INTRINSIC STRENGTH MODULE

Required for safety factor/infinite life/fatigue limit analysis

Recommended for cases with fatigue life longer than 10⁶ cycles

This module measures the material's intrinsic strength - the minimum

energy release rate required to produce crack growth. Operation below this limit does not supply sufficient energy to grow a crack so the intrinsic strength is also called the endurance limit. Use this module when the material is expected to serve for a very large number of cycles.

Experiment Overview

- cutting force vs. strain, minimum 3 strain levels
- number of slabs needed for test: 3

Analysis and Reporting / Deliverables

- cutting vs. tearing curve
- cutting energy vs. strain curve
- intrinsic strength To





Use with

Safe-life safety

factor analysis Lake Lindley Law

The intrinsic strength minimizes the sum of the tearing and cutting energies.

0.05

Strain

 $T_0 = min(T(\varepsilon) + F(\varepsilon))$

0.06

0.07

0.08

0.09

0.1

The intrinsic strength is the lower bound of the fatigue crack growth rate curve.

FPM-IS

1500

1000

500

0.01

0.02

0.03

0.04

Tearing + Cutting Energy J/m²

Intrinsic Strength Module completed at lab ambient temperature (23°C)

Subject material

Subject fit

\$2,445