

ANALYSIS OF STRESS CONCENTRATION FACTOR IN BOLTED JOINT USING FINITE ELEMENT METHOD

Abstract

Bolted joints are widely used in industries e.g. pressure vessels, automobiles, machine tools, home appliances etc., thus it is becoming increasingly important to accurately predict the behavior of bolted joints. The tightening of bolted joints can be divided into two basic categories, where the screw is utilized either in its elastic or plastic region. Usually stresses are induced around the thread root while tightening of the bolted joints. It causes the plastic deformations primarily around the bottom of thread roots even under relatively low axial bolt force. This plastic deformation can significantly affect the behavior of bolted joint. Meanwhile, plastic region tightening allows a bolt to be tightened beyond its yield point. In present study an attempt is made to understand the behavior of the bolted joints and the stress concentration factor when loaded statically with uni-axial external loads. Linear finite element analysis method is used to determine the stress concentration factor of the threads in bolted connection.