The United States of America’s Military, more specifically the Army, has since the late 1990's had a vested interest in the development of super-lightweight, portable, short-span composite bridge and decking components to replace aging heavy metal-alloy machine driven modular systems. The following study looks at the feasibility of using balsa wood as the structural core material in fiber reinforced polymer (FRP) wrapped hollow-core composites in short-span bridge applications. The balsa provides shear resistance and the FRP the flexural resistance, resulting in extremely high strength-to-weight and strength-to-depth ratios. Several scaled short span specimens were constructed and tested using a variety of fibers and resins. In addition, a calibrated non-linear finite element model (FEM) was developed using data acquired through testing. The following study will show balsa as viable core material in conjunction with FRP in the construction of lightweight short-span portable bridging solutions.

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Approved for distribution by Dr. Kevin Mackie, Committee Chair, on March 2, 2010.

The public is welcome to attend.