Lifting the brakes on fuel efficiency

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Xiaodi "Scott" Huang in China with Michigan Governor Rick Snyder.

The work of a research leader at Michigan Technological University is attracting attention from Michigan's Governor as well as automotive companies around the world. Xiaodi "Scott" Huang of Michigan Tech's Department of Materials Science and Engineering helped Governor Rick Snyder promote Michigan's automotive industry at China's 2013 international auto parts expos. Huang's research is the basis for his MTEC SmartZone company, LiteBrake Tech, which was one of eight companies chosen to represent Michigan automotive technology overseas.

Huang had the opportunity to network with many high level executives from large companies at the conference. Governor Snyder spoke to the audience about "Pure Michigan" and the business development opportunities the state has to offer. "He introduced us to the entire audience and spoke with the media about our work. Overall, the trip went better than I expected," Huang said. The researcher pointed out that it may take time to develop relationships with some of these companies, but overall, he said, it was a good start. "I am really thankful for the Governor's effort," he added.

Huang's braking technology allows vehicles to operate more efficiently than with conventional disc braking systems. This is due to an innovative reinvention of brake rotor design.

Disc brake technology has become the preferred design choice for many auto manufacturers, but it carries some innate weaknesses. For one, when the vehicle starts moving, the brake pads do not always lose contact with the rotor. This means that as the vehicle moves, it fights the friction built up between the pad and the rotor, a phenomenon called 'brake drag'. Friction developed from contact develops heat, which degrades the life of vehicle components. Additionally, traditional brake rotors are constructed of cast iron, which is both heavy and susceptible to corrosion.

Huang's design employs the unique physical characteristics of aluminum to solve some of these problems. His innovative design decreases the weight of braking systems, reduces corrosion and improves fuel efficiency by decreasing brake drag. The rotor also has the distinctive feature of dissipating heat by employing an aluminum wheel to absorb heat, using its large surface area to dissipate heat quickly, which in turn prolongs the life of braking components. Computers use the same "heat sync" principle to cool on-board electronics with aluminum fins.

Aluminum lacks the strength and stiffness of conventional cast-iron components, however. Huang's invention overcomes this by cladding the rotor in steel, which increases hardness and durability. Huang is still working to optimize the design.

Back in the US, Huang is working with suppliers to make this technology available for purchase at stores.

More information: litebrake.com/technology.html

Provided by Michigan Technological University