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Features of Calculating Structures for Frequent Weak Earthquakes

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Abstract : The features of calculating structures for the action of weak earthquakes are analyzed. Earthquakes with a recurrence of 30 years and 50 years are considered. In the first case, the structure is to operate normally without damage after the earthquake. In the second case, damages are allowed that do not affect the possibility of the structure operation. Three issues are emphasized: setting elastic and damping characteristics of reinforced concrete, formalization of limit states, and combinations of loads. The dependence of damping on the reinforcement coefficient is estimated. When evaluating limit states, in addition to calculations for crack resistance and strength, a human factor, i.e., the possibility of panic among people, was considered. To avoid it, it is proposed to limit a floor-by-floor speed level in certain octave ranges. Proposals have been developed for estimating the coefficients of the combination of various loads with the seismic one. As an example, coefficients of combinations of seismic and ice loads are estimated. It is shown that for strong actions, the combination coefficients for different regions turn out to be close, while for weak actions, they may differ.

Keywords : weak earthquake, frequent earthquake, damage, limit state, reinforcement, crack resistance, strength resistance, a floor-by-floor velocity, combination coefficients
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