

NASCAR tests tires on a unique machine that can spin rubber at 200 mph

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Frank Della Pia at the National Tire Research Center.

(Phys.org) —Tens of thousands of NASCAR race fans will converge March 30 in nearby Martinsville for the STP 500, watching dozens of race cars zip around the Martinsville Speedway at speeds exceeding 130 miles per hour, tires screeching and leaving rubber on the track.

The same type of tires used in the race and every NASCAR competition were specifically tested for the Martinsville track weeks before by

Virginia Tech researchers located an hour away in Alton, Va.

At the National Tire Research Center, Goodyear Racing—the official supplier of race tires for NASCAR—has been testing a sample of the tires it designs specifically for each track. "Shortly after we opened for business last year, we established a very busy test schedule with Goodyear Racing, and we are excited to be a part of their massive effort to supply NASCAR with the best tires possible for each and every race," said Frank Della Pia, executive director of the tire research center.

An affiliated company of Virginia Tech and the Virginia Tech Transportation Institute, the center is a third-party research and test lab working with dozens of other clients, including several tire makers and various motorsports teams and series from around the globe. The center helps these clients gather the data critical to create the best tires for the job at hand, whether for racing or on-road use.

Located adjacent to the Virginia International Raceway, tires are placed on a massive force and moment machine known as the LTRe. As the \$11.3 million, 14-ton machine turns and rotates up to speeds of 200 miles per hour, the fastest machine of its kind in the world, a massive arm holding the tire can mimic not just the common road, but any specific race track in the world, from the texture of the asphalt surface to the slant of the track.

If a motorsports team, tire company, or auto manufacturer wants to understand how the tire construction will impact the vehicle, the center is the only place in the world that they can go to achieve realistic highway or race track speeds, said Della Pia.

The center was the result of a grant from the Virginia Tobacco Indemnification and Community Revitalization Commission. Matching funds were supplied by General Motors—one of the other major users of

the facility—and the Institute for Advanced Learning and Research, the latter located in Danville.

The center started with 15 employees just more than a year ago, and that number has now jumped to 25, with 35 workers expected to be on the payroll by November 2014. These new employees will enable the tire center to become a three-shift, seven-day-a-week operation to meet the customer demand.

Della Pia came to Virginia Tech in 2010 after 34 years of working with General Motors, spending his last 10 years managing the car makers' vehicle dynamics test labs at the GM Milford Proving Grounds in Michigan. As GM sought out new ways to best test and model tires, Della Pia was part of a team that helped form an alliance with GM, Virginia Tech, and the Institute for Advanced Learning and Research.

The center opened in fall 2012, with the LTRe first being built and tested in Minnesota, under Della Pia's direction, before being disassembled and moved to Alton. Tire testing officially began in January 2013 and has not slowed since.

"We are 'characterizing' the tire to quantify how the tire reacts to forces, loads, and other inputs. That characterization data then goes into the building of high-fidelity tire models that are used in simulations to understand how the tire impacts vehicle performance," Della Pia said of testing race tires. "The racing teams and series that test with us are satisfied with our equipment and the knowledge and support from our staff. The on-track results prove our ability, and the fact that our clients travel here to Southern Virginia from all over the world to be repeat customers speaks for itself."

"This Goodyear partnership is another example of how we can move the needle in Southern Virginia by developing world-class facilities that

build on both the history of the region and its existing capabilities," said Tom Dingus, president of the center, an endowed professor with Virginia Tech's Charles E. Via Jr. Department of Civil and Environmental Engineering, and director of the Virginia Tech Transportation Institute. "We are building on the 65-year history of the Martinsville Speedway and the recent reemergence of the Virginia International Raceway."

Della Pia said other new testing machines will soon be brought in as the [tire](#) center expands its research footprint, testing tires for rolling resistance, high-speed uniformity, and more.

"We are just getting started," said Dingus. "The capabilities of the National Tire Research Center are already impressive, and enhancing them through new partnerships and initiatives will ensure we can continue to attract clients from all over the world. We want to keep growing the economy and job opportunities in Halifax County by making it one of the world's major destinations for automotive research testing."

Provided by Virginia Tech

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