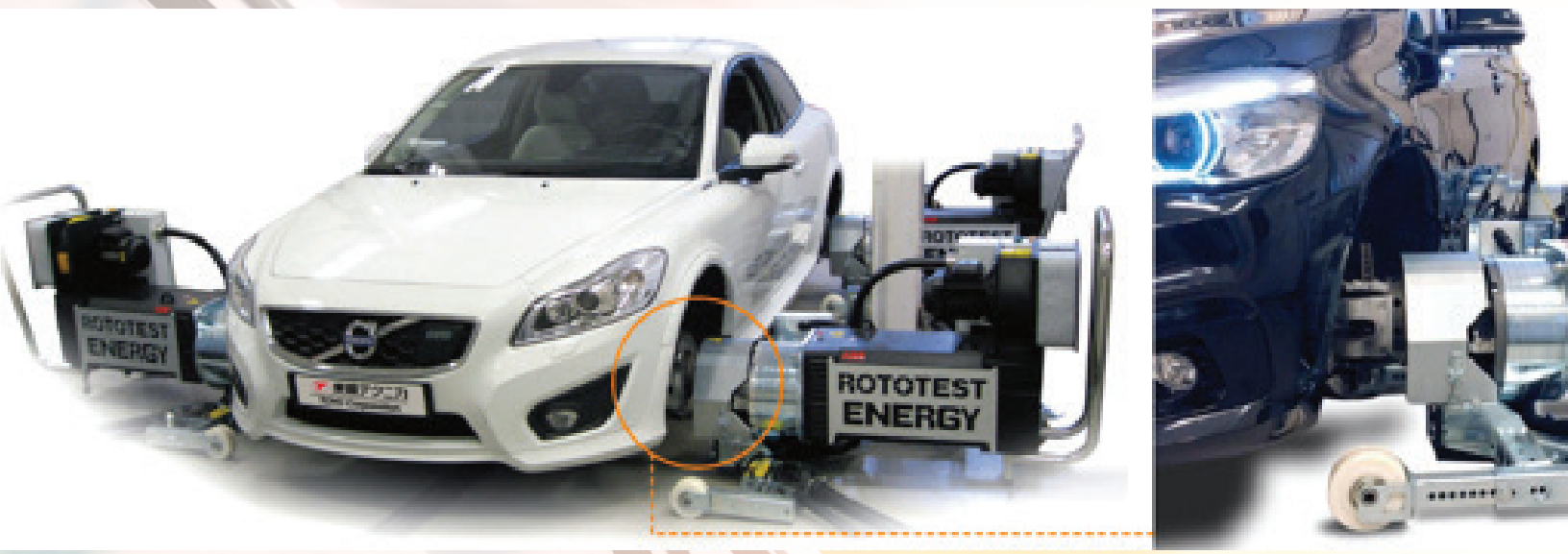
Driving innovation into the world of auto development

The versatile "ROTOTEST Energy" powertrain testing system is now being introduced in the United States

"ROTOTEST® Energy™" (hereinafter ROTOTEST) is a hub-coupled chassis dynamometer system for powertrain testing with a proven record of successful adoption by major auto manufacturers in Europe. TOYO Corporation acquired the distribution rights for ROTOTEST in America in July 2018, and has officially started overseas sales. Recently, Mr. Han (CEO of TOYOTech[1]), a key figure of the ROTOTEST business in America, and Mr. Kiuchi, (Chief of the Technical Research Center, TOYO Corporation and former Honda F1 project lead), talked enthusiastically about the system's superior capabilities and future business prospects.



ROTOTEST Energy hub-coupled chassis dynamometer system

Han: Powertrain testing is one of the most critical processes in vehicle development. To date, the common testing method used has been the roller-type chassis dynamometer.

Kiuchi: I have produced several prototype vehicles during my tenure at Honda, and we used chassis dynamometers. It is true that we, as developers, were not satisfied with traditional chassis dynamometers because they did not allow for sufficient testing and data collection. We would place a prototype vehicle on the chassis roller to test it but we were unable to steer because the chassis roller only allows for straight-ahead driving. Thus it was not possible for us to conduct tests that simulated various road conditions and loads.

Han: ROTOTEST enables you to perform measurements with the tires removed and the movable dynamo directly attached to the wheel hubs. This is a capability that is highly sought by vehicle developers, wouldn't you say?

Kiuchi: It is crucially important to be able to perform detailed measurements on each of the four wheels individually. In addition, ROTOTEST allows us to turn the steering wheel. We can collect accurate data on how torque is transmitted to each wheel when the steering wheel is turned left and right. This system makes it possible to collect and analyze valuable data from a prototype in order to improve vehicle performance. Furthermore, you can do it on the bench, indoors, which is a remarkable breakthrough.

SIGNIFICANTLY LOWER INITIAL INVESTMENT *(WHEN COMPARED WITH CONVENTIONAL SYSTEMS)*

Han: With ROTOTEST, the initial investment is lower than with roller-type chassis dynamometers, which is another powerful advantage.

Kiuchi: The traditional chassis dynamometer requires large-scale underground construction to house the large rollers, which is part of the reason for the large initial investment. In contrast, ROTOTEST requires no underground infrastructure, so it considerably reduces the initial cost.

Han: I believe ROTOTEST will be adopted and deployed by venture companies entering the EV industry and autonomous car development.

Kiuchi: Auto manufacturers have required three kinds of tests to date: roller-type chassis dynamometers, actual driving on test courses, and driving on public roads. I would really encourage them to consider this technology. You can consolidate performance tests for various conditions including sudden starts, sudden acceleration, sudden braking, and the impact of driving over bumps, all in one ROTOTEST bench-test environment. Data collection becomes possible indoors, instead of having to rely on actual driving. I think it will bring significant changes to the testing process, as well as reducing costs.

Han: Also, the installation of ROTOTEST is very quick; the time required from the delivery of the test system to the start of operation can be as few as two weeks. This shorter ramp up will provide formable competitive advantages for the ROTOTEST user.

DMTS IS EQUIVALENT TO RUNNING ACTUAL TESTS BUT IN A LAB

DMTS can reproduce a variety of road environments on the bench

Han: The ROTOTEST system to be distributed in America can support the DMTS® (Driving & Motion Test System) functions developed by the Technical Research Center of TOYO Corporation.

Kiuchi: ROTOTEST from TOYO Corporation is more than just a chassis dynamometer. It can utilize DMTS to create bench-testing environments that mimic actual driving. We have succeeded in linking chassis testing, road surface condition simulation, and visual data, and having them work together. This is a unique function developed by TOYO Corporation.

DMTS uses previously recorded videos taken while a car is driving on actual roads. Auto manufacturers commonly have their own testing courses on public roads. DMTS allows them to reproduce the same environment as in their testing course in the lab, using these pre-recorded videos coupled with high-precision GPS data. They can also perform test runs in conditions similar to specific road environments. DMTS incorporates road surface gradients and can even reproduce the inclination of mountain tracks. DMTS brings needed realism into lab bench testing.

Han: I anticipate further development of DMTS by the Technical Research Center.

Kiuchi: Please do keep your eyes on it. We will continue our development in Japan and update the DMTS for America to conform with customer requirements. Our focus will be to continue improving the ROTOTEST and DMTS system, hopefully to the point where actual driving tests may no longer be needed.

NVH TESTING IS OFFERED. FUTURE SUPPORT FOR EMC TESTING

Han: ROTOTEST from TOYO Corporation not only provides environments for power train testing, but also for NVH testing[2]. EMC testing[3] is going to be supported as well.

Kiuchi: Compared to the past, where only gasoline and diesel cars were made, NVH testing required for today's vehicles is becoming increasingly complex. EV and gasoline cars require entirely different NVH tests, all of which can be performed in ROTOTEST. In order to promote rapid development of connected cars and autonomous cars, I hope TOYO Corporation will be chosen as everyone's new partner. In advancing the development of EV, connected cars and autonomous cars, EMC testing will also be increasingly important.

Han: TOYO Corporation has accumulated a wealth of experience and know-how in EMC testing solutions. It even represented Japan at a world conference to discuss global and unified standards for EMC. TOYO Corporation can provide one-stop EMC support and expertise for anyone involved in automobile development.

Han: We can provide high-quality solutions to customers in the United States by utilizing the know-how and measurement technologies for automotive testing that we have cultivated for many years in Japan. You can count on it. Customers will even have a chance to discuss development with Mr. Kiuchi, a former Honda F1 project lead.

Kiuchi: I am willing to actively exchange views and support those involved in automobile development. We want to make innovation happen in this field, not only in Japan and the United States, but all over the world. I am serious about that.

[1] TOYOTech LLC: Local corporation established in California, U.S. by TOYO Corporation in 2015. Official web site: https://toyotechus.com/. Visit our Rototest microsite at https://toyotechus.com/automotive_measurement/powertrain_and_chassis/.
[2] NVH stands for noise, vibration, and harshness.
[3] EMC test: EMC stands for Electromagnetic Compatibility.

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