Evaluation of stress distribution in bolted steel angles under tension

Mohan Gupta

Reader, Department of Civil Engineering, Bhilai Institute of Technology, Durg – 491 001 (India)

and

L. M. Gupta

Professor and Head, Department of Applied Mechanics,
Visvesvaraya National Institute of Technology, Nagpur – 440 011 (India)

ABSTRACT

The stress distribution in the vicinity of connections in a bolted steel angle is non-uniform because of the coupled effects of connection eccentricity, shear lag and stress concentrations. Although, some researchers have attempted finite element analysis, stipulations in various codes and specifications regarding the design of angle tension members are primarily based on the experimental studies. Only a couple of previous studies has included geometric as well as material non-linear effects in such finite element analysis. This paper presents the state-of-the-art review of finite element techniques used in modelling the angle tension members with bolted connections. This review is followed by a non-linear finite element analysis so as to obtain the stress distributions in the vicinity of connections, at design loads. This stress distribution is then evaluated to draw several realistic conclusions.

KEYWORDS