

Q: What is the difference between plane strain approximation and plane stress approximation in 2D analysis?

A: Plane Strain Approximation

Plane strain approximation assumes the strain in the depth direction of the model is zero for 2D analysis. It is effective where the dimension in the depth direction is sufficiently large.

The analysis subject that is fixed in the depth direction, or Y direction, is analyzed on the assumption that displacement will not occur in the depth direction. The component of strain in the depth direction shall be zero and only the components of strain in-plane, or in the XZ direction, are taken into account.

Plane Stress Approximation

Plane stress approximation assumes the stress in the depth direction of the model is zero for 2D analysis. It is effective where the dimension in the depth direction is small.

The analysis subject of which depth dimension, or the thickness in the Y direction, is sufficiently smaller than its in-plane dimensions, or the dimensions in the XZ direction, is analyzed on the assumption that the subject can freely deform in the depth direction. The component of stress in the depth direction shall be zero and only the components of stress in-plane, or in the XZ direction, are taken into account.