Discussion

Seismic Drift Control and Building Periods

Paper presented by EDWARD J. TEAL
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Discussion by **Glen V. Berg**

Mr. Teal's Higgins Lectureship paper is an informative contribution to the understanding of seismic design and seismic drift control. A cautionary word needs to be added for engineers in seismic zones other than Uniform Building Code Zone 4.

The 1976 Uniform Building Code provides zone coefficients as follows:

Zone	Coefficient Z
4	1
3	3/4
2	3/8
1	3/16
0	—

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These differ somewhat from the coefficients given by Mr. Teal, which correspond to those of the next earlier version of UBC. The differences are of no consequence to the paper or to this discussion.

The maximum drift specified in the Uniform Building Code is independent of the zone. The code permits a maximum drift coefficient of 0.005 in Zone 1 as well as in Zone 4. Moreover, UBC provides a period formula:

$$T = 2\pi \sqrt{\frac{\sum w_i \delta_i^2}{g[\sum F_i \delta_i + F_t \delta_n]}}$$

If one were to design for maximum drift, the displacements δ would be proportional to the drift coefficient, and the seismic forces F would be directly proportional to the zone coefficient Z and inversely proportional to $\sqrt{T}$. With the drift unaffected by the zone coefficient, the period of a structure designed for maximum drift would be proportional to $Z^{-2/3}$. Thus Mr. Teal's example structure, if proportioned for maximum drift, would have a calculated period of 2.71 sec if it were located in Zone 4, but 8.28 sec if it were located in Zone 1. A 2.71-sec period for a seven story structure is long; an 8-sec period is patently absurd. The designer well acquainted with seismic design, as engineers in Zone 4 tend to be, would recognize the absurdity at once. Designers in Zone 1, who encounter seismic design only rarely, might not.