

# Abstract

The purpose of this study is to develop a rapid method to estimate period and frequency of coupled shear walls without the use of computer modeling. A study is conducted of frequency and period of reinforced concrete shear walls with perforations, a common lateral load resisting configuration where two shear walls are connected by a system of link beams. A set of shear walls is modeled using ANSYS<sup>®</sup> software, with properties calibrated to physical experimental testing within typical design criteria chosen in shear wall design.

Natural frequencies are determined and modeling results are utilized to generate an equation that approximates period and frequency for preliminary design purposes. In addition, a set of tabulated results is presented in order to expedite the approximation process, and to demonstrate the accuracy of the developed formula. The generated equation parameters are discussed and the effects of criteria on shear wall frequency are investigated. Shear wall behavior is studied as frequencies vary and link beams range from flexible to stiff.

The resulting formula may be utilized to quickly approximate shear wall frequency and period for the purposes of preliminary design if conditions follow outlined formula assumptions. The approximation developed should be particularly resourceful to the structural engineer undergoing preliminary design of medium height buildings with shear walls as the only lateral force resisting system.