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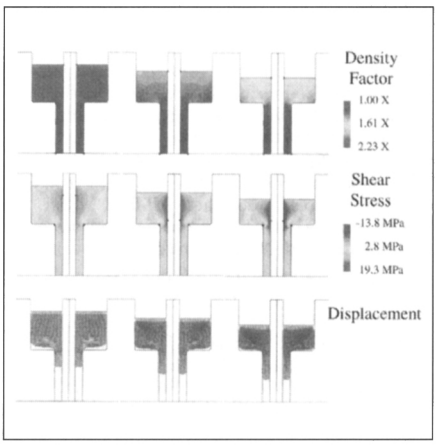
ABSTRACTS

DEPARTMENTS



ON THE COVER: Maps of density gradients, shear stresses, and material displacement predicted for a complex cylindrical-geometry body during uniaxial compaction from the top down. The simulations were completed by J.G. Argüello of Sandia National Laboratories in New Mexico using Sandia's SANTOS, two-dimensional finite-element-method (FEM) code with a cap-plasticity constitutive model. The properties of diatomaceous earth, which were determined using conventional (i.e., soil mechanics) hydrostatic and triaxial compaction tests, were used in the modeling. Die-wall friction, the large aspect ratio (i.e., height/diameter), and the transition radius from the large- to the small-diameter tube restrict material flow during compaction and contribute to nonuniform densification. The FEM results can be used to predict the formation pressing defects, including warping due to density gradients as well as cracking due to large shear stresses and strains between the regions colored blue and green in the shear-stress maps. The densities in the figure are normalized to the initial "die-fill" density of 1. For more information, see the section that begins on page 14.

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