FRACTURE AND CRACK GROWTH

BEASY's Fracture & Crack Growth (FCG) software enables engineers to quickly develop highly accurate fracture mechanics models based on the actual structural component. This software is used by engineers engaged in damage-tolerant design assessments, to determine accurate stress intensity factor (SIF) solutions and to simulate 3D crack growth. The BEASY SIF toolbox provides an interactive graphical user interface enabling engineers to automatically insert, into models, parametrically controllable crack shapes. Our easy-to-use crack definition process supports the setup and launch of a FCG simulation using the BEASY Crack Growth toolset, yielding critical data on crack growth rates in addition to automatically determining the crack growth shapes and paths.

APPLICATIONS AND BENEFITS

- Critical flaw assessment in aircraft, ships, pressure vessels, storage tanks, pipelines, and other structures
- Damage Tolerant Design (DTA)
- Fracture mechanics assessments for Structural Life Extension Programs (SLEP)
- Determining critical fracture data to support inspection and maintenance scheduling.
- Virtual Fracture Testing
- Assessment of allowable defects sizes during manufacturing
- BEASY's powerful boundary element solver accurately determines multi-point SIF solutions along the entire crack front

- Uses a mixed mode stress intensity factor solution (KI, KII, KIII) to simulate accurate, nonplanar, crack shape evolution (not restricted to Mode 1 solutions)
- Predict SIFs and fatigue crack growth under complex multiaxial loading
- Support for multiple cracks and coplanar crack coalescence.
- User-defined, arbitrary crack shapes, can be stored in the Crack Management Library and used in structural models
- Crack growth in residual stress fields is supported Reuse of existing FEA models (ABAQUS, ANSYS, NASTRAN) to create the specialist BEASY models and loading

FRACTURE MECHANICS SOLVER

BEASY utilizes a multi-threaded, dual boundary element solver, with parallel processing capability to solve computational fracture mechanics problems. This technology more accurately represents the near singular stress fields that occur near the crack front. BEASY's surface only meshing is efficient for crack modelling and integrates well, with automatic meshing routines used to advance cracks in structural models. The software provides an interface to existing FEA solutions, allowing automatic creation of the BEASY model from FEA input or result files.

BEASY supports both 2D and 3D crack growth simulations. Crack growth directions and rate are computed at discrete locations along the crack front. Crack grow direction is predicted using computed SIF values. Load spectrum data can be generated using a number of supported industry formats including block spectrum, sequential, multi-axial, and others. A variety of crack growth relationships (Paris, NASGRO, AFRGROW, etc) are also available to compute da/dN rates. In addition an add software is available to allow the use of BEASY crack growth results to be used within AFGROW.