PRAMUAL HADKHUNTHOD : ELASTIC-PLASTIC ANALYSIS OF STEEL RIGID FRAMES UNDER CONCENTRATED AND UNIFORMLY DISTRUBUTED LOADS.
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This thesis presented the principle of the first-order elastic-plastic analysis including the interaction between axial force and bending moment. Both concentrated and uniformly distrubuted loadings can be considered in the analysis. The method utilizes the AISC (1)'s interaction formulae in setting up conditions of plastic hinge formation. Both strength and in-plane stability effects are considered. A step-by-step algorithm is used in locating plastic hinges. The structural stiffness is recalculated everytime a new plastic hinge is formed. The structure collapses when enough plastic hinges are formed which causes the singularity in the structural stiffness. Maximum load factor, therefore, is the summation of all the load factor computed at every step in the analysis.

It has been shown that the proposed method is an effective method in solving elastic-plastic problem of steel rigid frames. The result yields the lower bound value. From the examples studied in this thesis, predicted maximum load factors are about 3-10% less than those obtained by the second-order elastic-plastic analysis. The proposed method, however, consumes less computational effort.