

Our Point of View: The Smarter Dummy

July 09, 2010

by Kristen Tabar

Today our group was introduced to the THUMS Version 4, the most advanced vehicle crash test dummy ever engineered. THUMS—which stands for Total HUMAN Model for Safety—is a full-scale anthropomorphic testing device, or ATD, that has been developed by Toyota Motor Corporation and Toyota Central R&D Labs. Version 4 enables us to better understand injury mechanisms in crashes that have historically been difficult to analyze with current crash test dummies.

Did you know that prior to the development of crash test dummies, automakers used cadavers and even live animals to perform certain diagnostic tests? That changed in the early 1950s, when human-scaled testing devices that simulate the dimensions, weight and articulation of people began being used for motor vehicle and aircraft testing.

If the THUMS model line—initiated in 1997 with the first version completed in 2000—marked a big leap forward in the development of this important safety testing hardware, THUMS4 represents an even bigger advance still. Whereas the THUMS Version 1 featured 80,000 elements representing all of the human body's major bones and ligaments; Version 4 has two million distinct parts, including bones and ligaments, a “brain,” and internal organs.

Why so complex? What are we looking to this “dummy” to tell us? Engineers not only are eager to learn if passengers will survive particular vehicular incidents, but also are looking to obtain insight into how passengers' bones, ligaments and organs will fare. This technology can also help us determine, for example, not just if a driver's hand might deflect off the dash during a collision, but whether that deflection might affect the driver's head or chest.

This more holistic diagnostic instrument—a “smarter dummy,” if you will—provides Toyota with more data than ever before to help us create the next generation of quality and safety features for our vehicles. What was especially interesting to me is that we are also making this technology available to other industries to improve safety, including various academic and research groups and even other automakers. The original technology has wide-reaching impact, and not just for Toyota customers—that's part of our commitment to improving overall vehicle safety across the industry.

[Kristen Tabar](#)

General Manager, Electronic Systems
Toyota Technical Center, Michigan, USA