

An approximate method for static and dynamic



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Initially the differential equation of this equivalent sandwich beam is written; shape functions for each storey can then be obtained by the solution of differential equations. By using boundary conditions and storey transfer matrices obtained from these shape functions, system modes and periods can be calculated. The reliability of the study is shown using several examples. A computer program has been developed in MATLAB and numerical samples have been solved for demonstration of the reliability of this method. The results of the samples show the agreement between the present method and other methods given in the literature.

Under horizontal loads, wall-frame buildings demonstrate neither Timoshenko beam nor Euler–Bernoulli beam behavior. The behavior of high-rise buildings is equivalent to a sandwich beam which denotes the total of these two types of behavior (Figure 1). Initially the differential equation of this equivalent sandwich beam can be written. The flexural rigidity of the sandwich beam contains the sum of the flexural rigidity of shear walls and columns; the shear rigidity of the sandwich beam is equal to the sum of the shear rigidities of frames and the sum of the connecting beam shear rigidities.

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