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PROPOSAL 3-3 (2009)

SCOPE: Chapter 23 (ASCE-7) – This chapter is new.

PROPOSAL FOR CHANGE: See attached pages.

REASON FOR PROPOSAL: Requested by TS-2 and TS-8.

TS 3 VOTE:

Yes = 11 Yes with Reservations = 0 No = 0 Not Voting = 2

Votes tallied during July, 2007.

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Chapter 23
VERTICAL GROUND MOTIONS FOR SEISMIC DESIGN

23.1 Design vertical response spectrum. Where a design vertical response spectrum is required by these *Provisions* and site-specific procedures are not used, the design vertical response spectral acceleration, S_{av} , shall be developed as follows:

1. For vertical periods less than or equal to 0.025 sec, S_{av} shall be taken as given by Eq. 23.1-1:

$$S_{av} = 0.32C_V S_{DS} \tag{23.1-1}$$

where C_V is defined in terms of S_S in Table 23.1-1.

2. For vertical periods greater than 0.025 sec and less than or equal to 0.05 sec, S_{av} shall be taken as given by Eq. (23.1-2):

$$S_{av} = 19.2C_V S_{DS} (T_V - 0.025) + 0.32C_V S_{DS} \tag{23.1-2}$$

3. For vertical periods greater than 0.05 sec and less than or equal to 0.15 sec, S_{av} shall be taken as given by Eq. 23.1-3:

$$S_{av} = 0.8C_V S_{DS} \tag{23.1-3}$$

4. For vertical periods greater than 0.15 sec and less than or equal to 2.0 sec, S_{av} shall be taken as given by Eq. 23.1-4:

$$S_{av} = 0.8C_V S_{DS} \left(\frac{0.15}{T_V} \right)^{0.75} \tag{23.1-4}$$

where:

S_{DS} = the design spectral response acceleration parameter at short periods

T_V = the period of the vertical fundamental mode of vibration of the structure

S_{av} shall not be less than one-half (1/2) of the corresponding S_a for horizontal components determined in accordance with the general or site-specific procedures of Section 11.4 or Chapter 21, respectively.

For vertical periods greater than 2.0 sec, S_{av} shall be developed from a site-specific procedure; however, the resulting ordinate of S_{av} shall not be less than one-half (1/2) of the corresponding S_a for horizontal components determined in accordance with the general or site-specific procedures of Section 11.4 or Chapter 21, respectively.

Table 23.1-1 Values of Vertical Coefficient C_v

Mapped MCE Spectral Response Parameter at Short Periods ^a	Site Class A, B	Site Class C	Site Class D, E, F
$S_s \geq 2.0$	0.9	1.3	1.5
$S_s = 1.0$	0.9	1.1	1.3
$S_s = 0.6$	0.9	1.0	1.1
$S_s = 0.3$	0.8	0.8	0.9
$S_s \leq 0.2$	0.7	0.7	0.7
^a Use straight-line interpolation for intermediate values of S_s			

In lieu of using the above procedure, a site-specific study may be performed to obtain S_{av} at vertical periods less than or equal to 2.0 sec, but the value so determined shall not be less than 80 percent of the S_{av} value determined from Eqs. 23.1-1 through 23.1-4.

23.2 MCE vertical response spectrum. The MCE vertical response spectral acceleration shall be 150 percent of the S_{av} determined in Section 23.1.