Guardrails at all other occupancies = 50 pounds "per foot of rail" ("load to be applied at railing height"), except, per Section 1714: "a roof guardrail ...may have the horizontal design load reduced to 20 pounds per foot of rail" (per Ordinance 269-69, effective August 29, 1969).
- Table 23-A.1 of **1975 San Francisco Building Code**:
 - Guardrails at residential occupancies = 20 pounds "per foot of rail" ("load to be applied at railing height")
 - Guardrails at all other occupancies = 50 pounds "per foot of rail" ("load to be applied at railing height")
 - Guardrails and parapets at roofs = 100 pounds "per foot of rail" ("load to be applied at railing height")
- Table 23-B of **1984 San Francisco Building Code** (which adopted by reference the model 1979 UBC and certain provisions of the 1982 UBC):
 - For balcony railings, guard rails and handrails at "exit facilities serving an occupant load greater than 50": 50 pounds "per lineal foot to be applied horizontally at right angles to the top rail"
 - For all other railings: 20 pounds
 - Except: for guardrails and parapets at roofs = 100 pounds "lateral load"
- Table 23-B of **1990 San Francisco Building Code** (which adopted by reference the model 1988 UBC): [same as 1984 SFBC]
- **Discussion (Part III and Part IV)**: as noted, the 1984 San Francisco Building Code was the first to adopt by reference the Uniform Building Code; however, it also should be noted that – beginning in the 1950s – the model UBC did closely influence many provisions of San Francisco's new building codes:
 - *"The Code in its final form will be patterned after the Uniform Building Code, and will have included up-to-date provisions of the National Fire Code."*⁵
 - *"The International Conference of Building Officials, which published the Uniform Building Code, and of which the Bureau is a member, appointed the Superintendent to two committees of that organization...
"The Bureau of Building Inspection, in preparing code changes to our code, recognizes those changes to the Uniform Building Code which are adopted from year to year and, upon study of these changes proposes similar legislation when appropriate, for the amending of the San Francisco Building Code. In this way the San Francisco Code is brought into agreement with the Uniform Building Code in those requirements where our special needs do not require different code requirements."*⁶

⁵ San Francisco Department of Public Works 'Annual Report for the Fiscal Year Ending June 30, 1953'

⁶ San Francisco Department of Public Works 'Annual Report for the Fiscal Year Ending June 30, 1962'

Summary Discussion

In 1988, the State of California (via the Building Standards Commission) took control of all city and county building codes:

- An updated State Building Code⁷ (aka: '*State of California 1989 Amendments to the 1988 Uniform Building Code*') adopted by reference the 1988 UBC with an effective date of July 1, 1989 for State projects and January 1, 1990 for all other jurisdictions.

By law (per Senate Bill 2871)⁸, all provisions of subsequent editions of the San Francisco Building Code had to meet (or exceed) the minimum requirements of the associated edition of the California Building Code:

- Introduction to 1990 San Francisco Building Code: "*Like the cities and counties, the State adopts model codes by reference, with substantial amendments to accommodate State needs. The State is mandated by law to adopt latest editions of these model codes within six months of their publication date. In turn, cities and counties are mandated by law to adopt the same editions of the model codes with six months of their adoption by the State.*"
- Monthly newsletter (September 1989) published by the San Francisco Chapter of the Construction Specifications Institute: "*The San Francisco Building Code will be amended to meet the new State Code, effective January 1, 1990.*"

Thus ended the City and County of San Francisco's decades-long efforts to maintain 'home rule' control of its own building code:

- "*This last year witnessed the increased pressures for preemption of the building code field simultaneously at the State level and at the Federal level, San Francisco's historical position favoring home rule was the basis of this Bureau's participation in activities to counteract this tendency.*

"Appearances at the Building Standards Commission hearings and Federal meetings to present the arguments for home rule were undertaken by the Bureau. In addition, various interested organizations in the building industry inquired further into this matter in order to develop their own positions, and this involved meetings with industry groups on this critical subject.

"This is a very serious erosion of the basic home rule philosophy, and appears to be backed by certain minority factions in the building industry who feel that through the intervention of State or Federal governments they can get their materials used to a greater extent than going through the usual Code processes.

*A major campaign is under way based upon the mythical 'Building Code mess', which has been disproved by a number of authoritative investigations but is still a very catchy slogan."*⁹

⁷ California's 'State Building Code', first issued in 1979, subsequently was renamed the 'California Building Code'.

⁸ Building Standards Commission: http://www.bsc.ca.gov/abt_bsc/history.aspx

⁹ San Francisco Department of Public Works 'Annual Report for the Fiscal Year Ending June 30, 1967'

The following two reports detailing the Bureau of Building Inspection's politically charged "home rule" battles with various State, Federal and local agencies can be downloaded at <http://www.RAvelar.com/company/articles.html>:

- *'An Abridged History of San Francisco's Bureau of Building Inspection – Part I: 1944 to 1992'*
- *'An Abridged History of San Francisco's Bureau of Building Inspection – Part II: 1993 to 1994'*

(Note: these historical reviews are informal and qualitative in nature and are not authorized or intended for project-specific use by attorneys or other parties in the construction, architectural, engineering, building codes or litigation fields.)

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