Compression of an Elastic Billet

Problem Description

This is an implementation of an example calculation from [1] in which an elastic billet is compressed by a rigid platen. See Section 5.1 of that manuscript for a complete description of the problem.

Simulation Specifics

Component used: Implicit MPM

Input file name: billet.ups

Command used to run input file: sus billet.ups

Simulation Domain: 40.0 x 21.0 x 0.5 cm

Cell Spacing:
.5 x .5 x .5 cm

Example Runtimes:
10 minutes (1 processor, 3.0 GHz Xeon)

Physical time simulated: 0.2 seconds (50% compression)

Associate scirun network: billet.srn

Results

Figure 1 shows a snapshot of the simulation, at about 25% compression of the billet.

References

[1] J.E. Guilkey and J.A. Weiss. Implicit time integration for the material point method: Quantitative and algorithmic comparisons with the finite element method. *International Journal for Numerical Methods in Engineering*, 57:1323–1338, 2003.

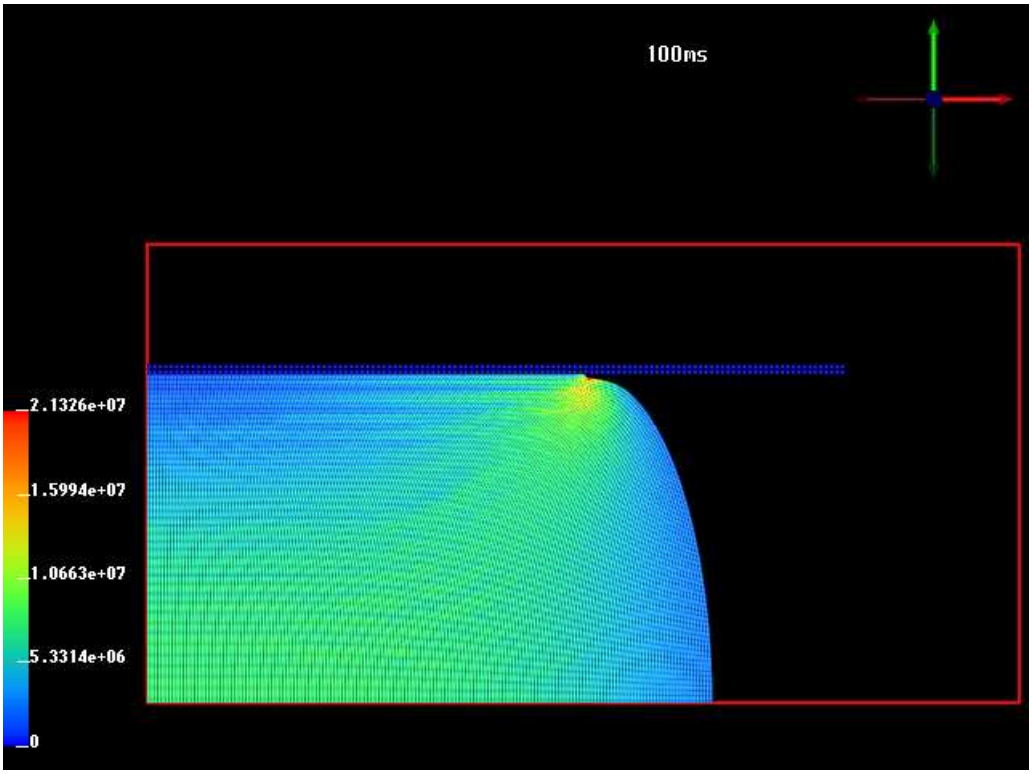

Figure 1: Compression of an elastic billet. Particles are colored according to equivalent stress.