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One-Dimensional Strain Initiated by Rapid Compaction of a Heterogenous Mixture CULLEN BRAUN, JOHN BORG, Marquette University, MARQUETTE UNIVERSITY TEAM — The aviation industry manufactures brake-pads from a multi-component mixture of copper, iron, silica, graphite, molybdenum-disulfide and tin. The work presented here investigates the possibility of utilizing dynamic compaction in this manufacturing process and compares the end state morphological differences and damage mechanisms between samples prepared by static pressing and sintering or dynamic compaction without sintering. Statically compressed and sintered samples were obtained from a commercial vendor, whereas green samples were prepared at Marquette University in a hydraulic press up to pressures of 0.03 GPa. Dynamically compressed samples were prepared in the one-inch gas gun at Marquette University up to pressures of 0.5 GPa. The end state morphology of all of the samples was investigated using a scanning electron microscope and electron dispersive spectroscopy. From the dynamics experiments a bulk Hugoniot was obtained and used in a numeric investigation of the compaction process. Both bulk and mesoscale simulations were used to not only reproduce the bulk Hugoniot but also to investigate damage mechanisms. It was found that the dynamically compressed samples had large regions of sintered grains with lateral fractures resulting from release.

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