

## **An Approximate Formula for Calculating the Fundamental Mode Period of Vibration of Practical Building**

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**Abstract :** Most international codes allow the use of an equivalent lateral load method for designing practical buildings to withstand earthquake actions. This method requires calculating an approximation to the fundamental mode period of vibrations of these buildings. Several empirical equations have been suggested to calculate approximations to the fundamental periods of different types of structures. Most of these equations are knowing to provide an only crude approximation to the required fundamental periods and repeating the calculation utilizing a more accurate formula is usually required. In this paper, a new formula to calculate a satisfactory approximation of the fundamental period of a practical building is proposed. This formula takes into account the mass and the stiffness of the building therefore, it is more logical than the conventional empirical equations. In order to verify the accuracy of the proposed formula, several examples have been solved. In these examples, calculating the fundamental mode periods of several farmed buildings utilizing the proposed formula and the conventional empirical equations has been accomplished. Comparing the obtained results with those obtained from a dynamic computer has shown that the proposed formula provides a more accurate estimation of the fundamental periods of practical buildings. Since the proposed method is still simple to use and requires only a minimum computing effort, it is believed to be ideally suited for design purposes.

**Keywords :** earthquake, fundamental mode period, design, building

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