

Rational Stability Design Method Based on Evaluation of Buckling Performance Considering the Actual Condition for Steel Structural Members

Kikuo IKARASHI

Professor, Tokyo Institute of Technology

In this study, considering the actual stress condition and the boundary condition of the steel structural members, the member performance is evaluated by using useful and reasonable stability evaluation index and the rational stability design method are developed.

First, after examining in detail the stress distribution acting on the plate element and the influence of the boundary condition, the buckling strength of plate element was cleared and the stability design method of plate elements were proposed. Next, factors that can appropriately evaluate the stress distribution acting on the member have been studied, and a local buckling strength calculation formula of the steel structural members considering the coupled local buckling was proposed. A new plate slenderness ratio index derived from this evaluation formula was presented. Using the index, the strength and the plastic deformation capacity decided by coupled plate local buckling were evaluated. Finally, indicator to distinguish whether collapse type was local buckling or lateral buckling was clarified. Steel structural member performance evaluation method using the indicator was presented.

As application, this evaluation method was applied to the tapered steel member. And, in order to realize reasonable thin plate members, the design method using stiffener at beam end was shown.