

**LOCAL LAWS
OF
THE CITY OF NEW YORK
FOR THE YEAR 1995**

No. 17

Introduced by Council Members Spigner, Pagan, Rosado, Malave-Dilan, Ognibene, Linares, Williams and Michels; also Council Members Eisland, Harrison, Leffler, Marshall, McCaffrey, Pinkett, Rivera, White and Stabile.

A LOCAL LAW

To amend the administrative code of the city of New York, in relation to the design and construction of buildings, structures and portions thereof to resist the effects of earthquakes.

Be it enacted by the Council as follows:

Section 1. Article 5 of subchapter 9 of chapter 1 of title 27 of the administrative code of the city of New York is amended to read as follows:

**ARTICLE 5
WIND LOADS AND EARTHQUAKE LOADS**

27-569 Wind loads and earthquake loads. (a) *Wind loads.* The structural frame and exterior components of all buildings, signs, tanks, and other exposed constructions shall be designed to resist the pressures due to wind as prescribed in reference standard RS 9-5. Wind shall be assumed to act from any direction. For continuous framing, the effects of partial loading conditions shall be considered.

(b) *Earthquake loads.* Every building, structure and portion thereof shall, at a minimum, be designed and constructed to resist the effects of seismic ground motions as prescribed in reference standard RS 9-6.

§2. The listing for "Unreinforced Masonry" under the column entitled "Operations on Structural Elements That Shall Be Subject to Controlled Inspection" of table 10-2 of subdivision (c) of section 27-588 of the administrative code of the city of New York is amended to read as follows:

Placement and bedding of units and sizes of members including thickness of walls and wythes; sizes of columns; *cleanouts*; and provisions for curing and protection against freezing for all masonry construction proportioned on the basis of structural analysis as described in section four of reference standard RS 10-1B, unless such operations are specifically not designated for controlled inspection

§3. The listings for "Reinforced Masonry" and "Unreinforced Masonry" under the column entitled "Operations on Structural Elements That Are Not Subject to Controlled Inspection" of table 10-2 of subdivision (c) of section 27-588 of the administrative code

of the city of New York are amended by repealing item (1) under both "Reinforced Masonry" and "Unreinforced Masonry" and, in each case, renumbering items (2), (3) and (4) to be (1), (2) and (3), respectively.

§4. The opening paragraph of section 27-594 of the administrative code of the city of New York is amended to read as follows:

Dead loads, live loads (including impact) and reduced live loads, where applicable, shall be considered as basic loads. Wind, *earthquake*, thermal forces, shrinkage, and unreduced live loads (where live load reduction is permitted by subchapter nine of this chapter) shall be considered as loads of infrequent occurrence. Members shall have adequate capacity to resist all applicable combinations of the loads listed in subchapter nine of this chapter, in accordance with the following:

§5. Subdivision (a) of section 27-670 of the administrative code of the city of New York is amended to read as follows:

(a) Earth and ground water pressure. Every foundation wall or other wall serving as a retaining structure shall be designed to resist, in addition to the vertical loads acting thereon, the incident lateral earth pressures and surcharges, plus hydrostatic pressures corresponding to the maximum probable ground water level. *Retaining walls shall be designed to resist at least the superimposed effects of the total static lateral soil pressure, excluding the pressure caused by any temporary surcharge, plus an earthquake force of $0.045 w_s h^2$ (horizontal backfill surface), where w_s equals unit weight of soil and h equals wall height. Surcharges which are applied over extended periods of time shall be included in the total static lateral soil pressure and their earthquake lateral force shall be computed and added to the force of $0.045 w_s h^2$. The earthquake force from backfill shall be distributed as an inverse triangle over the height of the wall. The point of application of the earthquake force from an extended duration surcharge shall be determined on an individual case basis. If the backfill consists of loose saturated granular soil, consideration shall be given to the potential liquefaction of the backfill during the seismic loading using reference standard RS 9-6.*

§6. The list of referenced national standards of reference standard RS-9 of the appendix to chapter 1 of title 27 of the administrative code of the city of New York is amended by adding a new standard to read as follows:

*UBC SECTION 2312 Earthquake Regulations with Accumulative
Supplement 1990*

§7. Reference standard RS-9 of the appendix to chapter 1 of title 27 of such code is amended by adding a new reference standard RS 9-6 to read as follows:

**REFERENCE STANDARD RS 9-6
EARTHQUAKE LOADS**

UBC SECTION 2312-1990

*Earthquake Regulations with
Accumulative Supplement*

MODIFICATIONS -- The provisions of UBC Section 2312 shall be subject to the following modifications. The subdivisions, paragraphs, subparagraphs and items are from this section.

Subdivision (a) General.

Paragraph 1. Minimum seismic design.

Delete this paragraph and substitute the following:

"The following types of construction shall, at a minimum, be designed and constructed to resist the effects of seismic ground motions as provided in this section:

- new structures on new foundations;*
- new structures on existing foundations; and*
- enlargements in and of themselves on new foundations. Buildings classified in New York City occupancy group J-3 and not more than three stories in height need not conform to the provisions of this section.*

The Commissioner may require that the following types of construction be designed and constructed to incorporate safety measures as necessary to provide safety against the effects of seismic ground motions at least equivalent to that provided in a structure to which the provisions of this section are applicable:

- new buildings classified in occupancy group J-3 and which are three stories or less in height; and*
- enlargements in and of themselves where the costs of such enlargement exceeds sixty percent of the value of the building.*

Pursuant to section 27-191 of the code the Commissioner shall have the authority to reject an application for a building permit which fails to comply with the requirements of this section.

Subdivision (b) Definitions.

Delete the definitions of the following terms and substitute the following new definitions:

"ECCENTRIC BRACED FRAME (EBF) is a steel-braced frame designed in conformance with reference standard RS 10-5C.

ESSENTIAL FACILITIES are those structures which are necessary for emergency operations subsequent to a natural disaster.

STORY DRIFT is the displacement of one level relative to the level above or below, including translational and torsional deflections."

Add the following definition before "SHEAR WALL":

"REINFORCED MASONRY SHEAR WALL is that form of masonry wall construction in which reinforcement acting in conjunction with masonry is used to resist lateral forces parallel to the wall and which is designed using reinforcement in conformance with Chapter 7 of reference standard RS 10-2."

Delete the definitions of the five frames under the SPACE FRAME paragraph and substitute the following stand-alone definitions:

"INTERMEDIATE MOMENT-RESISTING FRAME (IMRF) is a concrete frame designed in accordance with the requirements of Chapters 1 through 20 and Sections 21.1, 21.2 and 21.9 of reference standard RS 10-3.

MOMENT-RESISTING FRAME is a frame in which members and joints are capable of resisting forces primarily by flexure.

ORDINARY MOMENT-RESISTING FRAME (OMRF) is a moment-resisting frame conforming to the requirements of Chapters 1 through 20 of reference standard RS 10-3 or reference standards RS 10-5A and RS 10-5C but not meeting the special detailing requirements for ductile behavior.

SPECIAL MOMENT-RESISTING FRAME (SMRF) is a moment-resisting frame conforming to reference standards RS 10-3 or RS 10-5A and RS 10-5C and specially detailed to provide ductile behavior by complying with the requirements of Chapters 1

through 20 and Sections 21.1 through 21.8 of reference standard RS 10-3 or reference standards RS 10-5A and RS 10-5C.

VERTICAL LOAD-CARRYING FRAME is a frame designed to carry all vertical gravity loads."

Subdivision (d) Criteria Selection.

Paragraph 1. Basis for design.

Delete the word "zoning" in the first sentence and delete the last sentence.

Paragraph 2. Seismic Zones.

Delete the title and paragraph and substitute the following:

"2. **Seismic Zone.** The seismic zone factor, Z , for buildings, structures and portions thereof in New York City shall be 0.15. The seismic zone factor is the effective zero period acceleration for S_1 type rock."

Paragraph 3. Site geology and soil characteristics.

Delete the title and the paragraph and substitute the following:

"3. **Site geology, soil characteristics and foundations.**

A. General.

Soil profile type and site coefficient, S , shall be established in accordance with Table No. 23-J.

B. Liquefaction.

(i) Soils of classes 7-65, 8-65, 10-65 and non-cohesive class 11-65 below the ground water table and less than fifty feet below the ground surface shall be considered to have potential for liquefaction.

(ii) The potential for liquefaction of level ground shall be determined on the basis of Standard Penetration Resistance (N) in accordance with Figure No. 4;

Category A: Soil shall be considered liquefiable.

Category B: Liquefaction is possible.

Soil shall be considered liquefiable for structures of Occupancy Categories I, II and III of Table No. 23-K.

Category C: Liquefaction is unlikely and need not be considered in design.

At any site the highest category of liquefaction potential shall apply to the most critical strata or substrata.

(iii) Liquefiable soils shall be considered to have no passive (lateral) resistance or bearing capacity value during an earthquake. An analysis shall be submitted by an engineer which demonstrates, subject to the approval of the Commissioner, that the proposed construction is safe against liquefaction effects on the soil.

(iv) Where liquefiable soils are present in sloped ground or over sloped nonliquefiable substrata and where lateral displacement is possible, a stability analysis shall be submitted by an engineer which demonstrates, subject to the approval of the Commissioner, that the proposed construction is safe against failure of the soil.

C. Foundation Plates and Sills.

Foundation plates or sills shall be bolted to the foundation or foundation wall with not less than one-half inch nominal diameter steel bolts embedded at least seven inches into the concrete or masonry and spaced not more than six feet apart. There shall be a minimum of two bolts per piece with one bolt located within twelve inches of each end of each piece. A properly sized nut and washer shall be tightened on each bolt to the plate.

D. Foundation Interconnection of Pile Caps and Caissons.

Individual pile caps and caissons of every structure subjected to seismic forces shall be interconnected by ties. Such ties shall be capable of resisting, in tension or compression, a minimum horizontal force equal to the product of $ZI/4$ and the larger column vertical load at the end of each tie.

Exception: Other approved effective methods of foundation interconnection may be used where it can be demonstrated by an analysis that equivalent restraint and relative displacement can be provided."

Paragraph 5, subparagraph C, Irregular structures.

Delete the entire last sentence in item (i).

Paragraph 6, subparagraph E, Dual system.

Delete items (ii) and (iii) and substitute the following:

"(ii) Resistance to lateral load is provided by shear walls or braced frames and a moment-resisting frame (SMRF, IMRF or OMRF). The moment-resisting frames shall be designed to independently resist at least 25 percent of the design base shear. The shear walls or braced frames shall be designed to resist at least 75 percent of the cumulative story shear at every level. Overturning effects may be distributed in accordance with item (iii) below.

(iii) The two systems shall be designed to resist the total design base shear in proportion to their relative rigidities considering the interaction of the dual system at all levels."

Paragraph 7. Height limits.

Delete this paragraph.

Paragraph 8. Selection of lateral force procedure.

Delete paragraph 8 and substitute the following:

"8. Selection of lateral force procedure. All structures shall be designed using either the static lateral force procedure of Section 2312 (e) or using the dynamic lateral force procedure of Section 2312 (f). In addition, the dynamic lateral force procedure shall be considered, but is not required, for the design of the following:

A. Structures over 400 feet in height.

B. Irregular structures.

C. Structures located on Soil Profile Type S₄ which have a period greater than 1 second. The analysis should include the effects of soils at the site and should conform to Section 2312(f)2."

Paragraph 9, subparagraph C, Irregular features.

Delete this subparagraph and substitute the following:

"C. Irregular features. Only structures having either vertical irregularities Type D or E as defined in Table No. 23-M or horizontal irregularities Type D or E as defined in Table No. 23-N shall be designed to meet the additional requirements of those sections referenced in the tables."

Paragraph 10. Alternate procedures.

Add at the end of the paragraph the words "when such procedures are consistent with this standard and subject to the approval of the Commissioner".

Subdivision (e) Minimum Design Lateral Forces and Related Effects.

Paragraph 1. General, subparagraph A.

Add the words "parking structures" before the word "storage" in the first sentence.

Paragraph 1. General, subparagraph C.

Delete this subparagraph.

Paragraph 2, subparagraph A, Design base shear.

Change the value for the minimum ratio of C/R_w shown at the end of this subparagraph to "0.050".

Paragraph 2, subparagraph B, Structure period.

Delete the values in item (i) for C_t and substitute the following:

" $C_t = 0.035$ for concrete and steel moment-resisting frames.

$C_t = 0.030$ for eccentric braced frames.

$C_t = 0.030$ for dual systems where the building height exceeds 400 feet or 0.020 for heights less than 160 feet and varies linearly from 0.020 to 0.030 for building heights from 160 to 400 feet.

$C_t = 0.020$ for all other structures."

Delete the sentence immediately after " $C_t = 0.020$ for all other structures" and substitute the following:

"Alternately, the value of T for structures with concrete or masonry shear walls may be taken as $0.1 (h_n)^{3/4} \sqrt{A_c}$."

Paragraph 3, subparagraph C, Combinations along different axes.

Delete this subparagraph.

Paragraph 6. Horizontal torsional moments.

Delete the fourth paragraph starting with the words "Where torsional irregularity exists" and ending with the words "considered for design."

Paragraph 7, Overturning, subparagraph B.

Delete the words "Seismic Zones 3 and 4" at the beginning of this subparagraph.

Delete item (iii) and substitute the following:

"(iii) Such columns shall meet the detailing or member limitations of reference standard RS 10-3 for concrete and reference standard RS 10-5C for steel structures."

Paragraph 7, subparagraph C.

Delete this subparagraph and substitute the following:

"C. For regular buildings, the force F_t may be omitted when determining the overturning moment to be resisted at the foundation-soil interface."

Paragraph 8. Story drift limitation.

Change the value for the minimum ratio of C/R_w shown at the end of this paragraph to "0.050".

Paragraph 9. P-delta effects.

Delete the last sentence of this paragraph.

Paragraph 10. Vertical component of seismic forces.

Delete this paragraph in its entirety and substitute the following:

"10. Vertical component of seismic forces. Horizontal cantilever components shall be designed for a net upward force of $0.05 W_p$."

Subdivision (f) Dynamic lateral force procedure.

Paragraph 2. Ground motion.

Add the following at the end of subparagraph A.:

"For soil type S4 profile, see B. below."

Add the following at the end of subparagraph B.:

"The design of all structures located on a soil type S4 profile shall be based on properly substantiated site-specific spectra."

Paragraph 5, subparagraph C, Scaling of results.

Add after the word "procedures" in the first sentence, the words "including the appropriate Importance Factor, I,".

Delete item (i) and substitute the following:

"(i) The base shear shall be increased to the following percentage of the value determined from the procedures of Section 2312(e), including consideration of the minimum value of C/R_w , except that the coefficient C, for a period T greater than 3 seconds, may be calculated as $1.80 S/T$:

(a) 100 percent for irregular buildings; or

(b) 90 percent for regular buildings, except that the base shear shall not be less than 80 percent of that determined from Section 2312(e) using the period, T, calculated from Method A."

Paragraph 5, subparagraph D, Directional effects.

Delete the words "and prestressed elements" in the second sentence and delete the word "Alternately" at the start of the third sentence.

Paragraph 5, subparagraph F, Dual systems.

Delete this subparagraph and substitute the following:

"F. Dual Systems. Where the lateral forces are resisted by a dual system, as defined in Section 2312(d)6E above, the combined system shall be capable of resisting the base shear determined in accordance with this section. The moment-resisting frame, shear walls and braced frames shall conform to Section 2312(d)6E. The moment-resisting frame may be analyzed using either the procedures of Section 2312(e)4 or those of Section 2312(f)5."

Paragraph 6. Time history analysis.

Add the following words at the end of the sentence: "and the results shall be scaled in accordance with Section 2312(f) 5C".

Subdivision (h) Detailed Systems Design Requirements.

Paragraph 1. General.

Delete the words "Chapters 24 through 28" in the fourth sentence of the first paragraph and insert the words "reference standard RS 10".

Delete the words "in Seismic Zones 2, 3 and 4" in the second and fourth paragraphs.

Paragraph 2, subparagraph A, General.

Delete the words "Chapters 24 through 27" at the end of this subparagraph and insert the words "reference standard RS 10".

Paragraph 2, subparagraph C, Connections.

Delete this subparagraph.

Paragraph 2, subparagraph D, Deformation compatibility.

Delete the words "to the reinforcing steel" from the last sentence.

Paragraph 2, subparagraph G, Concrete frames.

Delete this subparagraph and substitute the following:

"G. Concrete frames. Concrete frames required by design to be part of the lateral force resisting system shall, at a minimum, be intermediate moment-resisting frames, except as noted in Table 23-0."

Paragraph 2, subparagraph H, Anchorage of concrete or masonry walls.

Delete the words "Section 2310" in the fifth line and insert the words "reference standards RS 9-6, 10-1B and 10-2".

Paragraph 2, subparagraph I, Diaphragms.

Delete items (iv), (v) and (vi).

Paragraph 2, subparagraph J, Framing below the base.

Delete the words "Chapters 26 and 27" in the third line and insert the words "reference standards RS 10-3 and RS 10-5C".

Paragraph 2, subparagraph K, Building separations.

Delete this subparagraph and substitute the following:

"K. Building Separations. All structures shall be separated from adjoining structures. Separation due to seismic forces shall allow for 1 inch displacement for each 50 feet of total building height. Smaller separation may be permitted when the effects of pounding can be accommodated without collapse of the building."

Subdivision (i) Nonbuilding Structures.

Paragraph 4. Other nonbuilding structures.

Delete in the first sentence of item (iii) the word "national" and insert the word "reference", and delete the words "seismic zones and" in the paragraph following item (iii).

Subdivision (j) Earthquake-recording Instrumentations.

Delete this subdivision.

Table No. 23-I, Seismic Zone Factor Z.

Delete this table and substitute the following new table:

**TABLE NO. 23-I
SEISMIC ZONE FACTOR Z**

ZONE	NEW YORK CITY
Z	0.15

Table No. 23-J, Site Coefficients.

Delete this table and notes and substitute the following new table and notes:

**TABLE NO. 23-J
SITE COEFFICIENTS**

TYPE	DESCRIPTIONS	FACTOR
S ₀	A profile of Rock materials of class 1-65 TO 3-65	0.67
S ₁	A soil profile with either: (a) Soft Rock (4-65) or Hardpan (5-65) or similar material characterized by shear-wave velocity greater than 2500 feet per second, or (b) Medium Compact to Compact Sands (7-65) and Gravels (6-65) or Hard Clays (9-65), where the soil depth is less than 100 feet.	1.0
S ₂	A soil profile with Medium Compact to Compact Sands (7-65) and Gravels (6-65) or Hard Clays (9-65), where the soil depth exceeds 100 feet.	1.2
S ₃	A total depth of overburden of 75 feet or more and containing more than 20 feet of Soft to Medium Clays (9-65) or Loose Sands (7-65, 8-65) and Silts (10-65), but not more than 40 feet of Soft Clay or Loose Sands and Silts.	1.5

<i>S4</i>	<i>A soil profile containing more than 40 feet of Soft Clays (9-65) or Loose Sands (7-65, 8-65), Silts (10-65) or Uncontrolled Fills (11-65), where the shear-wave velocity is less than 500 feet per second.</i>	<i>2.5</i>
-----------	---	------------

Notes:

1. The site *S* Type and corresponding *S* Factor shall be established from properly substantiated geotechnical data with the classes of materials being defined in accordance with Section 27-675 (C26-1103.1) of the administrative code of the City of New York.

2. The soil profile considered in determining the *S* Type shall be the soil on which the structure foundations bear or in which pile caps are embedded and all underlying soil materials.

3. Soil density/consistency referred to in the table should be based on standard penetration test blow counts (*N*-values) and taken as: (a) for sands, loose - where *N* is less than 10 blows per foot, medium compact - where *N* is between 10 and 30, and compact - where *N* is greater than 30 blows per foot; and (b) for clays, soft - where *N* is less than 4 blows per foot, medium - where *N* is between 4 and 8, stiff to very stiff - where *N* is between 8 and 30, and hard - where *N* is greater than 30 blows per foot.

4. When determining the type of soil profile for profile descriptions that fall somewhere in between those provided in the above table, the *S* Type with the larger *S* factor shall be used.

5. For Loose Sands, Silts or Uncontrolled Fills below the ground water table, the potential for liquefaction shall be evaluated by the provisions of Section 2312(d)3.

Table No. 23-K, Occupancy Categories.

Add the words "Buildings for schools through secondary or day-care centers - capacity more than 250 students" below the words "Fire and police stations" in the Essential Facilities category, and delete those words from within the Special Occupancy Structure Category.

Add in item III Special Occupancy Structure to the words, "All structures with occupancy > 5000 persons", the words "excluding Occupancy Group E buildings".

Table No. 23-0, Structural Systems.

Delete this table and notes and substitute the following new Table No. 23-0 and notes.

**TABLE NO. 23-0
STRUCTURAL SYSTEMS**

BASIC STRUCTURAL SYSTEM	LATERAL LOAD-RESISTING SYSTEM DESCRIPTION	R_w
A. Bearing Wall System	1. Light-framed walls with shear panels	
	a. Plywood walls for structures three stories or less	8
	b. All other light-framed walls	6
	2. Shear Walls	
	a. Concrete	6
	b. Reinforced masonry	5
	3. Light steel-framed bearing walls with tension-only bracing	4

	4. Braced frames where bracing carries gravity load	
	a. Steel	6
	b. Concrete	4
	c. Heavy timber	4
B. Building Frame System	1. Steel eccentric braced frame (EBF)	10
	2. Light-framed walls with shear panels	
	a. Plywood walls for structures three-stories or less	9
	b. All other light-framed walls	7
	3. Shear Walls	
	a. Concrete	8
	b. Reinforced masonry	6
	4. Concentric braced frames	
	a. Steel	8
	b. Concrete	8
	c. Heavy Timber	8
C. Moment-Resisting Frame System	1. Special moment-resisting frames (SMRF)	
	a. Steel	12
	b. Concrete	12
	2. Concrete intermediate moment-resisting frames (IMRF)	8
	3. Ordinary moment-resisting frames (OMRF)	
	a. Steel	6
	b. Concrete ⁴	4
D. Dual System	1. Shear Walls	
	a. Concrete with SMRF	12
	b. Concrete with Steel OMRF	6
	c. Concrete with concrete IMRF	9
	d. Concrete with concrete OMRF	5
	e. Reinforced masonry with SMRF	8
	f. Reinforced masonry with steel OMRF	6
	g. Reinforced masonry with concrete IMRF	7
	2. Steel eccentric braced frame	
	a. With steel SMRF	12
	b. With steel OMRF	6
	3. Concentric braced frames	
	a. Steel with steel SMRF	10
	b. Steel with steel OMRF	6
	c. Concrete with concrete SMRF	9
	d. Concrete with concrete IMRF	6

Notes:

1. Basic structural systems are defined in Section 2312(d)6.
2. See Section 2312(e)3 for combinations of structural systems.
3. See Sections 2312(d)8C and 2312(d)9B for undefined systems.
4. Prohibited with S3 or S4 soil profiles or where the height exceeds 160 feet.

Table No. 23-P, Horizontal Force Factor C_p .

Delete this table and notes and substitute the following new Table No. 23-P and notes:

Table No. 23-P
HORIZONTAL FORCE FACTOR C_p ¹

ELEMENTS OF STRUCTURES, NONSTRUCTURAL COMPONENTS AND EQUIPMENT	VALUE OF C_p
I. Part of Portion of Structure	
1. Walls, including the following:	
a. Unbraced (cantilevered) parapets.	2.00
b. Other exterior walls above street grade ² .	0.75
c. All interior bearing walls.	0.75
d. All interior nonbearing walls and partitions around vertical exits, including offsets and exit passageways.	0.75
e. Nonbearing partitions and masonry walls in areas of public assembly > 300 people.	0.75
f. All interior nonbearing walls and partitions made of masonry in Occupancy I, II and III.	0.75
g. Masonry or concrete fences at grade over 10 feet high.	0.50
2. Penthouses (defined in article 2 of subchapter 2 of chapter 1 of title 27 of the building code) except where framed by an extension of the building frame	0.75
3. Connections for prefabricated structural floor and roof elements other than walls (see above) with force applied at center of gravity.	0.75
4. Diaphragms ³ .	
II. Nonstructural Components	
1. a. Exterior ornamentation and appendages including cornices, ornamental statuary or similar pieces of ornamentation.	2.00
b. Interior ornamentation and appendages in areas of public assembly including cornices, ornamental statuary or similar pieces of ornamentation.	2.00
2. Chimneys, stacks, trussed towers and tanks on legs.	
a. Supported on or projecting as an unbraced cantilever above the roof more than one-half its total height.	2.00
b. All others, including those supported below the roof with unbraced projection above the roof less than one-half its height, or braced or guyed to the structural frame at or above its center of mass.	0.75
3. Exterior signs and billboards.	2.00

III. Equipment and Machinery ⁴ 1. Tanks and vessels (including contents), including support systems and anchorage.	0.75
--	------

Notes:

1. See Section 2312(g)² for additional requirements for determining C_p for nonrigid equipment or for items supported at or below grade.
2. See Section 2312(h)2D(iii) and Section 2313(g)2.
3. See Section 2312(h)2I.
4. Equipment and machinery include such items as pumps for fire sprinklers, motors and switch gears for sprinkler pumps, transformers and other equipment related to life-safety including control panels, major conduit ducting and piping serving such equipment and machinery.

Figure No. 3, Normalized Response Spectra Shapes.

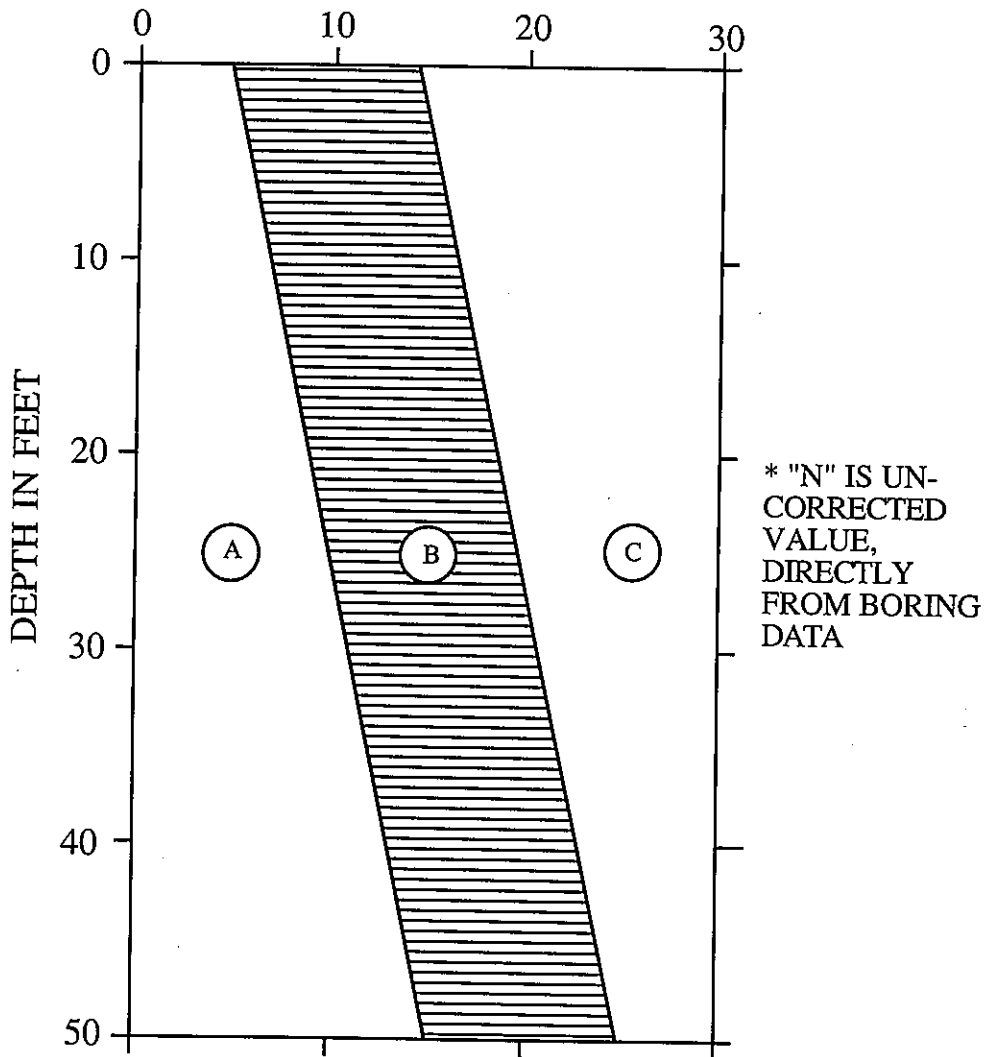
Delete the Figure No. 3 and insert the new Figure 3 and Table No. 23-R.

TABLE NO. 23-R
SPECTRAL ACCELERATION
IN FRACTION OF G
5% DAMPING

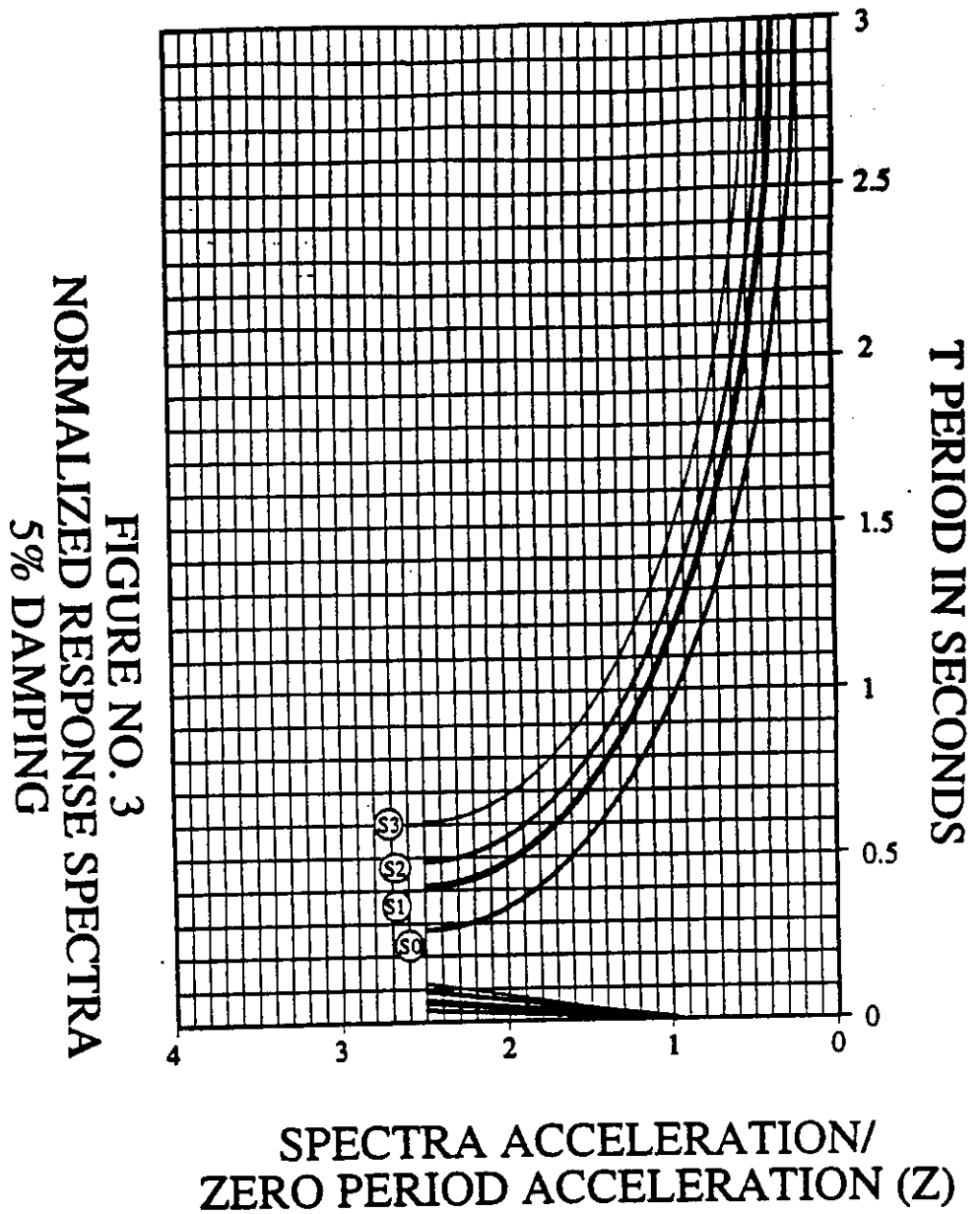
T-SEC	S ₀	S ₁	S ₂	S ₃
.01	0.150	0.150	0.150	0.150
.02	0.150	0.150	0.150	0.150
.05	0.375	0.283	0.262	0.244
.075	0.375	0.375	0.336	0.303
.090	0.375	0.375	0.375	0.334
.112	0.375	0.375	0.375	0.375
.267	0.375	0.375	0.375	0.375
.40	0.250	0.375	0.375	0.375
.48	0.208	0.313	0.375	0.375
.60	0.167	0.250	0.300	0.375
1.00	0.100	0.150	0.180	0.225
2.00	0.050	0.075	0.090	0.113
3.00	0.033	0.050	0.060	0.075

Note: This table presents acceleration (g) versus natural period (seconds) to facilitate the presentation of spectra in log-log form.

FIGURE NO. 4
"N" IN BLOWS PER FOOT *



CATEGORY A: PROBABLE LIQUEFACTION
CATEGORY B: POSSIBLE LIQUEFACTION
CATEGORY C: LIQUEFACTION UNLIKELY



§8. The list of referenced national standards of reference standard RS-10 of the appendix to chapter 1 of title 27 of the administrative code of the city of New York is amended by adding eight new standards to read as follows:

ACI 530/ASCE 5--Building Code Requirements for Masonry Structures, as modified.....	1992
ACI 530.1/ASCE 6--Specifications for Masonry Structures, as modified	1992
ANSI/ACI-318 --Building Code Requirements for Reinforced Concrete, as modified	1989
MNL-120 --Prestressed Concrete Institute Design Handbook, Third Edition.....	1985
UBC Section 2723--Steel Structures Resisting Forces Induced by Earthquake Motions in Seismic Zones Nos. 1 and 2 with Accumulative Supplement, as modified	1990
AITC 117 --Specification for Structural Glued Laminated Timber of Softwood Species - Design Standard ...	1987 and Manufacturing Standard
APA Form No. L350C Diaphragms- Design/Construction Guide	1989
APA Form No. E30K Residential & Commercial Design/ Construction Guide	1989

§ 9. Reference standard RS10-1 of the appendix to chapter 1 of title 27 of such code is amended by designating said standard as RS 10-1A and amending section 1.1 therein to read as follows:

1.1 Scope. -- This standard provides minimum requirements for the design and construction of *non enlargement alterations* to unit masonry in buildings constructed on or before the effective date of this local law as an alternate to RS 10-1B, not including plain or reinforced unit concrete, reinforced gypsum, or reinforced unit masonry. All new construction and enlargement alterations in and of themselves of unit masonry on new or existing foundations, not including plain reinforced concrete, reinforced gypsum, or reinforced unit masonry shall comply with reference standard RS 10-1B.

§10. Reference standard RS10 of the appendix to chapter 1 of title 27 of such code is amended by adding new reference standard RS10-1B to read as follows:

REFERENCE STANDARD RS 10-1B MASONRY

ACI 530-92/ASCE 5-92 Building Code Requirements for Masonry Structures, as modified.

ACI 530.1-92/ASCE 6-92 Specifications for Masonry Structures, as modified.

MODIFICATIONS -- The provisions of ACI 530-92/ASCE 5-92 shall be subject to the following modifications. The chapter and section numbers are from that standard.

Chapter 1 - General Requirements

Section 1.3 - Approval of special systems of design or construction

Delete this section.

Section 1.4 - Standards cited in this code

Section 1.4.1 -Delete the words "ANSI A 58.1-82 - Minimum Design Loads for Buildings and other structures".

Chapter 5 - General Analysis and Design Requirements

Section 5.2.2 - Delete this section and substitute the following:

"5.2.2.-Service loads shall be in accordance with the building code of the city of New York of which this standard forms a part, with such live load reductions as are permitted in the building code of the city of New York. The load provisions of the reference standard RS 9 shall be used."

Chapter 6 - Design Allowing Tensile Stresses in Masonry

Section 6.1.1 - Delete this section and substitute the following:

"6.1.1-The provisions of this chapter are to be applied in conjunction with the provisions of Chapter 5-General Analysis and Design Requirements and Appendix A."

Section 6.4 - Axial tension

Add the following sentence at the end of section 6.4:

"Axial tension stress shall be resisted entirely by steel reinforcement in accordance with Chapter 7."

Chapter 7 - Design Neglecting Tensile Strength of Masonry

Section 7.1.2 - Delete this section and substitute the following:

"7.1.2.-The provisions of this chapter are to be applied in conjunction with the provisions of Chapter 5-General Analysis and Design Requirements and Appendix A."

Chapter 9 - Empirical Design of Masonry

Section 9.1.1.1 - Seismic - Delete this section and substitute the following:

"9.1.1.1 - Seismic - Empirical requirements may apply to the design or construction of masonry for buildings, parts of buildings or other structures located in New York City."

Section 9.1.1.2 - Wind

Delete this section and substitute the following:

"9.1.1.2 - Wind - Empirical requirements shall not apply to the design or construction of masonry for buildings, parts of buildings, or other structures to be located in areas where the basic wind speed will result in a wind pressure that exceeds 20 psf."

Section 9.2 Height

Add the following sentence at the end of section 9.2:

"However, members which are not part of the lateral force resisting system of the building are permitted to be designed in accordance with the provisions of Chapter 9 of reference standard RS 10-1B in buildings greater than 35 feet in height."

Section 9.9 - Miscellaneous requirements

Delete this section and add the following new Chapter 10:

"Chapter 10 - Miscellaneous Requirements

10.1 - Chases and Recesses - Masonry directly above chases or recesses wider than 12 inches shall be supported on lintels.

10.1.1 - Where permitted - Chases and recesses shall be prohibited in any wall less than 12 inches thick and in the required area of piers and buttresses; except that where permitted in 8-inch walls, in residential buildings and in the apron under window openings, the maximum depth of chases shall be 4 inches.

10.1.2 - Maximum size - The maximum permitted depth of a chase in any wall shall not be more than one-third of the wall thickness, and the maximum length of a horizontal chase or the maximum horizontal projection of a diagonal chase shall not exceed 4 feet except as provided for in Section 10.1.6; and except further that the maximum length of the apron below window sills in all walls shall not exceed the width of the window opening. Waterproofed chases in such aprons in 8-inch walls shall not exceed 4 inches in

depth. The aggregate area of recesses and chases shall be not more than one-fourth of the area of the face of the wall in any one story.

10.1.3 - Waterproofing chases - The backs and sides of all chases in exterior walls with less than 8 inches of masonry to the exterior surface shall be insulated and waterproofed.

10.1.4 - Fire resistive limitations - Chases or recesses shall not reduce the thickness of masonry material below the minimum equivalent thickness required for firewalls, fire separation assemblies or required fire resistive coverings of structural members.

10.1.5 - Hollow walls - Where chases and recesses are permitted in hollow walls and walls constructed of hollow blocks or tile, the chases and recesses shall be built in with the wall. Chases shall not be cut in hollow walls after erection.

10.1.6 - Continuous chases - Where horizontal chases for the bearing of reinforced concrete floors and roof slabs are continuous, anchors shall be installed above and below the floor construction to resist bending and uplift in the wall due to flexure of the slab.

10.2 - Lintels - The design for lintels shall be in accordance with the provisions of Sections 5.6 and 7.3.3. Minimum end bearing shall be 4 inches.

10.3 - Support on wood - No masonry shall be supported on wood girders or other forms of wood construction.

10.4 - Corbelling

10.4.1 - Solid masonry units shall be used for corbelling. The maximum corbelled projection beyond the face of the wall shall be not more than one half of the wall thickness or one half the wythe thickness for hollow walls; the maximum projection of one unit shall neither exceed one half the height of the unit nor one third its thickness at right angles to the face which is offset. Corbelling of hollow walls or walls built of hollow units shall be supported on at least one full course of solid masonry.

10.4.2 - Molded cornices - Unless structural support and anchorage are provided to resist the overturning moment, the center of gravity of all projecting masonry or molded cornices shall lie within the middle one-third of the supporting wall. Terra cotta and metal cornices shall be provided with a structural frame of non-combustible anchored material.

10.5 - Arches and lintels - The masonry above openings shall be supported by properly buttressed arches or by lintels that bear on the wall at each end for at least 4 inches.

10.6 - Parapet walls - All cells in the hollow masonry units and all joints in solid, cavity, or masonry bonded hollow wall construction shall be filled solid with mortar. All corners of masonry parapet walls shall be reinforced with joint reinforcement or its equivalent at vertical intervals not greater than 12 inches. Such reinforcement shall extend around the corner for at least 4 feet in both directions and splices shall be lapped at least 6 inches. Parapet walls shall be properly coped and flashed with noncombustible, weatherproof material of a width not less than the width of the parapet wall plus sufficient overage for overlaps. Masonry parapet walls shall be not less than 8 inches in thickness and their height shall not exceed three times their thickness. Parapet walls shall be designed in accordance with the provisions of Appendix A.

10.7 - Isolated piers - Isolated masonry piers shall be bonded as required for solid walls of the same thickness and shall be provided with adequate means for distributing the load at the top of the pier.

10.8 - Bearing details - Concentrated loads shall be supported upon construction of solid masonry, concrete, or masonry of hollow units with cells filled with mortar, grout, or concrete and of sufficient height to distribute safely the loads to the wall or column, or other adequate provisions shall be made to distribute the loads.

10.8.1 - Joists - Solid construction for support under joists shall be at least 2 $\frac{1}{4}$ inches in height, and joists supported on such construction shall extend into the masonry at least 3 inches.

10.8.2 - Beams - Solid construction for support under beams, girders, or other concentrated loads shall be at least 4 inches in height and the bearing of beams shall extend into the masonry at least 4 inches.

10.9 - Use of existing walls - An existing masonry wall may be used in the alteration or extension of a building provided that it meets the requirements of this standard.

10.9.1 - Walls of insufficient thickness - Existing walls of masonry units that are structurally sound, but that are of insufficient thickness when increased in height, may be strengthened by an addition of similar masonry units laid in type M or S mortar. The foundations and lateral support shall be equivalent to those required for newly constructed walls under similar conditions. All such linings shall be thoroughly bonded into existing masonry by toothings to assure combined action of wall and lining. Toothings shall be distributed uniformly throughout the wall, and shall aggregate in vertical cross-sectional area at least 15 percent of the total surface area of the lining. Stresses in the masonry under the new conditions shall not exceed the allowable stresses.

10.10 - Precautions during erection - Temporary bracing shall be used wherever necessary to take care of any loads to which the walls may be subjected during erection. Such bracing shall remain in place as long as may be required for safety.

10.11 - Horizontal compression joints - All concrete framed buildings to be constructed over 35 feet in height (as measured from adjoining grade to the main roof level), whose exterior wythe are of cavity wall construction with steel lintels, shall have horizontal compression joints in the exterior wythe to prevent masonry distress induced by vertical shortening of the structural frame.

(a) Unless substantiated as indicated by (b) below, horizontal compression joints shall be $\frac{1}{4}$ inch minimum thickness, with neoprene, polyethylene, or urethane gasket or equivalent joint filler filling the entire joint, except for a recess from the toe of the lintel angle to the exterior of the facing brick, to provide space for caulking. These joints shall be spaced at each floor.

(b) The applicant of record shall submit an engineering analysis establishing that proposed building compression joints spaced further apart than in (a) above are sufficient to provide for the effects of vertical shortening of the structural frame.

10.12 - Dry-Stacked, surface-bonded masonry walls

10.12.1 - General - Dry-Stacked, surface-bonded masonry walls may be used for only one and two family dwellings and shall comply with the requirements of this code for masonry wall construction.

10.12.2 - Materials - Surface-bonding mortar shall comply with ASTM C476. Concrete masonry units shall comply with ASTM C55, C90 or C145.

10.12.3 - Design - Dry-stacked, surface-bonded masonry walls shall be of adequate strength and proportions to support all superimposed loads without exceeding the allowable stresses listed in Table 10.12.3. Allowable stresses not specified in Table 10.12.3 shall comply with the requirements in this standard.

Table 10.12.3

ALLOWABLE STRESS GROSS CROSS-SECTIONAL AREA

<i>Description</i>	<i>Maximum allowable stress (psi)</i>
<i>Compression</i>	
Standard block.....	45
Shear.....	10
<i>Flexural tension</i>	
Vertical span.....	18
Horizontal span	30

10.12.4 - Construction - Construction of dry-stacked, surface-bonded masonry walls, including stacking and leveling of units, mixing and application of mortar, curing and protection, shall comply with ASTM C946.

10.13 - Glass-block walls

10.13.1 - Exterior wall panels - The maximum dimensions of glass-block wall panels in exterior walls, where used singly or in multiples to form continuous bands of glass blocks between structural supports, shall be 25 feet in length and 20 feet in height between structural supports and expansion joints; and the area of each individual panel shall not be more than 250 square feet. Intermediate structural supports shall be provided to support the dead load of the wall and all other superimposed loads. Where individual panels are more than 144 square feet in area, a supplementary stiffener shall be provided to anchor the panels to the structural supports.

10.13.2 - Joint materials - Glass blocks shall be laid up in Type S or N mortar with approved galvanized metal panel anchors in the horizontal mortar joints of exterior panels. The sills of glass-block panels shall be coated with approved water-based asphaltic emulsion, or other elastic waterproofing material, prior to laying the first mortar course, and the perimeter of the panels shall be caulked to a depth of not less than 1/2 inch with nonhardening caulking compound on both faces, or expansion joints shall be provided. Where placed in joint materials other than mortars herein defined, a single panel shall not be more than 100 square feet in area, nor more than 10 feet in either length or height.

10.13.3 - Wind and seismic loads - Exterior wall panels held in place in the wall openings shall be designed to resist both the internal and external loads due to wind and seismic loads.

10.13.4 - Interior wall panels - Solid or hollow glass blocks shall not be used in fire walls, party walls, fire separation assemblies or fire partitions, or for loadbearing construction. Such blocks shall be erected with mortar and reinforcement in metal frames, structural channels or embedded panel anchors as provided for exterior walls or other joint materials. All mortar-bearing surfaces of the glass block shall be precoated or prepared to insure adhesion between mortar and glass. Wood strip framing shall not be used in fire separation assemblies that are required to be fire resistance rated.

Exceptions: Glass-block assemblies with a material and equipment acceptance number or Board of Standards and Appeals number having a fire-resistance rating of not less than 3/4 hour shall be permitted in fire separations which have a required fire resistance rating of one hour or less and do not enclose exit stairways or exit passageways.

10.14 - Veneer

10.14.1 - General - Veneer, as used in this section, refers to an exposed facing wythe of brick, tile, ceramic veneer, terra cotta, concrete masonry units, cast stone, natural stone, or similar weather-resistant noncombustible masonry units laid in mortar and securely attached to a surface for the purpose of providing ornamentation, protection or insulation, but not intentionally so bonded as to exert common action under load. In lieu of the provisions of Section 10.14, veneers may be designed according to Chapters 5, 6 and 9 of reference standard RS 10-1B.

10.14.1.1 - Limitations - Veneer shall not be assumed to add to the strength of any wall, nor shall it be assumed to support any load other than its own weight. No veneer shall be less than the thickness specified in Table 10.14.1.1. The height and length of veneer areas shall be unlimited, except as required to control expansion and contraction, and except as provided in Section 10.14.2.

TABLE 10.14.1.1 Minimum Thickness of Masonry Veneer

Type of Veneer	Minimum Thickness Actual (in.)
Anchored Type:	
Solid masonry units.....	1 5/8
Hollow masonry units.....	1 5/8
Ceramic veneer.....	1
Adhesion Type:	
Solid masonry units.....	3/8
Ceramic veneer.....	3/8

10.14.1.2 - Design - All anchor attachments shall be designed to resist a minimum positive or negative horizontal force as required for wind or seismic effects, and adhesion type veneer shall be designed to have a bond sufficient to withstand a shearing stress of 50 psi. At a minimum, the veneer shall also meet the attachment requirements of Sections 10.14.2.1 and 10.14.3.1.

10.14.1.3 - Support of veneer - The weight of all anchored type veneer shall be supported upon footings, noncombustible foundation walls, or other approved supports. Veneer above openings shall be supported upon noncombustible, non-corrosive lintels.

10.14.2 - Veneer on wood - Anchored masonry veneer attached to wood frame structures shall be supported on noncombustible footings or foundation walls. The height of the veneer shall not exceed 35 feet measured from the top of the supporting footings or foundation walls. Where anchored veneer exceeding 20 feet in height is applied, it shall be supported in a manner that will provide for movement between the veneer and its backing.

10.14.2.1 - Attachment - At a minimum, veneer of unit masonry shall be attached directly to wood studs, by one of the following means:

(a) With at least 22 gauge corrosion-resistance corrugated steel ties at least one inch wide, at vertical intervals of not more than 24 inches and horizontal intervals of not more than 32 inches, but in no case less than one tie for 3 1/2 square feet of wall area;

(b) Directly to a 1 inch reinforced cement mortar base.

10.14.3 - Veneer on masonry - Veneer attached to masonry or concrete backing shall not be limited in height other than by compressive stresses.

10.14.3.1 - Attachment - At a minimum, veneer shall be securely attached to the masonry or concrete backing by one of the following means or by a means that is equivalent in strength:

(a) Metal ties conforming to Section 5.8 except that ties shall be spaced not more than 24 inches apart either horizontally or vertically;

(b) Corrosion-resistant dovetail slot anchors where the backing and the veneer has been designed for this type of attachment. Such anchors shall be formed from at least 16 gauge steel at least 1 inch wide;

(c) Adhesion type masonry veneer shall be installed in accordance with the manufacturer's recommendations and setting plans;

(d) Where anchored veneer is not grouted to the back, it shall be supported in a manner that will provide for movement between the veneer and its backing.

10.15 Miscellaneous structures and systems

10.15.1 - Flat or Segmental Masonry Floor or Roof Arches - The provisions of this section do not apply when masonry floor or roof arches are proportioned on the basis of structural analysis.

10.15.1.1 - Span - The maximum clear span between supporting beams shall be 8 feet.

10.15.1.2 - Tie Rods - All masonry flat arches or segmental arches shall be provided with tie rods in both the exterior and interior spans. The minimum size and spacing of tie rods shall be:

For exterior spans-1 1/4 inches round rods spaced 4 feet
6 inches apart.

For interior spans-7/8 inches round rods spaced 4 feet
6 inches apart.

Washers shall be used with all tie rods. All tie rods shall have a minimum specified yield point of 36,000 psi.

10.15.1.3 - Flat arches - The depth of flat arches of burnt clay or shale hollow blocks shall be at least 1 1/2 inches for each foot of span, inclusive of the portion of the block extending below the under side of the beam, and such arches shall be at least 6 inches thick. Brick shall not be used for flat arches.

10.15.1.4 - Segmental arches - Segmental arches shall have a rise of at least 1 inch per foot of span, and the minimum thickness shall be 6 inches for hollow tile arches, 4 inches for brick arches with a span of 5 feet or less, and 8 inches for brick arches with a span exceeding 5 feet.

10.15.1.5 - Structural clay tile arches - The blocks shall be at least two cells deep, shall be laid in type M or S mortar, and shall be properly keyed.

10.15.1.6 - Brick arches - Brick arches shall be laid in a full bed of type M or S mortar and shall be solidly bonded.

10.15.1.7 - Openings in floors and roofs - Suitable metal framing or reinforcement shall be provided in masonry arch and roof construction around any opening more than 1 foot 6 inches on a side."

Appendix A - Special Provisions for Seismic Design

Section A.1.1.1 - Delete this section and substitute the following:

"A.1.1.1 - Appendix A sets special requirements for masonry and construction of masonry building elements for seismic design as defined in reference standard RS 9-6."

Section A.2 - Delete this section.

Section A.3 - Delete the words "for Seismic Zone 2."

Section A.3.3 - Delete this section and substitute the following:

"A.3.3 - Distribution of seismic loads or forces shall be in accordance with the provisions of reference standard RS 9-6."

Section A.3.6 - Delete the first two sentences and substitute the following:

"Masonry walls which require lateral forces shown in Table 23-P of reference standard RS 9-6 shall be anchored to all floors and roofs which provide lateral support for the walls. The anchorage of such walls or partitions shall provide direct connection capable of resisting the forces derived from Table No. 23-P or a minimum of 200 pounds per lineal foot of wall, whichever is greater."

Section A.3.8 - Delete this section and substitute the following:

"A.3.8 - Vertical reinforcement of at least 0.20 square inches in cross sectional area shall be provided continuously from support to support at each corner, at each side of each opening, at the ends of walls and at a maximum spacing of 10 feet apart throughout the wall. Horizontal reinforcement not less than 0.20 square inches in cross sectional area shall be provided: (1) at the bottom and top of wall openings and shall extend not less than 24 inches nor less than 40 bar diameters past the opening; (2) continuously at structurally connected roof and floor levels and at the top of walls; (3) at the bottom of the wall or in the top of the foundations when dowelled to the wall; (4) at maximum spacing of 10 feet unless uniformly distributed joint reinforcement is provided. Reinforcement at the top and bottom of openings when used in determining the maximum spacing specified in item (4) above shall be continuous in the wall."

Add the following sections:

"A.3.10 - Non-bearing back-up or infill walls and non-bearing partitions need not comply with the vertical and horizontal (2 way) reinforcing requirements of section A.3.8 if the requirements set forth in A. 3.10.1 through A. 3.10.4 are met.

A.3.10.1 - The cross sectional area of uniformly spaced steel reinforcement in either the horizontal or the vertical direction shall equal or exceed 0.0005 times the gross cross sectional area of the masonry.

A.3.10.2 - Reinforcement shall be continuous between supports.

A.3.10.3 - Spacing of prescribed horizontal reinforcement shall not exceed 16 inches for joint reinforcement and 4 feet for reinforcement bars in grouted bond beams. When vertical reinforcement is used, bars shall not exceed placement at 10 feet on center and at the ends of walls.

A.3.10.4 - Lateral support anchorage shall be provided between the non-loadbearing back-up, infill or partition wall and its structural support. Spacing of anchors shall conform to the provisions of Sections 4.2 and 5.11 and shall not exceed the spacing of prescribed reinforcement. Anchorage shall be designed to transfer lateral (out-of-plane) forces to the adjacent structural support."

Section A.4 - Delete this section.

MODIFICATIONS -- The provisions of ACI 530.1-92/ASCE 6-92 shall be subject to the following modifications. The chapter and section numbers are from that standard.

2.3.1. - Inspection and testing

Delete the opening sentence and substitute the following:

"Inspection shall conform to the requirements of Articles 1.5 and 1.6, the inspection and testing provisions of the building code of the city of New York, and the following:"

§11. Reference standard RS 10-2 of the appendix to chapter 1 of title 27 of the administrative code of the city of New York is REPEALED and reenacted to read as follows:

REFERENCE STANDARD RS 10-2**REINFORCED MASONRY**

ACI 530-92/ASCE 5-92 Building Code Requirements for Masonry Structures, as modified.

ACI 530.1-92/ASCE 6-92 Specifications of Masonry Structures, as modified.

MODIFICATIONS -- The provisions of ACI 530-92 and ACI 530.1-92 shall be subject to the same modifications as set forth in reference standard RS 10-1B and shall apply to reinforced masonry.

EXCEPTION -- For buildings designed utilizing reinforced masonry construction in existence on the effective date of this local law, repairs or alterations to the facade or interior of the structure shall be done in accord with ACI 530-92/ASCE 5-92 Building Code Requirements for Masonry Structures, as modified and ACI 530.1-92/ASCE 6-92 Specifications for Masonry Structures, as modified except for those provisions found in Appendix A Special Provisions for Seismic Design.

§12. Reference standard RS 10-3 of the appendix to chapter 1 of title 27 of such code is **REPEALED** and reenacted to read as follows:

REFERENCE STANDARD RS 10-3**ACI 318-1989 BUILDING CODE REQUIREMENTS****FOR REINFORCED CONCRETE**

Comments - The commentary on Building Code Requirements for Reinforced Concrete (ACI 318-89) may be used as a guide for interpreting this standard.

MODIFICATIONS -- The provisions of ACI 318-89 shall be subject to the following modifications. The section and subdivision numbers are from that standard.

- 1.2.1 -Delete this section and substitute the following:
"1.2.1 - The applicable provisions of the building code of the city of New York shall apply."
- 1.2.2 -Delete this section.
- 1.2.3 -Delete this section.
- 1.3.1 -Delete this section and substitute the following:
"1.3.1 - The applicable provisions of the building code shall apply".
- 1.3.2 -Delete this section.
- 1.3.4 -Delete this section.
- 1.4 -Delete this section and substitute the following:
"1.4 - The provisions of the building code for equivalent systems of design shall apply."
- 3.1.3 -Delete this section.
- 3.6.6 -Delete this section and substitute the following:
"3.6.6 -- Fly Ash may be used in lieu of Chemical Admixtures (ASTM C494) RS 10-44."
- 5.1.1 -Delete "5.3.2" on the second line and insert the words "Section 5.6.1.6 as listed", and delete the last sentence.
- 5.1.2 -Delete "5.6.2" on the second line and insert the words "the New York City Building Code".
- 5.2.1(c) -Delete "5.6" on the second line and insert the words "the New York City Building Code".

- 5.2.3 -Delete this section.
- 5.3 -Delete the words "and/or trial mixtures".
- 5.3.1 -Delete the words "Standard deviation" and insert the words "Method II Proportioning on the basis of field experience".
- 5.3.1.1(c) Delete the words "except as provided in 5.3.1.2".
- 5.3.1.2 -Delete in its entirety, including Table 5.3.1.2.
- 5.3.2.1 -Delete "or 5.3.1.2" at the end of the sentence.
- 5.3.2.2 -Delete in its entirety, including Table 5.3.2.2.
- 5.3.3 -Delete the words "several strength test records, or trial mixtures" at the end of the sentence.
- 5.3.3.1 -Delete the third sentence starting with the words "For the purpose of" and ending with the words "less than 45 days".
- 5.3.3.2 -Add a period on the third line after the word "mixtures", delete the remainder of the section, and add the following sentence:
"The Trial mixtures shall conform to the provisions of Section 27-605(a)(3) of the New York City Building Code."
- 5.4.1 -Delete this section and substitute the following:
"Proportioning shall conform to New York City Building Code Section 27-605 (a) Method I."
- Table 5.4 -Delete in its entirety.
- 5.4.2 -Delete this section.
- 5.4.3 -Delete this section.
- 5.5 (b) -Delete this section.
- 5.6.1.1 -Delete this section and substitute the following:
"5.6.1.1 - Whenever strength tests of concrete specimens are required by the provisions of the building code of the city of New York, compression test samples shall be taken directly from the mixer in accordance with reference standard RS 10-51, cured in accordance with reference standard RS 10-52, and tested at the age of 28 days or as otherwise specified in accordance with reference standard RS 10-17."
- 5.6.1.2 -Delete this section and substitute the following:
"5.6.1.2 - Three test specimens shall be molded for each 50 cubic yards or fraction thereof for each class of concrete placed in any one day's concreting. In addition, concrete test specimens shall be made from concrete taken out of the bucket, hopper or forms as directed by the engineer designated for controlled inspection. These test specimens shall be separate and distinct from those made from the mixer and shall be made from the same batch and cured and tested in the same manner as described above for the samples taken from the mixer."
- 5.6.1.3 -Delete this section and substitute the following:
"5.6.1.3 - The number of test specimens made from the concrete taken out of the bucket, hopper or forms may be reduced to a minimum of one set of three (3) specimens for every 150 cubic yards, or fraction thereof, for each class of concrete placed in any one day's concreting. When the concrete is being placed directly from the mixer into the

forms without any intermediate conveyance, the above additional specimens will not be required."

5.6.1.4

-Delete this section and substitute the following:

"5.6.1.4 - Additional specimens may be molded and tested where there is a question as to the required interval between placing of concrete and stripping forms or placing the structure into use."

Add the following section:

"5.6.1.5 - The test specimens shall be tested by a licensed concrete testing laboratory. The testing of each batch of three specimens shall be considered one strength test. The strength of such test shall be the average of the breaking strengths of the three specimens comprising the test, except that if one of the specimens shall manifest evidence of improper sampling, molding, handling or testing, it shall be discarded and the remaining two averaged. If more than one specimen must be discarded, the entire strength test shall be voided."

Add the following section:

"5.6.1.6 - The average of all sets of three consecutive strength tests representing each class of concrete shall be equal or greater than the specified strength (f'_c) and not more than 10% of the strength tests shall have values less than the specified strength, but no test shall show an average strength less than 85% of the specified strength."

5.6.2.1

-Delete this section.

5.6.2.2

-Delete this section.

5.6.2.3

-After the word "satisfactory" in the second line, delete the remainder of the section and add the words "if the provisions of Section 5.6.1.6 are met".

5.6.2.4

-Delete this section.

5.6.3.1

-Delete the words "Building Official" on the first line and insert the word "Commissioner".

5.6.4.1

-Delete the first three lines through the words "[Section 5.6.2.3(b)]", and substitute the following: "If tests of laboratory cured specimens fail to conform to the requirements of Section 5.6.1.6 refer to Section 5.6.3.4."

5.6.4.2

-Delete the words "strength test more than 500 psi below specified value of f'_c " and insert the words "set of three specimen tests which fail to conform to the requirements of Section 5.6.1.6."

Add the following section:

"5.9.3 -Conveying by pumping methods shall be in accordance with the applicable provisions of the Building Code."

5.10.4

-Add a period on the second line after the word "used", delete the words "unless approved by the Engineer" and add the following sentence: "For additional requirements see applicable provisions of the Building Code Section 27-607(a)(2)."

Add the following sections:

"5.14 - SPECIAL REQUIREMENTS FOR HIGH STRENGTH CONCRETE"

5.14.1 - All high strength concrete (6000 PSI and higher) shall be proportioned and manufactured only in accordance with the provisions of Building Code Section 27-605(b) Method II Proportioning on the basis of field experience.

5.14.2 - All high strength concrete specimens shall be made utilizing metal or plastic molds that comply with reference standard RS 10-52. Each test shall consist of eight specimens taken directly from the mixer. Two specimens shall be tested at seven days, three at 28 days and three at 56 days. These requirements are in addition to the hopper specimens as required by the Building Code.

5.14.3 - At the time of placement of high strength concrete, two concrete production facilities shall be available. Said facilities shall have been previously approved by the architect or engineer designated for controlled inspection.

5.14.4 - All high strength concrete for columns shall be of normal weight concrete.

5.14.5 - The requirements of Section 10.13.4 shall be adhered to in all respects.

5.14.6 - Where lightweight concrete is to be used for the floor system, the columns and the beam or slab "sandwich" immediately above the columns shall be stone concrete, placed in accordance with the requirements of Section 10.13.

5.14.7 - The engineer will insure that there are no cold joints at the interface between the lightweight concrete and stone portions of the slabs or beams.

5.14.8 - All data shall be submitted periodically to the Department of Buildings for review."

Add the following section:

"6.1.7 - For additional form work requirements, see applicable provisions of Building Code Section 27-1035."

Add the following sections:

"6.3.13 - Concrete cover over electrical cables and snow melting pipes in sidewalks shall meet the requirements of the Bureau of Highways of the Department of Transportation.

6.3.14 - No conduits, pipes or other similar embedded items will be permitted in prestressed or post-tension concrete members other than as shown on the plans as filed with the Department of Buildings or on shop drawings reviewed by the engineer of record. Computations demonstrating the effects of such embedded items on the structural adequacy of prestressed or post-tensioned concrete shall be submitted."

Add the following section:

"10.13.4 - When the specified compressive strength of concrete in a column is greater than 1.4 times that specified for a floor system, the following additional requirements shall be adhered to:

- (a) All of the design provisions of Section 10.13 (unmodified) are adhered to.
- (b) Application is made to the Borough Superintendent in each individual case.
- (c) The concrete construction is supervised and inspected continuously by a full-time Professional Engineer responsible for controlled inspection of concrete and not in the regular employ of the owner or contractor. Such engineer shall perform no other work during the construction of the particular building nor shall he delegate his responsibility to any subordinates.
- (d) The Professional Engineer referred to in subdivision (c) above, without incurring any personal liability, shall be authorized to stop construction, reject any concrete, direct that the concrete testing laboratory being used be dismissed and a new laboratory be retained.
- (e) Affidavits by the parties involved shall be filed with and acceptable to the Borough Superintendent prior to approval of any plans."

Add the following section:

"12.1.3. - Development (Section 12.2) and splice lengths (Section 12.5) computed based on the minimum requirements of the ACI 318-83 code are deemed equally applicable for usage.

16.4.2

- Delete this section and substitute the following: "16.4.2 - Lifting devices shall have a capacity sufficient to support four times the appropriate portion of the members dead weight. The inclination of the lifting force shall be considered."

16.4.2.1

-Delete this section.

16.4.2.2

-Delete this section.

16.4.2.3

-Delete this section.

21.2.1.2

- Add the following sentence to the beginning of this section: "New York City is to be considered in a region of moderate risk."

§13. Reference standard RS 10-4 of the appendix to chapter 1 of title 27 of such code is REPEALED and reenacted to read as follows:

REFERENCE STANDARD RS 10-4 PRECAST CONCRETE AND PRESTRESSED CONCRETE

ACI 318-1989 Building Code Requirement for Reinforced Concrete
MNL-120-1985 Prestressed Concrete Institute Design Handbook,
Third Edition.

MODIFICATIONS -- The applicable section of ACI 318-89 as modified by the applicable provisions of reference standard RS 10-3 shall apply for precast concrete and prestressed concrete.

§14. Reference Standard RS 10 of the appendix to such chapter, title and code is amended by adding a new reference standard RS 10-5C to read as follows:

**REFERENCE STANDARD RS 10-5C
STEEL STRUCTURES RESISTING EARTHQUAKE FORCES**

UBC SECTION 2723-1990 Steel Structures Resisting Forces Induced by Earthquake Motions in Seismic Zones Nos. 1 and 2 with Accumulative Supplement.

MODIFICATIONS -- The provisions of UBC Section 2723 shall be subject to the following modifications. The subdivisions, paragraphs, subparagraphs and items are from that standard.

Subdivision (a) General, Paragraph 1.

Delete this paragraph and substitute the following:

"1. Design and construction of steel framing in lateral force resisting systems shall conform to the requirements of this reference standard. The use of reference standard RS 10-5B is prohibited for the design of seismic resisting elements."

Subdivision (b) Definitions.

Delete this subdivision and substitute the following:

"(b) Definitions. ALLOWABLE STRESSES are prescribed in reference standard RS 10-5A.

CHEVRON BRACING is that form of bracing where a pair of braces located either above or below a beam terminates at a single point within the clear beam span.

CONNECTION is the group of elements that connect the member to the joint.

DIAGONAL BRACING is that form of bracing that diagonally connects joints at different levels.

ECCENTRIC BRACED FRAME (EBF) is that form of braced frame where at least one end of each brace intersects a beam at a point away from the column girder joint.

GIRDER is the horizontal member in a seismic frame. The words beam and girder may be used interchangeably.

JOINT is the entire assemblage at the intersections of the members.

K BRACING is that form of bracing where a pair of braces located on one side of a column terminates at a single point within the clear column height.

LINK BEAM is that part of a beam in an eccentric braced frame which is designed to yield in shear and/or bending so that buckling of the bracing members is prevented.

STRENGTH is the strength as prescribed in reference standard RS 10-5A.

V BRACING is that form of chevron bracing that intersects a beam above and inverted V bracing is that form of chevron bracing that intersects a beam from below.

X BRACING is that form of bracing where a pair of diagonal braces cross near midlength of the bracing members."

Subdivision (c) Materials.

Delete this subdivision and exception and substitute the following:

"(c) 1. Materials. Materials shall be as prescribed in reference standard RS 10-5A. Structural steel designed to be part of the lateral force resisting system of multistory buildings shall not have a specified yield strength greater than 50,000 psi.

2. Member Strength. When these provisions require that the strength of the member be developed, the following shall be used:

Members:	Strength
Flexure	$M_s = ZF_y$
Shear	$V_s = .55F_y d_t$
Axial compression	$P_{sc} = 1.7F_a A$
Axial tension	$P_{st} = F_y A$
Connectors:	
Full penetration welds	$F_y A$

Partial penetration and
fillet welds
Bolts

1.7*Allowable
1.7*Allowable

Members need not be compact unless otherwise required by this chapter."

Subdivision (d) Ordinary Moment Frame Requirements.

Delete the words "Section 2723(e)1" and insert the words "paragraph 1 of Special Moment-resisting Frame (SMRF) Requirements".

Subdivision (e) Special Moment-resisting Frame Requirements (SMRF).

Paragraph 1, Subparagraph A. Required Strength.

Delete the words "Formula 22-1" in item (ii) and insert the words "the panel zone strength, defined as:

$$V = 0.55F_y d_{ct} (1 + 3b_{ct} t_{cf}^2 / d_b d_{ct})$$

where:

t = the total thickness of the joint panel zone including doubler plates

d_b = the depth of the beam

d_c = the column depth

b_c = the width of the column flange

t_{cf} = the thickness of the column flange".

Paragraph 3, Subparagraph A. Restrained joint.

Delete item (i) and substitute the following:

$$\Sigma Z_c (F_{yc} - f_a) / \Sigma Z_b F_{yb} > 1.0$$

where ($f_a \geq 0$).

Paragraph 3, Subparagraph B. Unrestrained joint.

Delete the words "Section 2703, Formula (3-2)" in the first sentence and insert the words: "Section 1.6.2 of reference standard RS 10-5A".

Delete the words "Section 2723(e)3A and P-delta" in the sentence following item (ii) and insert the words "Section 2723(f)3A, as well as P-delta effects".

Add new a Paragraph 5 entitled Drift Calculations to read as follows:

"5. Drift Calculations. Drift calculations shall include bending and shear contributions from the clear girder and column spans, column axial deformation, and the rotation and distortion of the panel zone.

Exceptions:

1. Drift calculations may be based on column and girder centerlines where either of the following conditions is met:

a. It can be demonstrated that the drift so computed for frames of similar configuration is typically within 15 percent of that determined above.

b. The column panel zone strength can develop $0.8 \Sigma/M_s$ of the girders framing to the column flanges at the joint.

2. Column axial deformations may be neglected if they contribute less than 10 percent to the total drift."

Subdivision (f) Requirements for Braced Frames.

Paragraph 2, Subparagraph A. Stress reduction.

Delete the words "2702(b)3 and Section 2303(d)" of the definition of " F_a " and substitute the words "1.5.1.3 and Section 1.5.6 of reference standard RS 10-5A".

Paragraph 2, Subparagraph C. Compression elements in braces.

Delete the number "2706" and insert the words "1.9 of reference standard RS 10-5A".

Paragraph 3, Subparagraph B. Net area.

Delete the words "2722(g)3A" in F* and 2722(g)2A in α and insert the words "2723(f)3A" and "2723(f)2A" for F* and α , respectively.

Subdivision (h) Nondestructive Testing.

Delete the words "Section 2722(i)" and insert the words "reference standard RS 10-5A".

§15. The first paragraph of section 10 of reference standard RS 10-9 of the appendix to chapter 1 of title 27 of the administrative code of the city of New York is amended to read as follows:

Plywood diaphragms may be used to resist horizontal forces in horizontal and vertical distributing or resisting elements, provided the deflection in the plane of the diaphragm, as determined by calculations, tests, or analogies drawn therefrom, does not exceed the permissible deflection of attached distributing or resisting elements. *Diaphragms to resist earthquake loads may be designed and constructed in accordance with reference standard RS 10-58.*

§16. Reference standard RS 10-18 of the appendix to chapter 1 of title 27 of such code is amended by adding three new standards to read as follows:

ANSI/AITC A190.1-1983 Structural Glued Laminated Timber and AITC 200-1983 Inspection Manual.

AITC 117-1987 Specification for Structural Glued Laminated Timber of Softwood Species - Design Standard.

AITC 117-1988 Specification for Structural Glued Laminated Timber of Softwood Species - Construction Standard.

§17. Reference standard RS10 of the appendix to chapter 1 of title 27 of such code is amended by adding a new reference standard RS 10-58 to read as follows:

REFERENCE STANDARD RS 10-58

APA Form No. L350C-1989 - Diaphragms - Design/Construction Guide.

APA Form No. E30K-1989 - Residential & Commercial, Design/Construction Guide.

§18. This local law shall take effect one year after it shall have been enacted into law and shall apply to all buildings for which an application for the approval of plans for the construction of such building has been filed with the department of buildings on or after the effective date of this local law.

THE CITY OF NEW YORK, OFFICE OF THE CITY CLERK, s.s.:

I hereby certify that the foregoing is a true copy of a local law of the City of New York, passed by the Council on February 2, 1995, and approved by the Mayor on February 21, 1995.

CARLOS CUEVAS, City Clerk, Clerk of the Council

CERTIFICATION PURSUANT TO MUNICIPAL HOME RULE LAW §27

Pursuant to the provisions of Municipal Home Rule Law §27, I hereby certify that the enclosed Local Law (Local Law 17 of 1995, Council Int. No. 465-B) contains the correct text and:

Received the following vote at the meeting of the New York City Council on February 2, 1995: 47 for, 0 against.

Was approved by the Mayor on February 21, 1995.

Was returned to the City Clerk on February 21, 1995.

JEFFREY D. FRIEDLANDER, Acting Corporation Counsel