

Material deformation and rupture analysis uses ANSYS finite element analysis with material models that represent basic material property data, as illustrated in Figure 1.

ANSYS has several resident routines that enable simple models of small-scale yielding and creep. Material properties that are used with these resident routines must be matched to the specific material being used in the component. This data is often available in public or commercial databases. In its simplest form, a model can be constructed from the Ultimate Tensile Strength or Yield Strength and ductility of the material, but greater accuracy is achieved if the complete stress-strain curve is modeled.

More complex material models are needed for large scale inelasticity, combined void formation and combined yielding and creep, or inelasticity during changing temperatures. Additional complexity is needed if the evolution of damage or microstructural change is desired. CAE Associates has broad experience in modeling these more complex behaviors by developing sub-routines that are integrated with ANSYS.

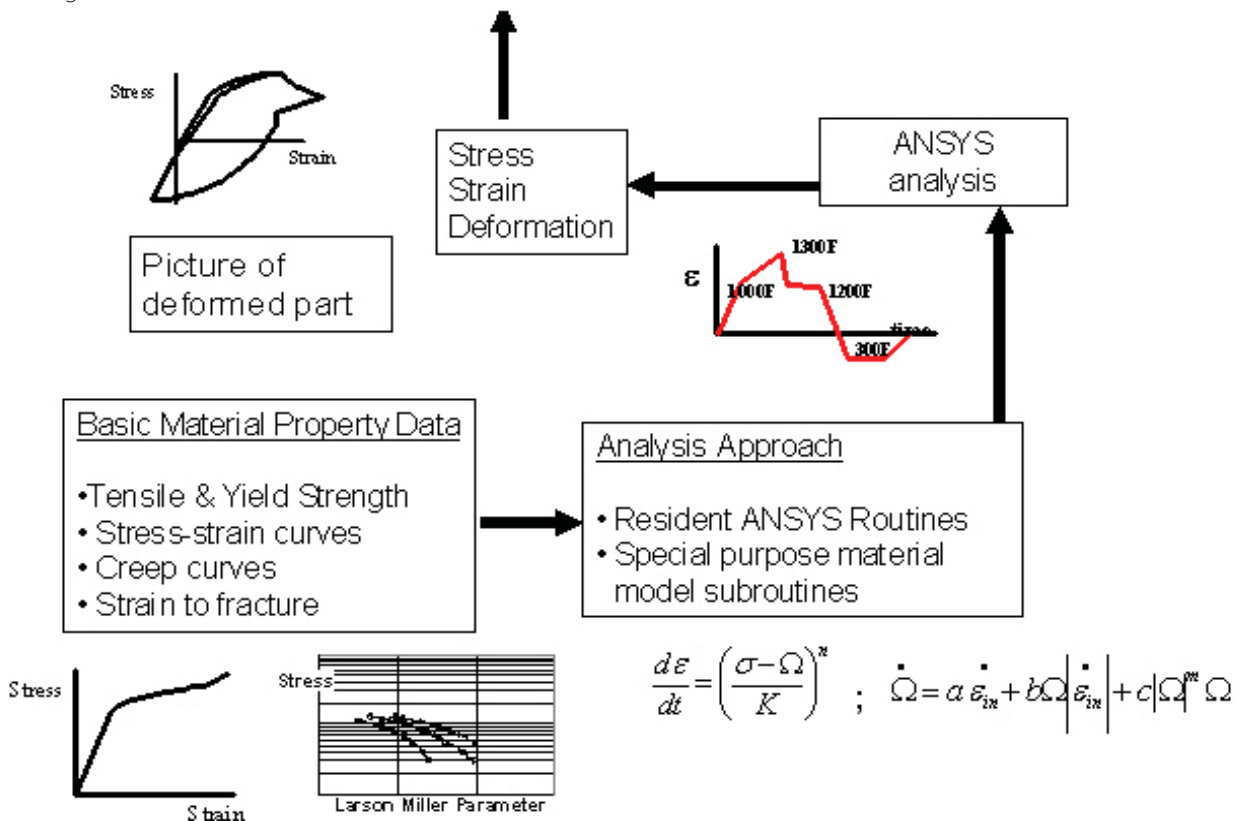


Figure 1. Elements of a deformation and rupture analysis.