عنوان مقاله:

Evaluating the Sensitivity of Dynamic Transient Solution of Concrete Bridge Piers in Contact with Surrounding Water to Time Step Values via ANSYS Finite Element Software

محل انتشار:

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خلاصه مقاله:

Sensitivity of developed finite element models with respect to time step needs to be investigated for accurate transient analyses. In this paper, sensitivity of the ANSYS finite element software for dynamic analyses of cylindrical concrete bridge piers with surrounding water modeled by SOLID45 and MASS21 elements is investigated for the displacement-control and force-control analyses. Although displacement-control method is more convenient than the force-control method for modeling seismic ground motions in ANSYS environment, it is shown that the displacement-control method is sensitive with respect to time step and its accuracy does not stably increase by decreasing time step. Furthermore, the amplitude-reduction coefficient for parameters of the Newmark time-marching solution can reduce numerical oscillations of the ANSYS displacement-control method. The force-control method is less sensitive to time step reduction and has higher accuracy than the displacement-controlled method for transient analyses such as fluid-structure interaction of bridge piers

کلمات کلیدی:

Transient finite element modeling, Fluid-structure interaction, Time-step sensitivity analyses, Displacement-control method, Force-controlled method