This paper deals with a continuum approach to analyze the symmetrical multi-story plane frame structures. Beam theories presented herein as Euler-Bernoulli beam, shear beam, and Timoshenko beam were used to derive the two important continuum properties namely the equivalent flexural rigidity and equivalent racking shear rigidity. Based on the assumption of strain energy of the continuum be equal to the strain energy of the actual structure for a finite set of assumed deformation modes, the structure can be simplified to a simple equivalent one-dimensional continuum model. Finite element method is used for the numerical solutions. Lateral displacements of the structure are determined in static analysis. Undamped free vibration is considered in dynamic analysis and Hamilton's principle is used to formulate the equations of motion. By using the inverse iteration method, the fundamental natural frequency and fundamental natural mode shape are obtained. Model accuracies are verified by comparison with the full-discrete finite element results for the actual structure. The results indicate that the one-dimensional continuum Timoshenko beam model agrees very well with the full-discrete finite element solutions for both static and dynamic analyses. The maximum error is in order of about 6% and it decreases if a larger and more complex is used.