ANSYS - Plate with a Hole (Results-Interpretation)

Author: Benjamin Mullen, Cornell University

Plate with a Hole (Results-Interpretation)

Created using ANSYS 13.0

Problem Specification

Consider the classic example of a small circular hole in a rectangular plate of constant thickness subjected to an in-plane tensile load. The material is structural steel with a Young's Modulus of 29E6 psi and a Poisson ratio of 0.3. The geometric dimensions and applied tensile load are shown below.

P = 1e6 psi
a = .5 inches
w = 5 inches
L = 10 inches
t = thickness = .2 inches
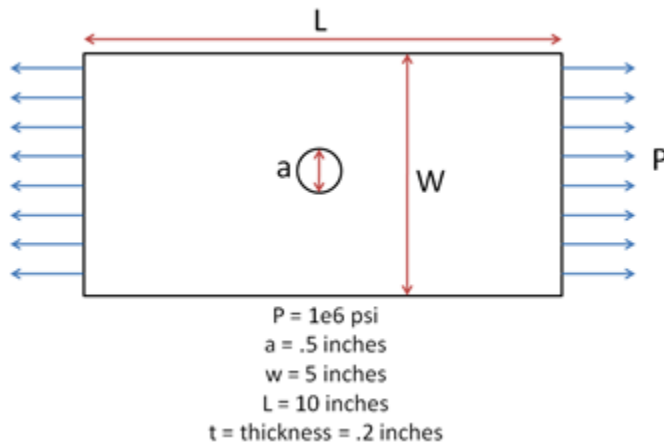
Click here for an enlarged image

In this exercise, you are presented with the numerical solution to the above problem obtained from finite-element analysis (FEA) using ANSYS software. Compare FEA results for the stress distribution presented to you with the corresponding analytical solution for an infinite plate (there is no analytical solution for a *finite* plate). Justify agreements and discrepancies between the two approaches (FEA vs. Analytical).

Note that you will be using the ANSYS solution presented to you to explore the physics of the problem. You will be downloading the ANSYS solution prepared for you. The objective is to help you learn important fundamentals of mechanics through the interactive, visual interface provided by ANSYS. You will *not* be obtaining the FEA solution using ANSYS; there are other tutorials to help you learn this.

Go to Step 1: Pre-Analysis & Start-Up

Go to all ANSYS Learning Modules