



# The Hemp and Bamboo Bicycle

by *Craig Calfee*

This bicycle frame was built to demonstrate the strength of Hemp as a reinforcing fiber and how Bamboo can be used to replace bicycle frame tubing. With all the focus and hype on high-tech bicycle frame materials like Titanium and Carbon Fiber, it's easy to forget that some natural materials can be used in their place.

This frame was designed to be built as a commuting bike, demonstrating that a 3000 pound automobile can be replaced by a 26 pound bicycle built mostly from renewable resources. The frame is stiff and strong, yet weighs only 4 pounds. It also absorbs road vibration, much like an expensive carbon fiber frame.

The material cost of this bicycle frame was about \$30 and that was taken up mainly by the metal parts that hold the rear wheel and front forks. The cost of labor depends on who is building the frame. There are no special tools necessary and the skill is easy to learn. The first step is to make a fixture that will hold the parts in the desired frame geometry. This can be made of wood and some simple hardware. Then you obtain some cured bamboo and cut it to the desired lengths, mitering the ends to fit each other. The bamboo and metal parts are glued and held in the fixture until the glue dries. The frame can then be removed from the fixture for wrapping. The hemp fiber is soaked in epoxy and wrapped around the junctions of the bamboo tubes, much like lashing poles together. After the epoxy is cured, the hemp wrappings

are sanded smooth. The frame should then be sealed with linseed oil or other sealer.

You can spend as little as 10 hours building the frame. I have a frame fixture but spent about 25 hours on it anyway. Most of the time is taken up in finishing, which can be enjoyable work. This method of building bike frames is not suitable for mass production but can be a way of enabling people of crafting an excellent bike that they might otherwise not be able to afford.



*Craig Calfee is the owner of Calfee Design, engaged mainly in building carbon fiber bicycles. He has built frames for such luminaries as Tour de France winner, Greg LeMond and Hawaii Ironman winner, Dave Scott. He can be reached at (408) 430-9201.*