Weld Life Estimate

- Two methods were employed
  - Historical method – International Truck and Engine, Truck Division
  - Structural Stress approach developed by the Weld Joint Industry Program at Battelle Labs
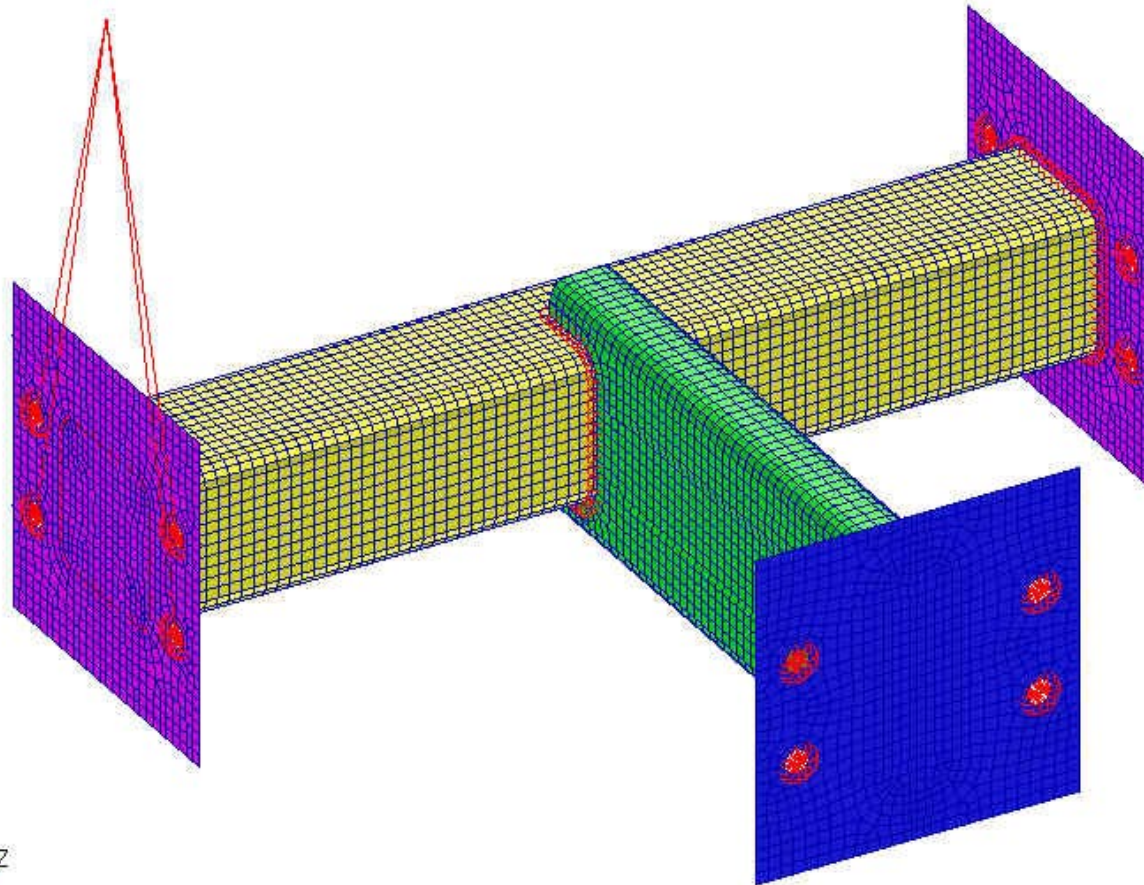
Historical Method

- Weld is modeled as a rigid (RBE2)
- Stress at base elements
- Non-averaged centroidal value
- K_f is historically based
- Method is known to be growing more conservative over time (mesh density increases)

Historical Method - Model

Historical Method - Stress
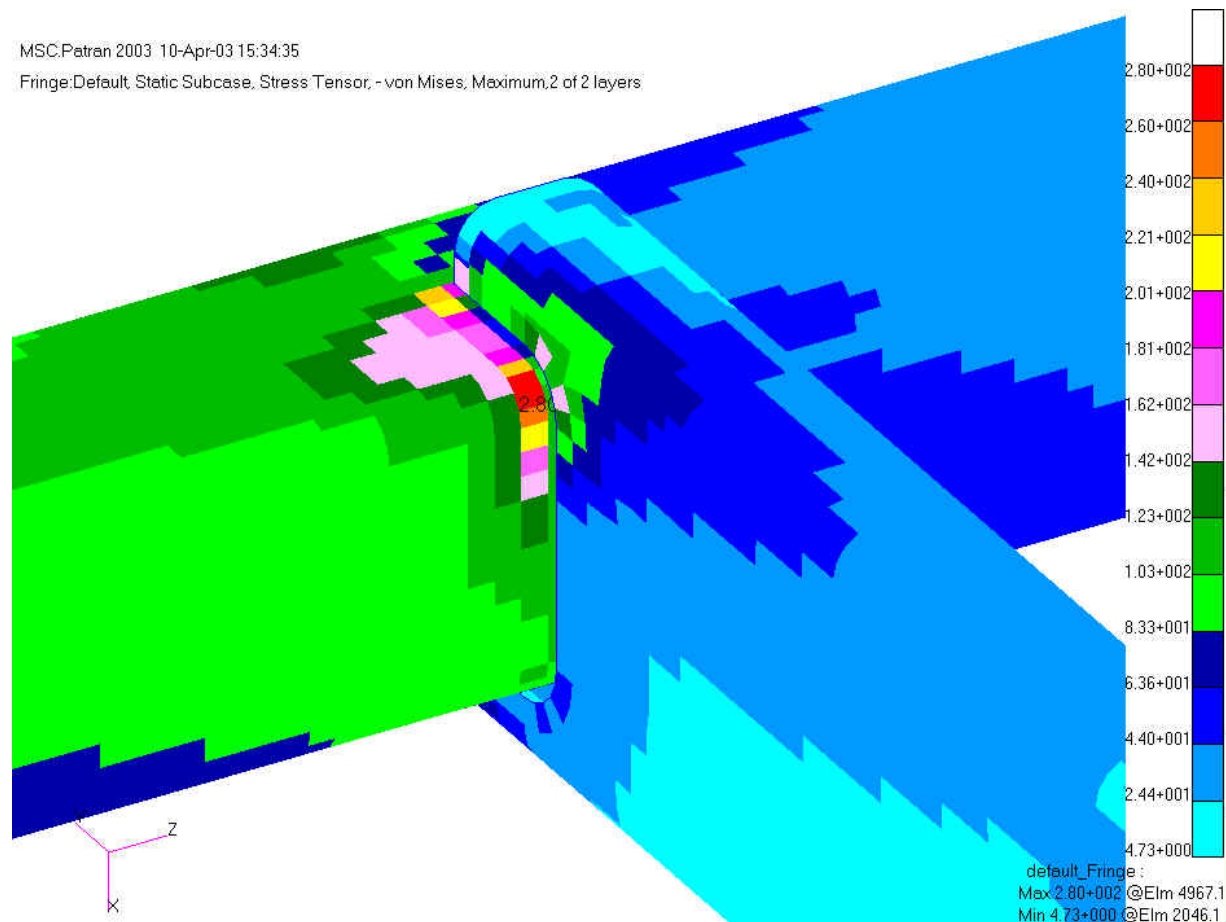
Historical Method - Results

- Peak stress (linear FEA) = 280 Mpa

- R = -1   7,500 cycles

- R = 0   429,000 cycles

Structural Stress Method

Reasons International is pursuing this

- Mesh insensitive

- Can distinguish between one-sided and two sided welds, as well as weld ends
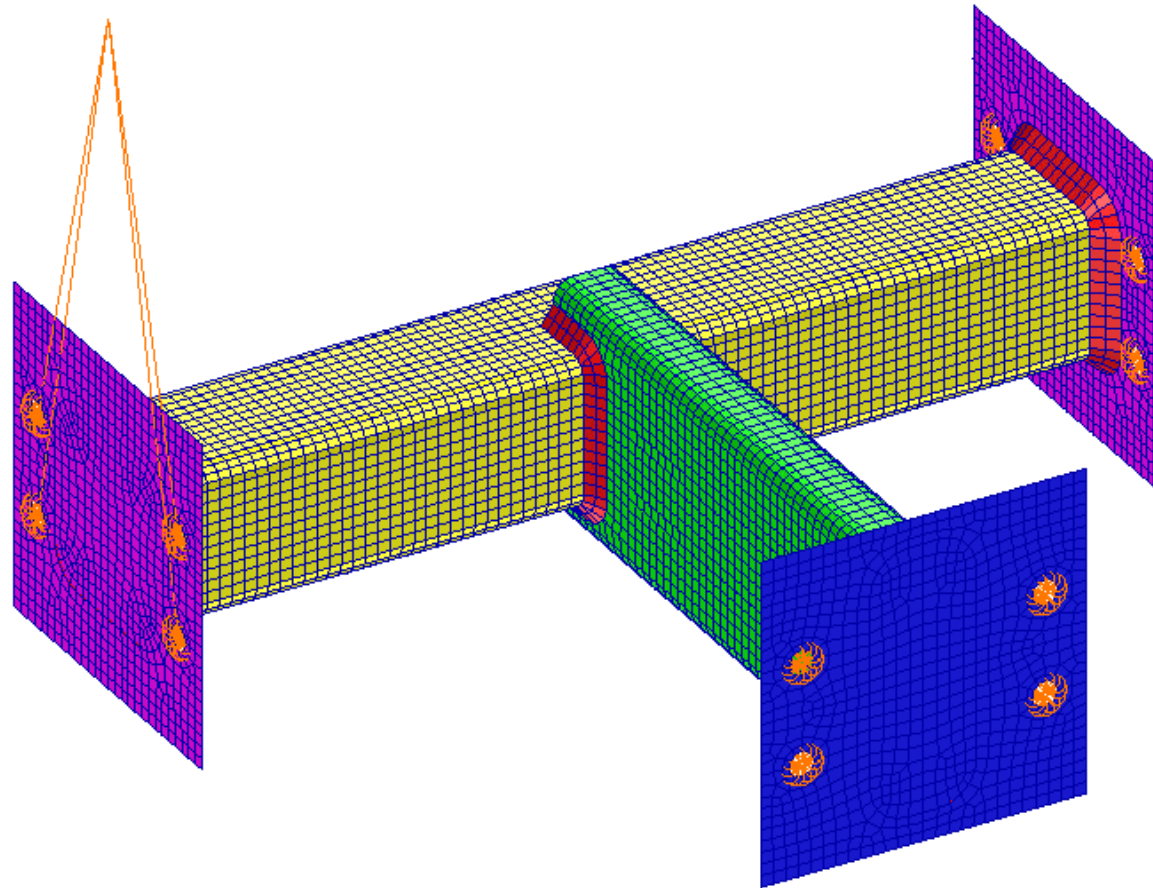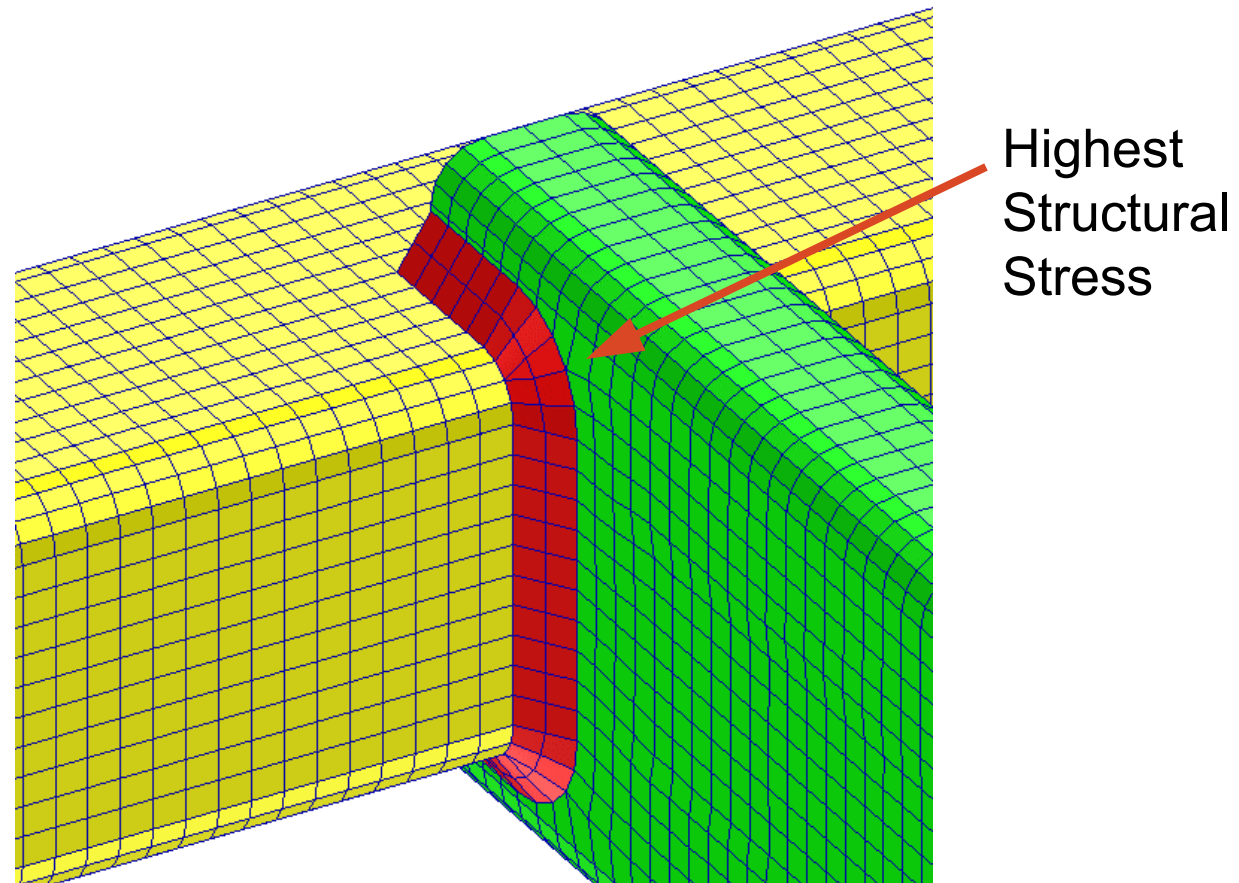
Structural Stress - Model

Structural Stress - Results
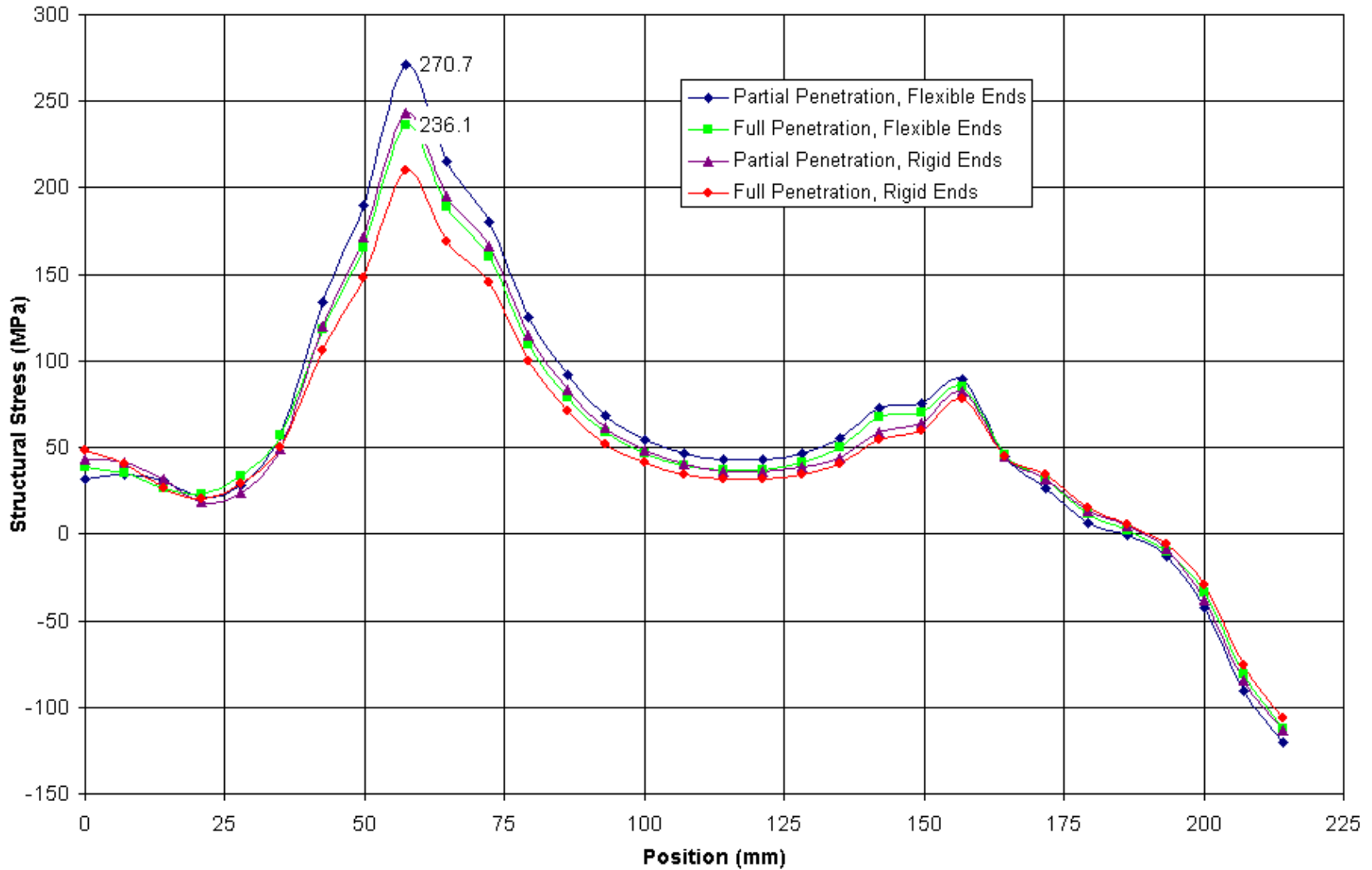
Highest Structural Stress

Weld toe on 2x6

Weld toe on 4x4
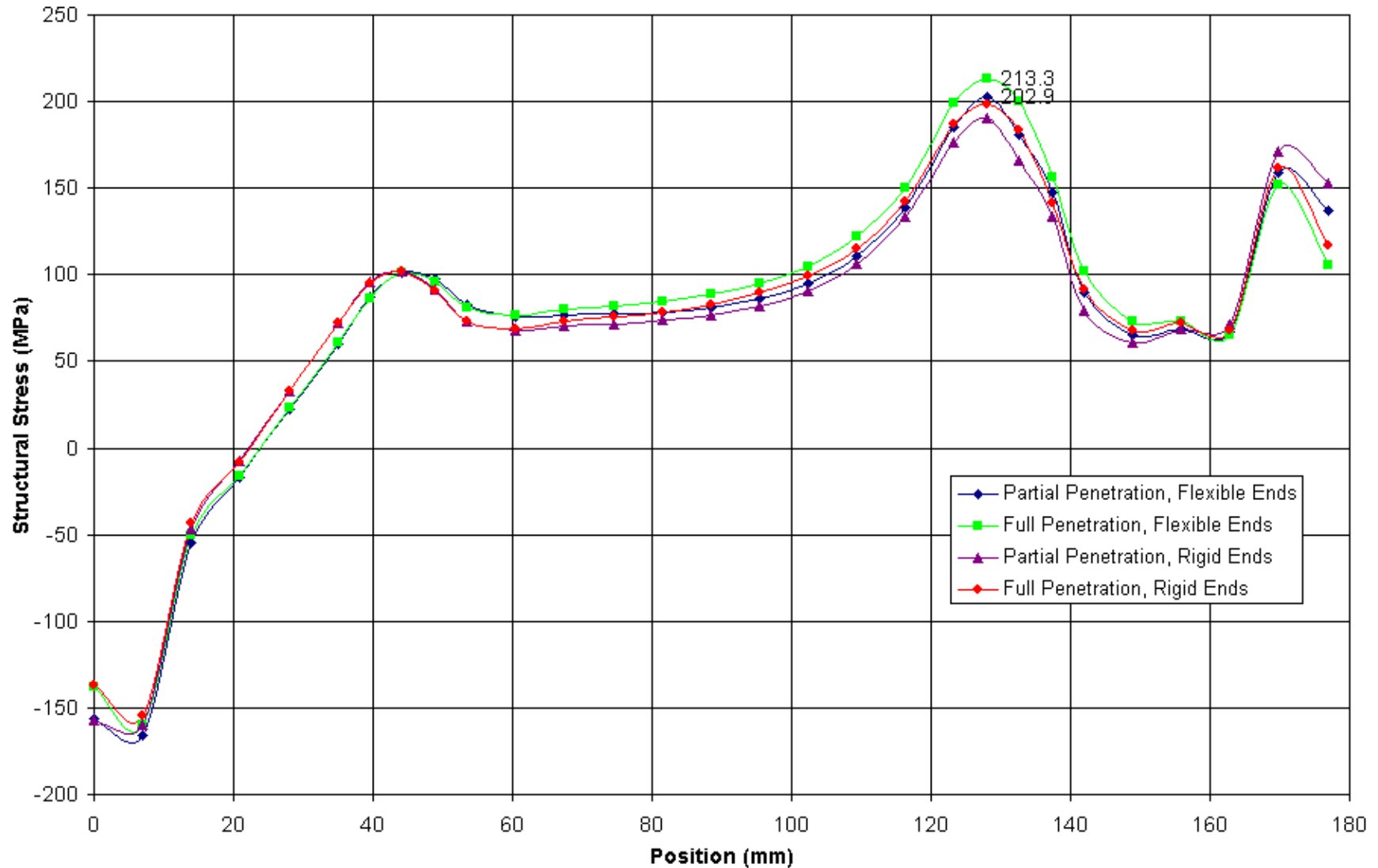
Structural Stress - Results

Life Estimates based on Structural Stress

- Partial Penetration
  - R = -1   35,000 cycles
  - R = 0   241,000 cycles
- Full Penetration
  - R = -1   51,000 cycles
  - R = 0   353,000 cycles