

HOLE DRILLING METHOD

Technical summary:

Hole drilling is a method for determination of near-surface residual stress in a material. The method can be applied to quantify the average residual stress over the depth of the hole (appx. 1.0 mm) or incremental hole drilling can be performed to determine the distribution of residual stress versus depth from the surface. Hole drilling is a common method for measurement of residual stress that can be applied under a variety of circumstances.

Hole drilling is based on the principle that residual stress causes a body to deform when it is cut, and drilling a hole into a body while measuring its deformation (strain gages) allows calculation of the initial (pre-cut) residual stress distribution.

Residual stress is determined from the measured strain versus depth data through an elastic inverse solution based on the principles of elasticity. Hole drilling is standardized by ASTM under E837.

Hill Engineering has a reputation for providing high-quality residual stress measurement data suitable for engineering analysis. Our in-house laboratory performs residual stress measurements using a variety of techniques to meet the needs of industry. Custom approaches can be developed for complex applications.

Hole-drilling is useful for:

- Near-surface residual stress determination (to approximately 0.080" or 2.0 mm)
- Determination of multiple stress components (and principal stresses)
- Parts with large or complex geometry
- Applications requiring in-field measurements using portable equipment
- Applications requiring rapid turn time

