Michigan Tech Seniors Build an Air-Powered Moped

April 15 2010, By Marcia Goodrich

Moped Senior Design team members Andrew Bomstad, Ben Vindedahl, Adam Bieber, Jared Recker and Josh Schmidt

(PhysOrg.com) -- What do you get when you cross a couple of scuba tanks and a 1978 Sachs moped? Ideally, an air-powered two-wheeler to give you a boost up Houghton's hills, backed up by leg power if the air runs out before you get home.

That's the idea behind an air-driven moped developed as a Senior Design project in the Department of Mechanical Engineering-Engineering Mechanics. Advisors James De Clerck, a professor of practice, and graduate student Nick Mastricola lead the five team members: Adam Bieber, Andrew Bomstad, Jared Recker, Joshua Schmidt and Benjamin

Vindedahl. The moped was exhibited at Tech's Undergraduate Expo.

"It's a hybrid between a moped and a bicycle," says Bomstad. Two standard scuba tanks containing 3,000 psi of air are mounted on either side of the rear wheel. The driver can pedal around using the moped's bicycle gears or engage the pressurized air to reach a top speed of about 12 mph on the flat.

The team wanted to build a moped that never needed to stop at a gas station and could be powered by a renewable energy source. However, they noted, just being air-powered doesn't necessarily make it environment-friendly. Powering an air compressor to fill the tanks takes energy, so the moped is only as green as the compressor's power source.

That said, the air-powered moped has a quality that not even a hydrogen-powered vehicle can claim: no emissions other than plain old air. Period. "It would be perfect for getting around in enclosed spaces, like a warehouse," Bomstad says.

While the team members are pleased with their handiwork, they didn't get to build the moped of their dreams. It can only travel about a mile and a half on air power alone, much less than they had hoped. The shortfall is due in part to "overly optimistic estimates of torque requirements" and funding constraints. A little research revealed that using super-light carbon fiber air tanks and the ideal air motor would push their budget well over the limit.

That's OK, says De Clerck. "They learned a lot about the design process; they started with ideal goals and had to compromise," he says. "And they did a great job of applying mechanical engineering concepts. This was a very good approximation of a real-world experience."

Provided by Michigan Technological University