

Our Point of View: Anatomy of a Test Crash

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by Kristen Tabar

Today, on the third and last day of the tour, our group arrived at Higashi-Fuji Technical Center—perhaps the world’s most advanced automotive quality and safety center—to witness a 40mph vehicle crash test. It was quite a morning wake-up call!

The Higashi-Fuji testing facility is truly unique. It can replicate various kinds of crashes, like rollovers, car-to-car crashes, pedestrian collisions, even “pole” impact tests that simulate crashes into stationary objects. [These tests enable Toyota to evaluate its vehicles more thoroughly](#) by reproducing a wider variety of accidents than ever before. While the untrained eye might view these tests as destructive, they’re all about safety.

In addition to thousands of virtual simulations, Toyota conducts more than 1,600 actual vehicle crash tests in three facilities every year. Each one costs approximately \$30,000 and takes 11 working days to plan and execute. The crash tests are really amazing to watch: the vehicles are propelled toward each other (or another obstacle) by an electric carrier—you keep thinking they will slow down or veer off as in real life as you watch. But they don’t. The actual impact seems wrong, but the cars are merely recreating the real conditions that we’ve already modeled and simulated. Because computer modeling has improved exponentially in recent years, our engineers can now run crash test simulations that almost perfectly match the real crash results. As one engineer put it today, “the actual crash is just a confirmation.” Still, today’s confirmation was fascinating to watch.

Test crashes are filmed in extreme slow motion—from 50 to 200,00 frames per second (compared with normal film speed of 24 fps)—with multiple cameras positioned around the crash platform, and even mounted under Plexiglass platforms, for good views of the vehicle’s underbody. Toyota engineers then take the myriad data from vehicle sensors and crash test dummies and use it to develop safer vehicle body structures, occupant protection devices, and other advanced safety features that help minimize the potential for passenger injury.

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