PERIOD FORMULAS FOR MOMENT-RESISTING FRAME BUILDINGS

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ABSTRACT: Most seismic codes specify empirical formulas to estimate the fundamental vibration period of buildings. Evaluated first in this paper are the formulas specified in present US codes using the available data on the fundamental period of buildings “measured” from their motions recorded during eight California earthquakes, starting from the 1971 San Fernando earthquake and ending with the 1994 Northridge earthquake. It is shown that, although the code formulas provide periods that are generally shorter than measured periods, these formulas can be improved to provide better correlation with the measured data. Subsequently, improved formulas for estimating the fundamental periods of R/C and steel moment-resisting frame buildings are developed by regression analysis of the measured period data. Also recommended are factors to limit the period calculated by a rational analysis, such as Rayleigh’s method.

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