

Yokohama develops tire design technology to reduce aerodynamic drag

TOKYO (Dec. 19, 2012) — The Yokohama Rubber Co. Ltd. has developed tire design technology that reduces aerodynamic drag, the tire maker announced at the 26th Computational Fluid Dynamics Symposium, running through Dec. 20 at the National Olympics Memorial Youth Center in Tokyo.

The new technology, which Yokohama also will present at the Tire Technology Expo 2013 in Cologne, Germany, Feb. 5-7, takes the environmental contribution made by reducing rolling resistance a step further by improving the flow of air around the tires while a vehicle is in motion, Yokohama said.

Air flows turbulently inside the wheel wells when a vehicle is moving, and some of this air flows out alongside the vehicle and causes aerodynamic drag to worsen. Yokohama researched using both aerodynamic simulations and wind tunnel testing.

Yokohama said aerodynamic simulation technology was developed in 2010 to enable air flow around tires to be simulated under the conditions expected to be encountered in actual use—with tires mounted in the wheel wells and revolving—and the scope of simulation is presently being expanded to include the entire vehicle.

These simulations and wind tunnel tests resulted in a tire design that reduces the aerodynamic drag on a vehicle, Yokohama said, adding an analysis was made of a tire with fin-shaped protuberances on the side facing inwards when mounted. The results showed that while drag on the tire itself was worse than on a normal tire, Yokohama said, drag on the vehicle as a whole was considerably reduced. This was found to be attributable to changes in pressure in the wheel wells caused by the spiraling flow of air induced in the direction of the tire's rotation by the fins.

Yokohama plans to conduct further research on the relationship between tire shape and air flow, alongside assessing performance on actual vehicles, as it pursues its development of tires that reduce the aerodynamic drag on vehicles overall.