Alan Pierce
Technology.Today@worldnet.att.net

April 2002

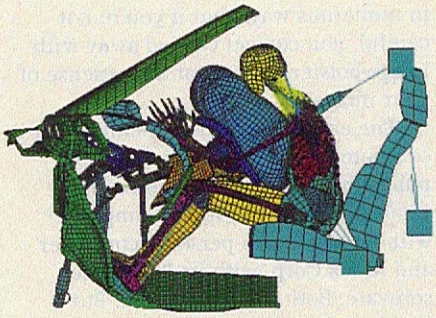
THUMS

THE race is back on to build very low sonic-boom Mach 2 commercial jets that can be licensed to fly at supersonic speeds across the populated continents of the world. To build such a plane or any other type of aircraft, engineers spend thousands of hours in front of their computers devising their designs and testing them with computer simulations.

The question becomes, If technologists are so satisfied with computer design and computer simulations, why are we still strapping dummies into new cars for crashing rather than performing these tests using computer systems?

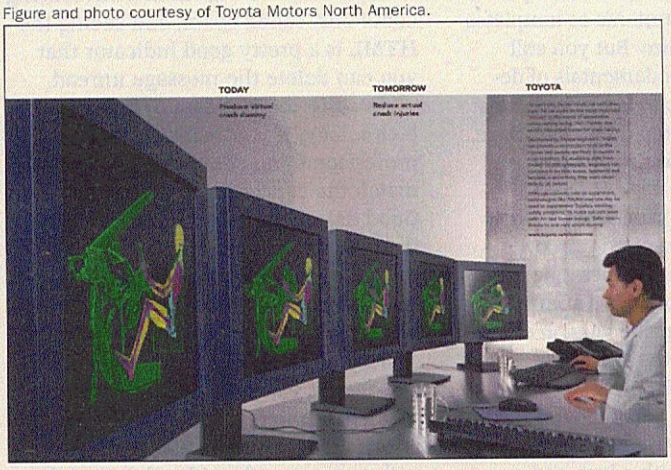
Engineers at Toyota Motors asked themselves this same question back in 1996. For the last eight years, they have been quietly developing the technology that will eventually place most automobile industry test dummies on unemployment lines. If test dummies are ever completely put out of work, I will miss their safety TV commercials.

The Toyota acronym THUMS is short for Total Human Model for Safety. The depth of THUMS research



The data in a THUMS simulation is gathered from the interaction of 80,000 human body locations during the forces of a simulated crash.

Figure and photo courtesy of Toyota Motors North America.



Computerized automobile crashes will put test dummies out of work.

became apparent when I read three of Toyota's research engineering presentations that were given at safety car-crash conferences in Amsterdam, June 4-7 and Atlanta, November 6-8 in 2001.

Having read the papers, it was easy to see that this technology is the wave of the future—and not just because they will save automobile manufacturers money by not having to crash so many cars to prove automobile worthiness. The truth is that computer simulations will provide a more accurate picture of what happens to the human body when it is involved in an automobile crash as a car occupant or pedestrian.

TV's CSI shows how criminal pathologists use information gathered from crime scenes. Toyota engineers used this same approach to build cyberspace people who can provide invaluable information on how to build safer cars. The data in a THUMS simulation is gathered from the interaction of 80,000 human body locations during the forces of a simulated crash.

The data points include the full body structure of our skin, tendons, ligaments, muscles, and bones—everything, from head to toe. To create these virtual dummies, Toyota engineers had the assistance of CSI-type pathologists who gathered data by dissecting people killed in automobile crashes.

Today, engineers develop safety systems to meet the needs of average people. At this time of development, THUMS virtual test dummies have been built around the average human male, female, and young child.

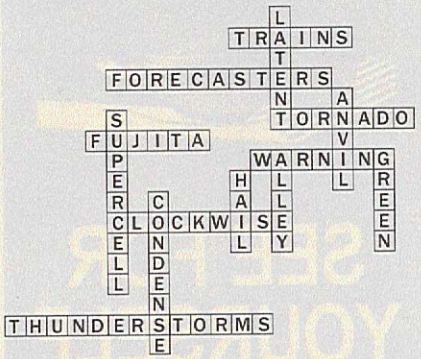
Future developments will allow engineers to use THUMS and similar systems developed by other automobile manufacturers to model a broad range of human physical variations. This will prevent manufacturers from adopting safety systems that place very short, very small, or very tall (i.e., nonaverage) people in greater danger during an automobile accident.

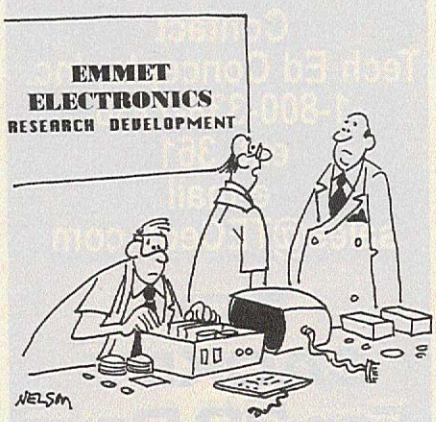
Don't expect to find many test dummies out of work before 2004.

Recalling the Facts

1. What do automobile test dummies and THUMS have in common?
2. What does the acronym THUMS stand for?
3. How do Toyota engineers know that they will gather accurate information during a simulation?

More than Fun Answer





"We're having trouble with our new model computer. All the good fruit colors are taken."