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Flow characteristics in dynamically compacted soft porous materials[1] MICHEL AL CHIDIAC, YIANNIS ANDREOPOULOS, SHELDON WEINBAUM, City College of CUNY — The dynamic behavior of soft compressible porous media undergoing uniform axial compaction was investigated experimentally in our unique cylinder-piston apparatus that has been used successfully in our previous work with snow compaction. Several synthetic porous materials have been tested and characterized under compression time scales below 0.2 sec. Excess pore pressure has been generated during dynamic compaction which is due to the substantial increase in hydraulic resistance that the fluid encounters as it tries to vent from the confining boundaries through the thin compressed layer. The contributions from the solid phase force have been decoupled from those of the air phase by measuring the total force with miniature load cells first and then subtracting the air pressure force measured by pressure transducers. Static strain-stress measurements showed that the axial compression of the solid phase is accompanied by the generation of significant radial stresses at the cylinder wall which introduce frictional force opposing the piston motion. A dramatic reduction in permeability of the porous media has been found with increased compaction. A 50 per cent compression ratio results in a 60 percent decrease in permeability.

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