

FRANC3D Training Workshop: Part 7

Static Crack Analysis & SIF Computation

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Workshop Agenda

- Part 1: Introduction to Fatigue and Damage Tolerance
- Part 2: Introduction to Fracture Mechanics Analysis
- Part 3: Introduction to FRANC3D
- Part 4: FRANC3D User Interface
- Part 5: Finite Element (FE) Model Import
- Part 6: Crack Insertion
- **Part 7: Static Crack Analysis & SIF Computation**
- Part 8: SIFs from FE Analysis
- Part 9: Crack Growth
- Part 10: SIF History & Fatigue Life
- Part 11: Miscellaneous Topics

Demo/Hands On (Homework): Static Crack Analysis and SIF Computations

FRANC3D Documentation

Download & Install
Instructions

Brochure

Reference Manual

Tutorial for ABAQUS Users

Tutorial for ANSYS Users

Tutorial for NASTRAN Users

Tutorial for SIERRA Users

Tutorials 2-14

User's Guide

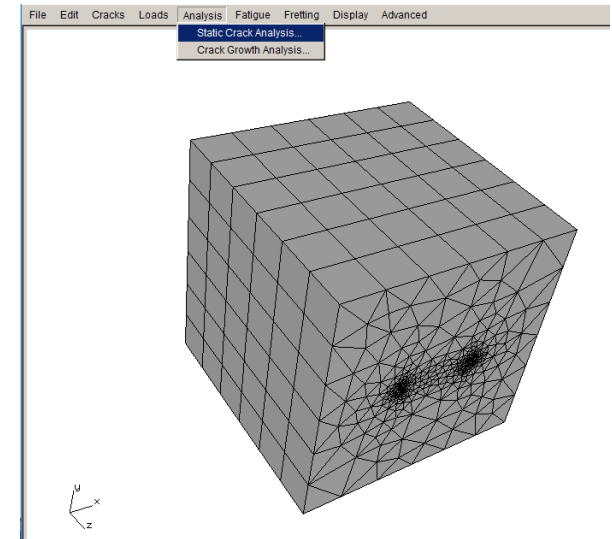
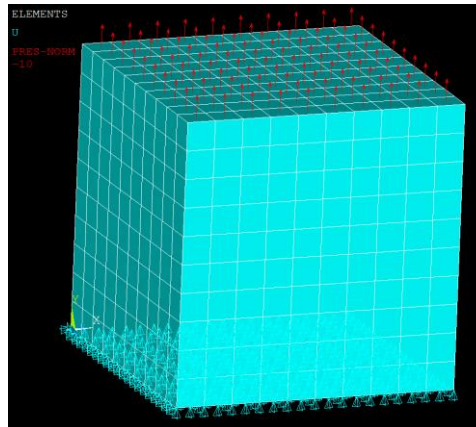
Command Line & Python
Interface

Benchmark Reference

Training Slides

Download Files

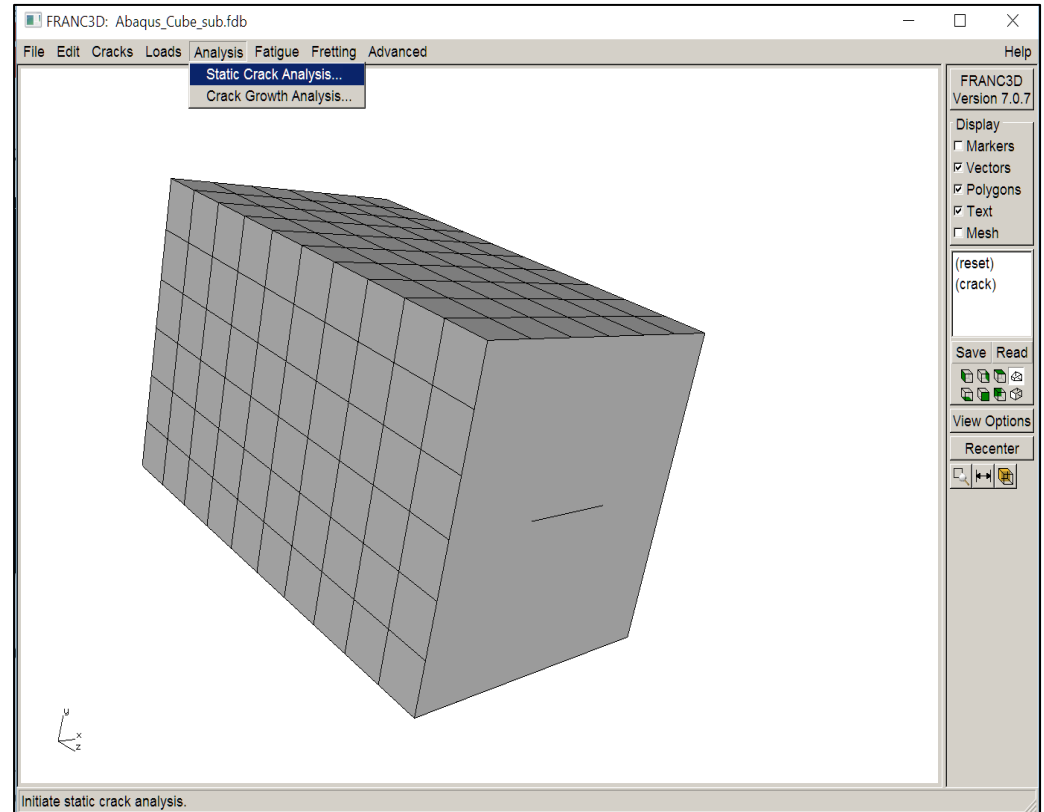
Tutorial #1: Crack Insertion and Growth in a Cube



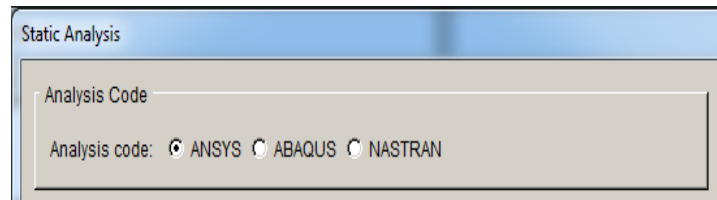
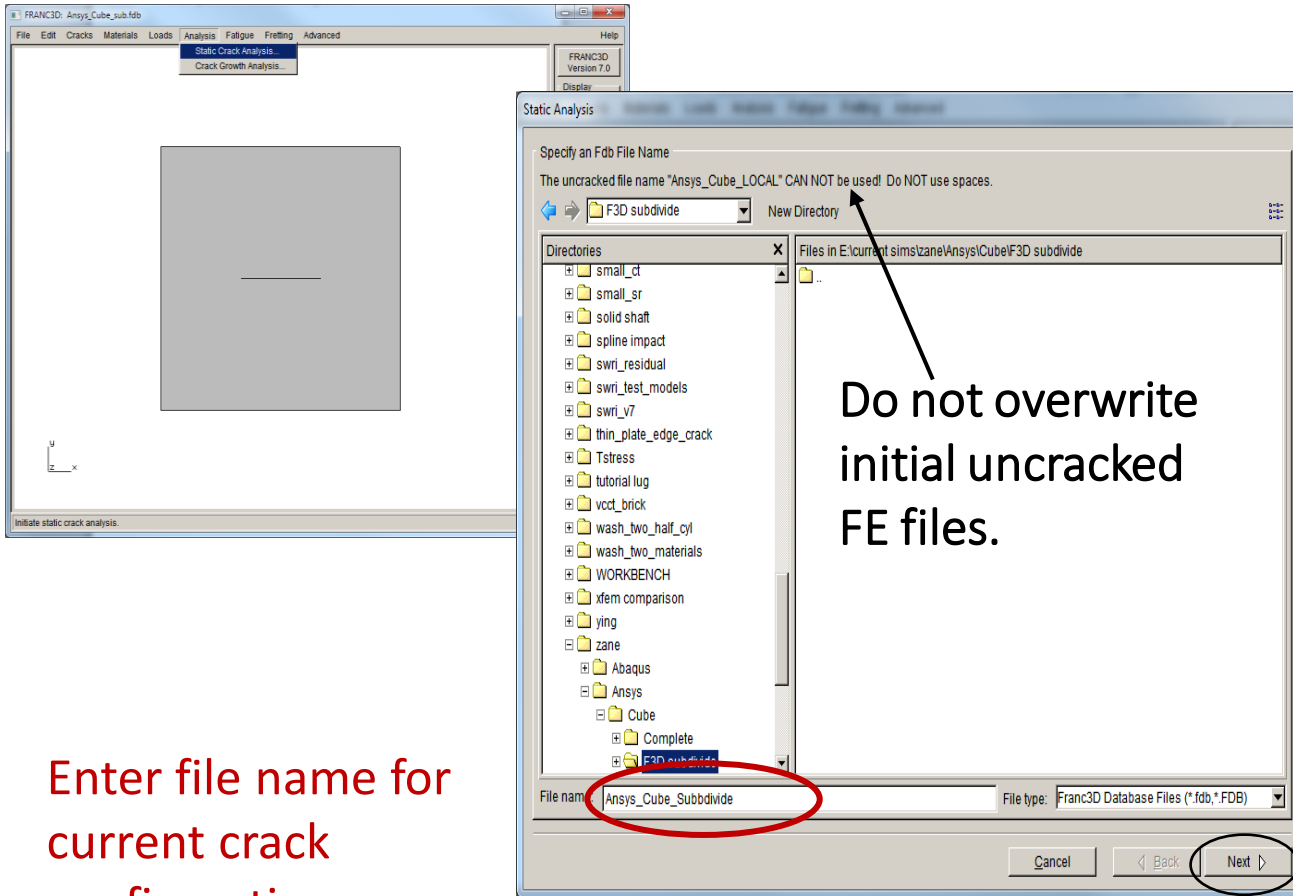
<http://www.fracanalysis.com/software.html>

Static Crack Analysis

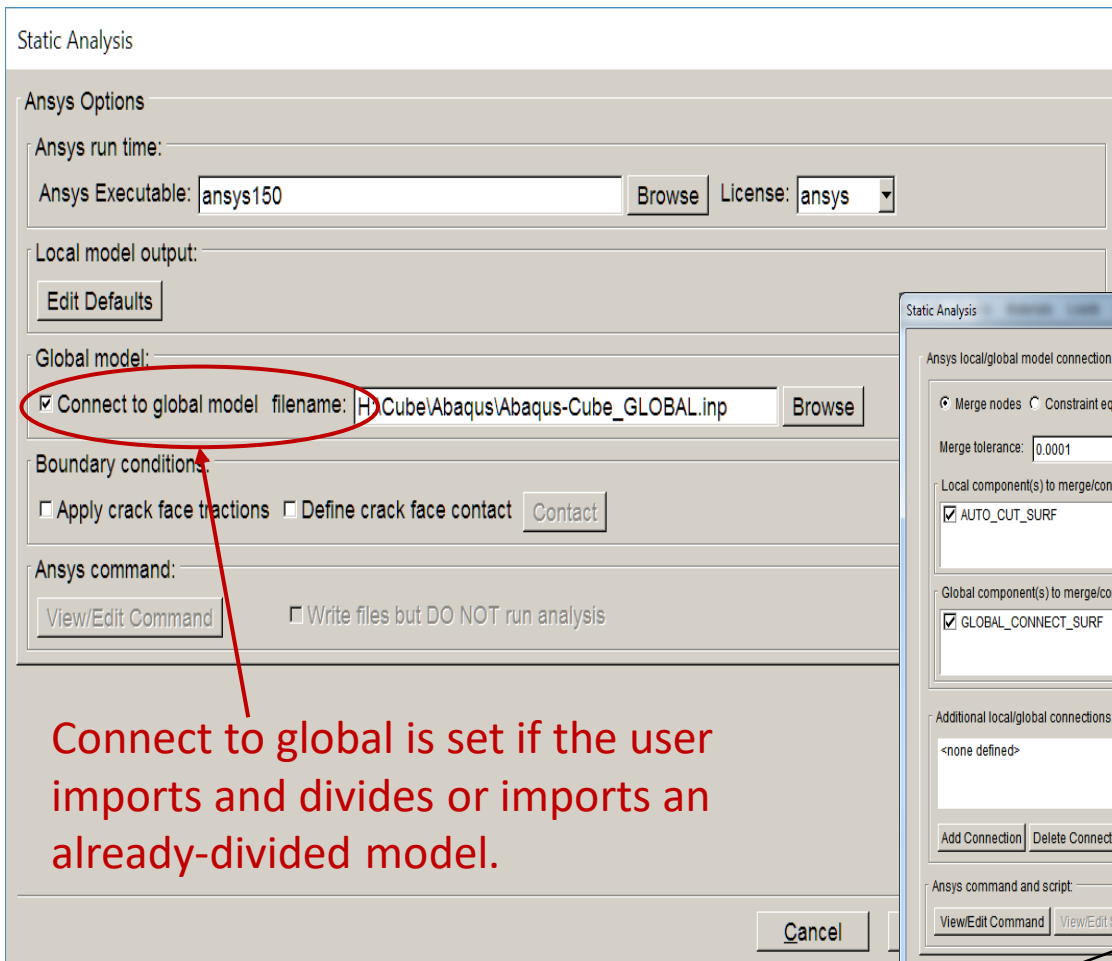
- Perform the FE analysis of current crack configuration to get displacement (and other) results to compute SIFs



Static Crack Analysis



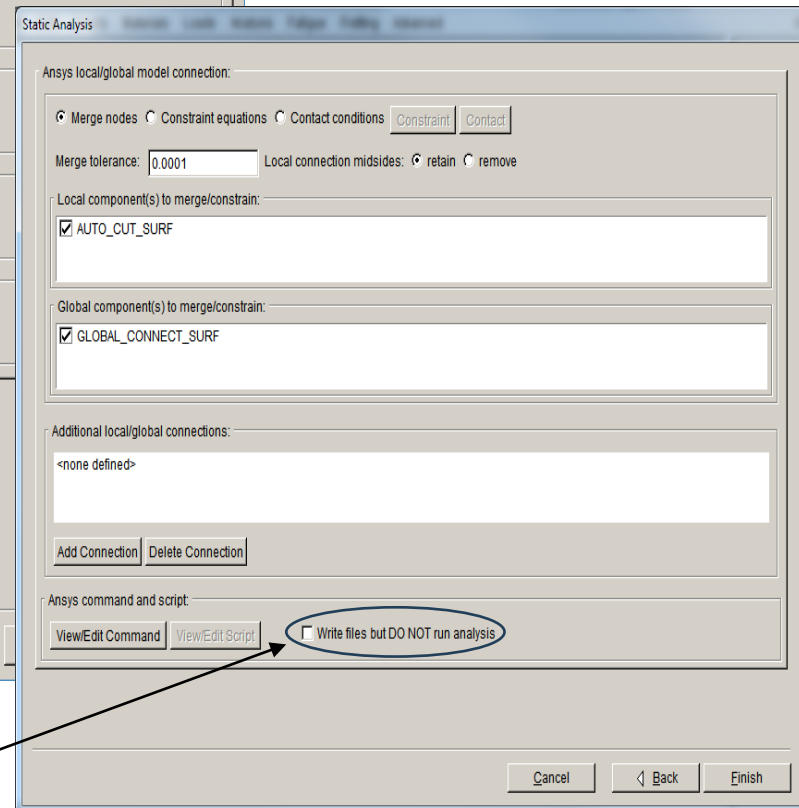
Static Crack Analysis



Connect to global is set if the user imports and divides or imports an already-divided model.

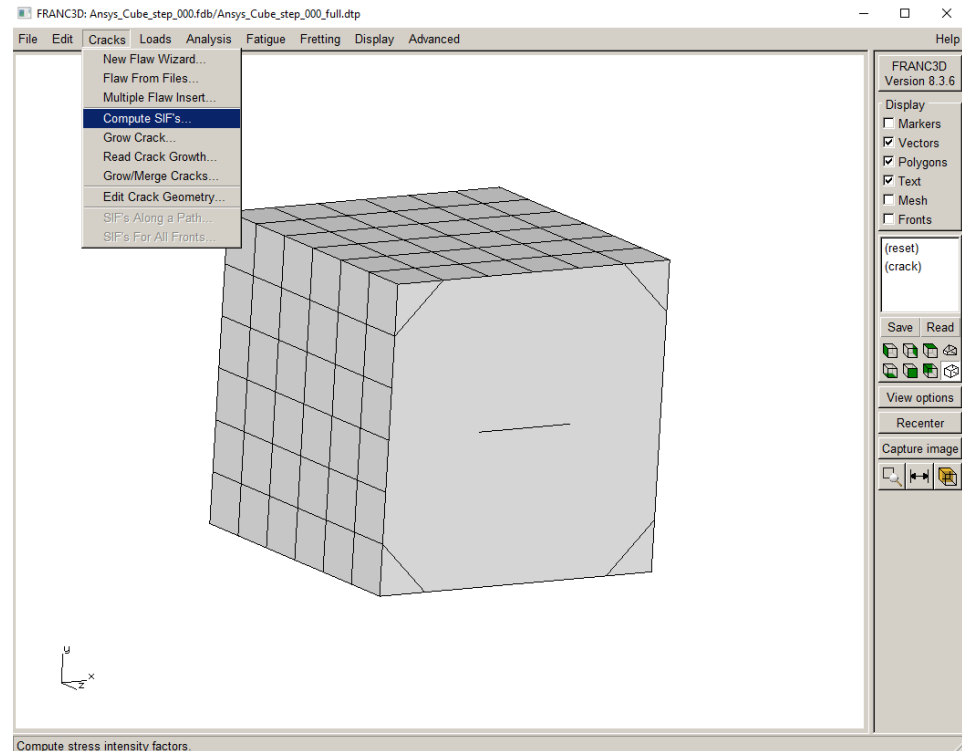
Write files but Do Not run if you need to run analysis on a different computer.

Executable (and license info) should be pre-set using **Edit - Preferences**.



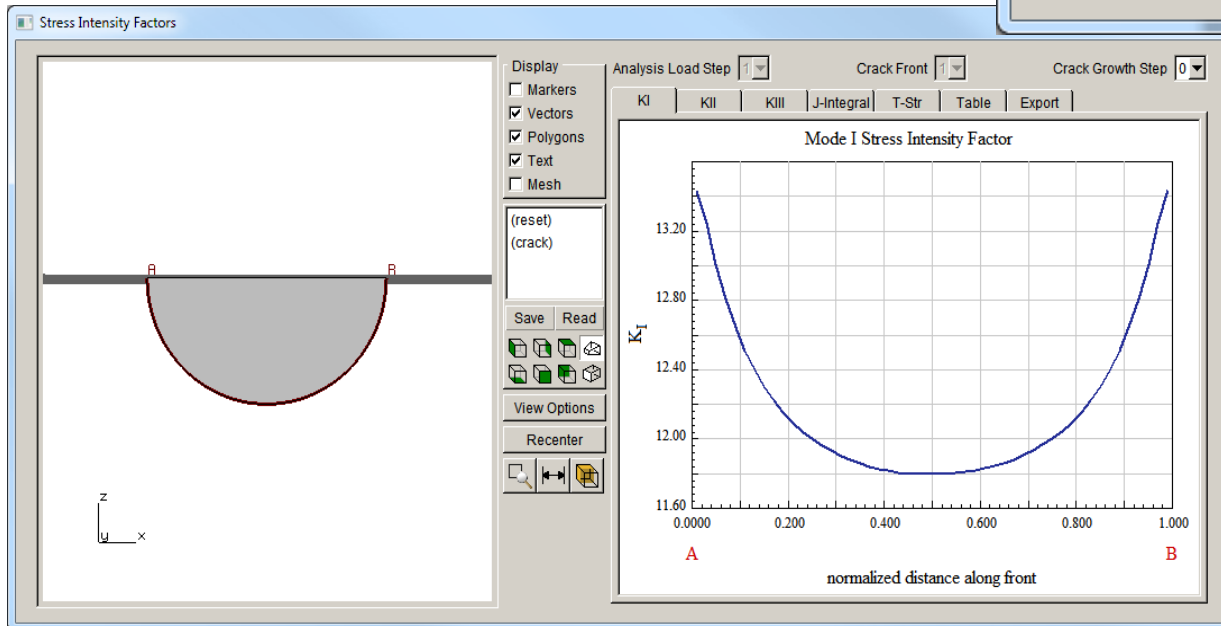
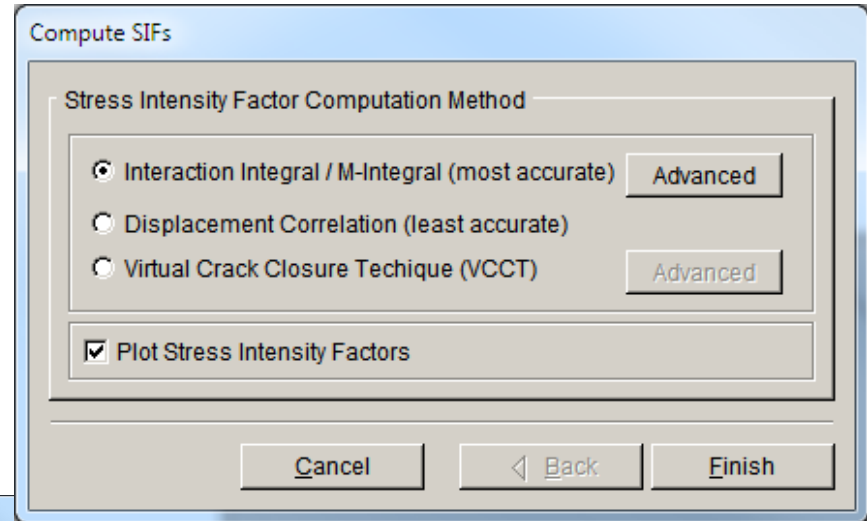
Compute SIFs

- If the FE analysis ran successfully, the Compute SIFs menu option will be active



Computing SIFs

- M-Integral is the default method
- Thermal and crack face traction terms will be used if needed (see **Advanced**)
- Displacement correlation can be used to verify the M-integral extra terms are included correctly
- Virtual Crack Closure – for cracks in bi-material interfaces



Plot SIF modes.

Export SIF data.

Switch between load steps, crack fronts, and steps of growth.

SIF Computation from FE Analysis Described in Part 8

(along with more description of the FRANC3D Compute SIFs dialog)

End Part 7