Technical Content

It was decided to participate in natural fabric division. After a little research, hemp fabric was chosen. The fabric was purchased in a local Hobby Lobby. In university lab, eight-layer hemp / epoxy component was prepared out of this fabric using vacuum mold and curing cycle provided by resin manufacturer. After tests, the material satisfied expectations so we could start working on design. The main idea was a “sandwich” structure with aluminum core and a truss structure above the roadbed. From stress analysis of the bridge, it was found which members of the bridge are going to be in compression or tension. Since composites perform better in tension, members in compression are design to be larger. The bridge was manufactured in parts: 2 arch-shape truss structure, top and bottom parts of “sandwich”, and a hollow tube. All the parts were made larger than designed and were cut after curing to the designed shape. The components were bonded to each other by Megabond 56 and cured according to manufacturer’s curing cycle. Then, the bridge was painted.

Why sandwich structure?

• The face skins carry the bending stresses to which the beam is subjected
• One face skin in compression, the other is in tension
• Honeycomb core resists the shear loads and increases the stiffness of the structure
• Core provides continuous support to the facing skins to produce a uniformly stiffened panel