Explicit Integration: Abaqus

A fixed beam subjected to a pulse load distributed uniformly on top surface.

Length – 3000mm

Cross section – 400*400mm

Reinforcement – Longitudinal: 4 bars (2 each on top and bot) of 20mm; Transverse: 10mm@50mm c/c

Concrete: M30 (Target compressive strength - 38MPa, Tensile strength - 3.88MPa), E = 27.8GPa, poisson = 0.2, Density = 2500 kg/m^3

Steel: Fe500 (Yield = 500MPa), E = 200GPa, poisson = 0.25

Damping = 5% for concrete

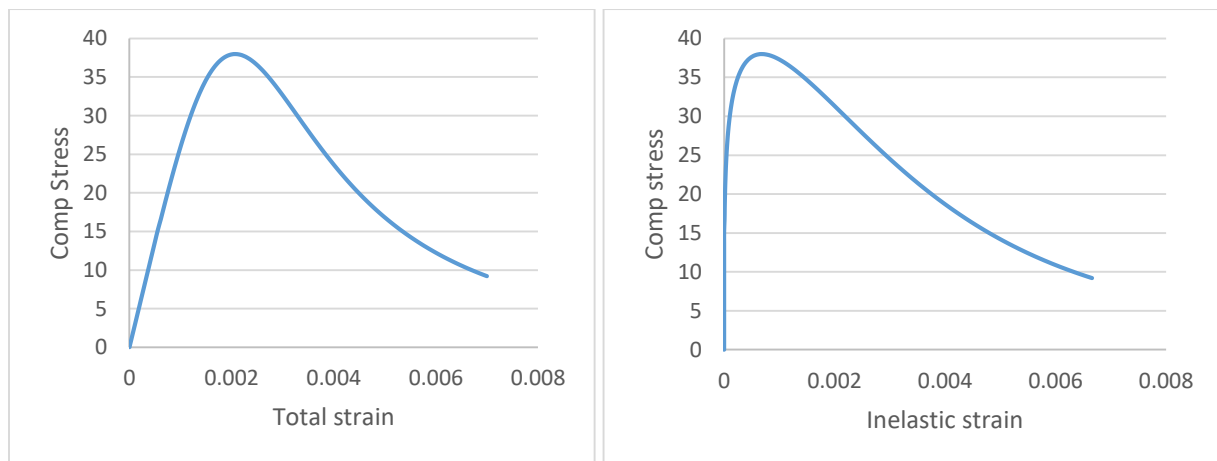Material models: CDP for concrete, Elastic-perfect plastic for steel reinforcement

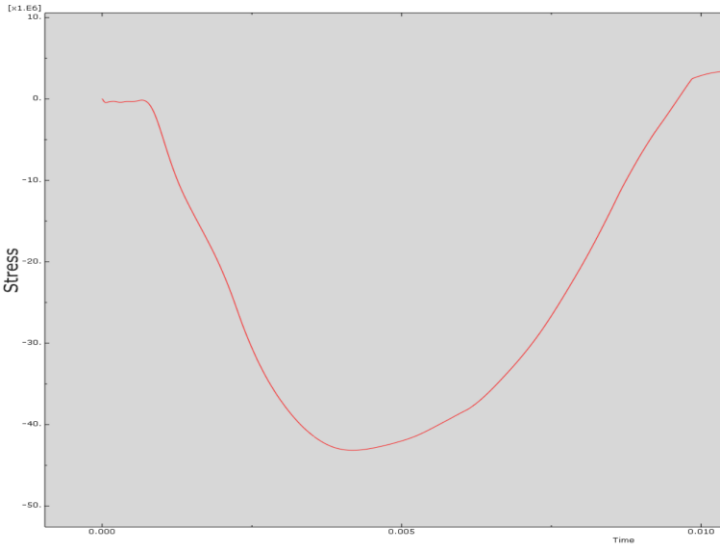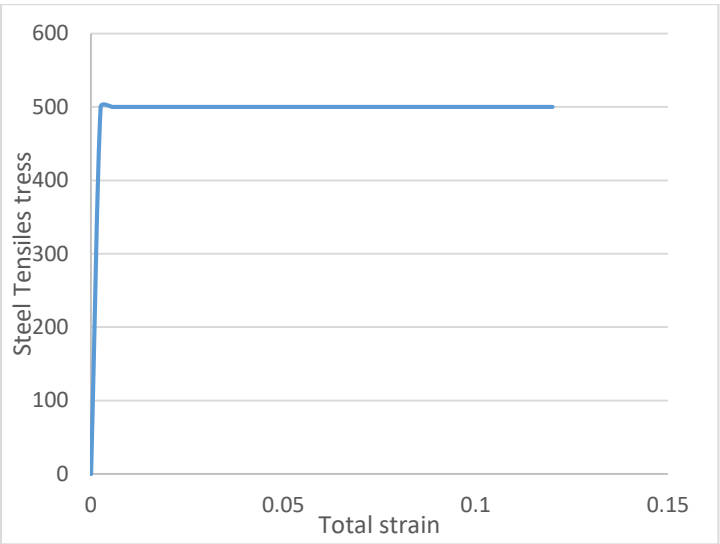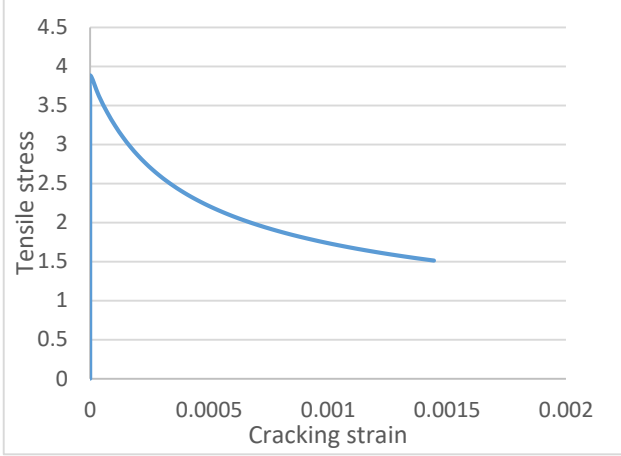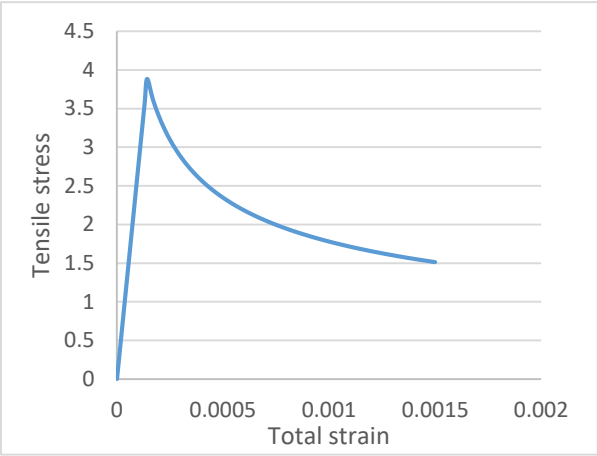Constraint: Reinforcement EMBEDDED in concrete

Mesh size = 100mm (Uniform), Element type = C3D8R for concrete, T3D2 for steel.
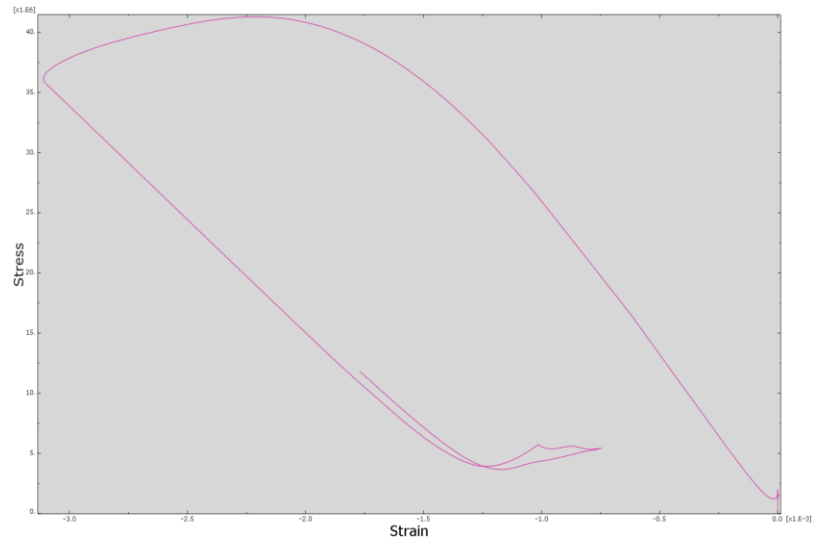
Hourglass control = Viscous

Automatic time stepping followed, with all other default parameters.

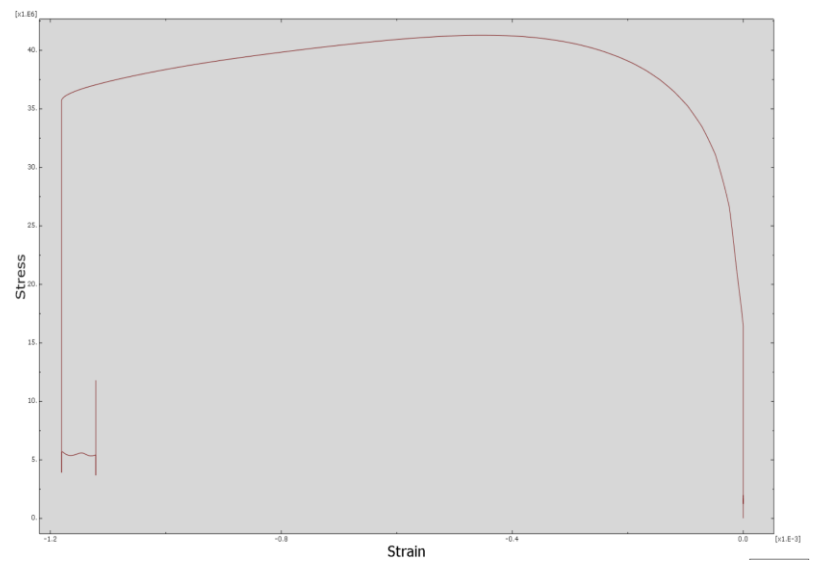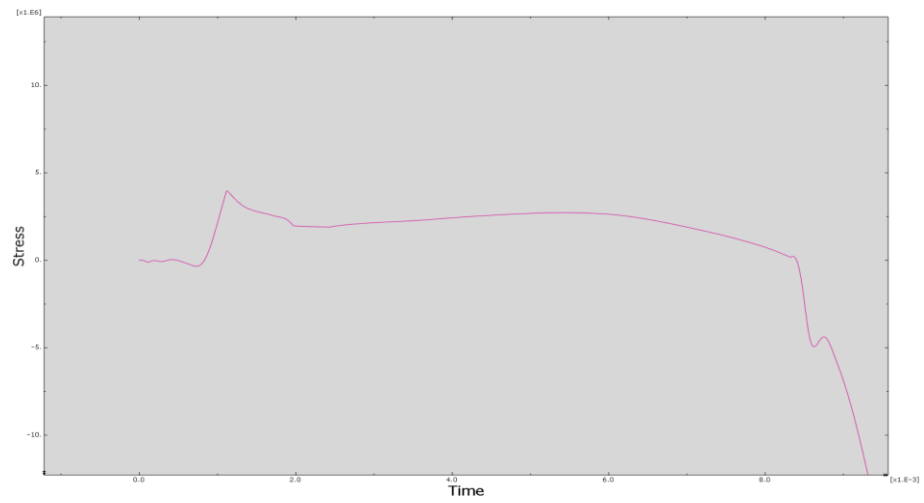CDP material model is attached in other file: Please check the excel sheet.
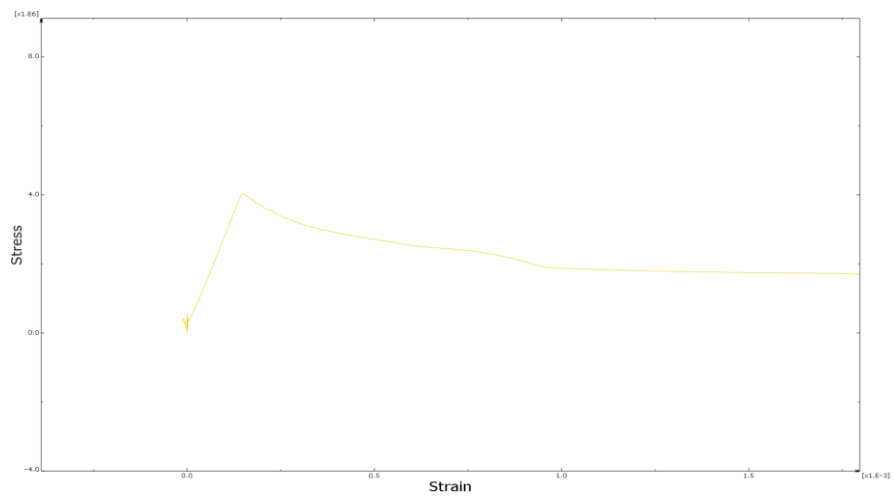
Compression stress vs time

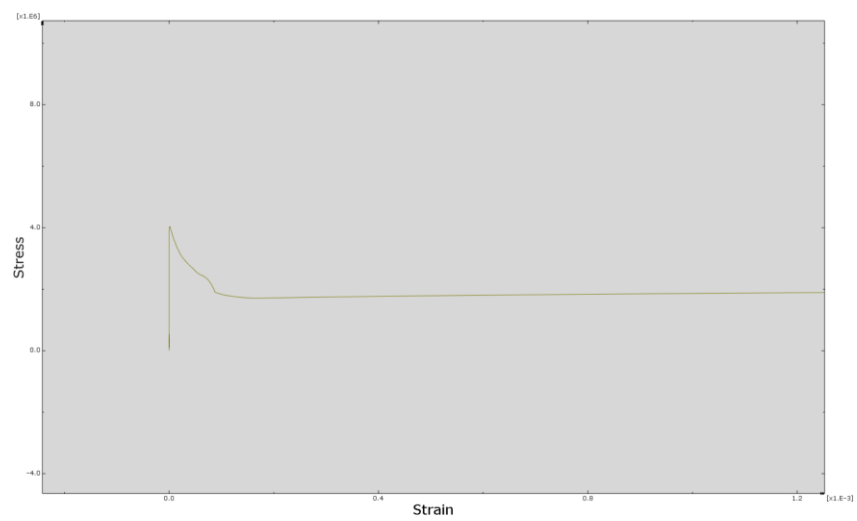Mises stress vs total strain for concrete in compression

Mises stress vs plastic strain for concrete in compression

Compression stress vs time

Mises stress vs total strain for concrete in compression

Mises stress vs plastic strain for concrete in compression