Taylor Impact Test

Problem Description

This is a simulation of an Taylor impact experiment calculation from [1] in a copper cylinder at 718 K that is fired at a rigid anvil at 188 m/s. The copper cylinder has a length of 30 mm and a diameter of 6 mm. The cylinder rebounds from the anvil after 100 μs.

Simulation Specifics

Component used: MPM

Input file name: taylorImpact.ups

Command used to run input file: sus taylorImpact.ups

Simulation Domain: 8 mm x 33 mm x 8 mm

Cell Spacing:
   1/3 mm x 1/3 mm x 1/3 mm (Level 0)

Example Runtimes:
   1 hour 20 min. (1 processor, AMD Opteron 2.2 GHz)

Physical time simulated: 100 μseconds

Associate scirun network: taylorImpact.srn

Results

Figure 1 shows a snapshot of the simulation after the cylinder begins to rebound.

Additional data are available within the uda in the form of "dat" files.

References

[1] W. H. Gust. High impact deformation of metal cylinders at elevated temperatures. *J. Appl. Phys.*, 53(5):3566–3575, 1982.
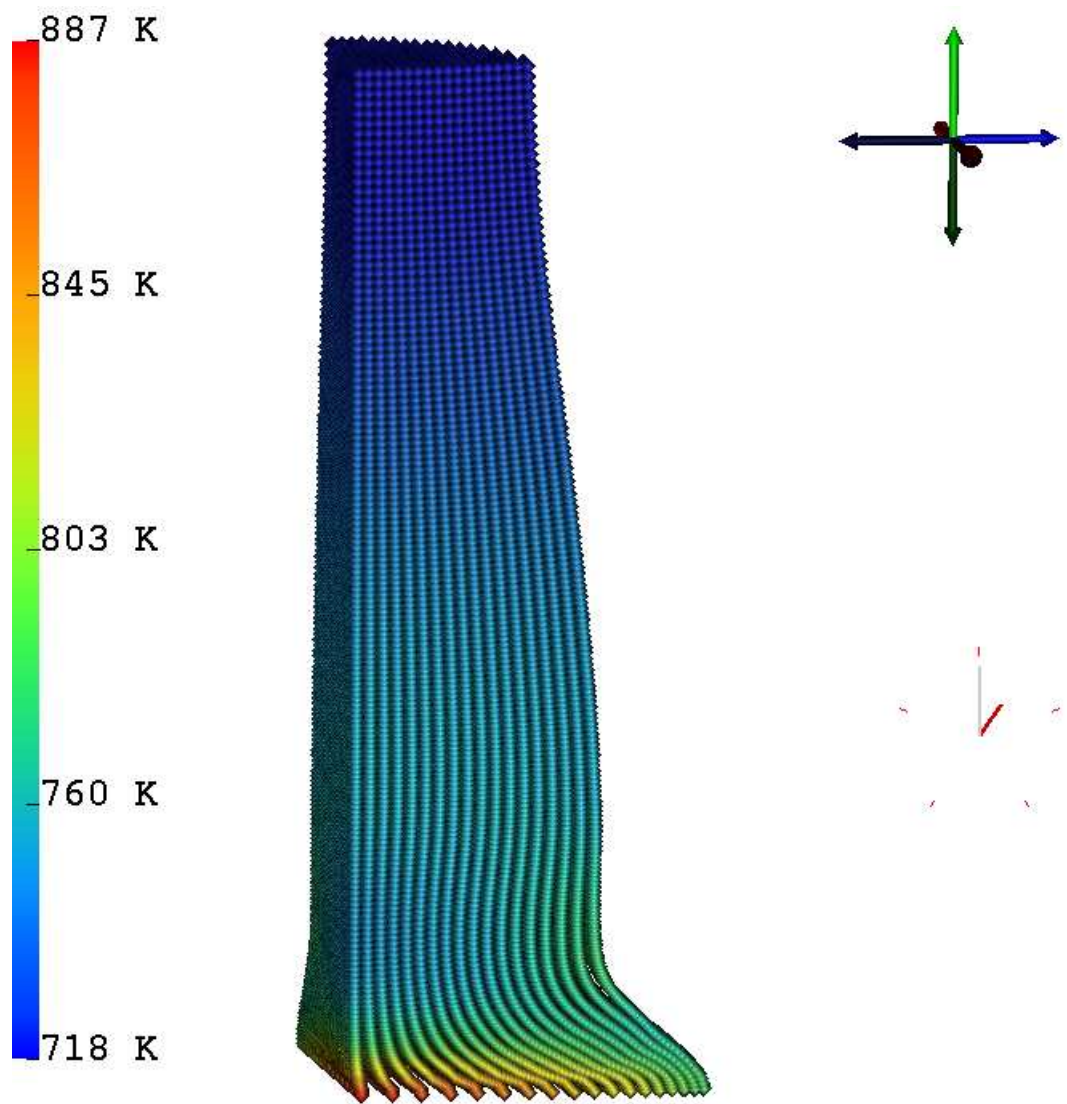
Figure 1: Taylor impact simulation. Particles colored according to temperature.