MONOTSUKURI INNOVATION

We are realizing high levels of diversity, which enhances the competitive edge of our products, and commonality, which boosts the efficiency of mass production, through efforts in Monotsukuri Innovation.

Looking five to 10 years into the future, we have implemented Monotsukuri Innovation for efficiently developing and manufacturing products. Common development methods and manufacturing processes are made possible by using bundled product planning for models to be introduced in the future, spanning market segments and model classes.

Optimized structures of each function are shared across all car lines and laterally spread to each car line based on bundled product planning. A flexible production system is used to produce products engineered based on a common architecture concept in a highly efficient and flexible way. We are aiming to raise operational efficiency through building a flexible production process that can handle changes in volumes and can quickly introduce new models with a minimum of investment.

Through Monotsukuri Innovation, our products since the Mazda CX-5, launched in 2012, and Skyactiv Technology have achieved improved efficiency in terms of both product development and manufacturing facility investment as well as significant improvements in vehicle costs. Through design based on common architecture under Monotsukuri Innovation, Mazda is able to promptly apply the latest technologies and designs to all of its products. In new-generation technology development, we are working to enhance the efficiency of development processes through bundled planning and computer modeling-based development.

Computer Modeling-Based Development

Cars are being called on to provide increasingly advanced and diverse functions, while at the same time vehicle architecture and control systems are becoming more complex. To continue to rapidly develop complex systems with limited resources, the use of computer modeling-based development, which realizes efficient development, is extremely important.

Computer modeling-based development involves creating computer models of the vehicle, control systems, drivers, passengers, driving environments, and other development elements, and conducting development via thorough computer simulation to efficiently optimize the development elements. By carrying out modeling-based powertrain and vehicle development through simulations from design to vehicle evaluation, we are able to reduce the number of prototype parts and actual unit verification, thereby enabling us to develop complex, highly sophisticated new products with minimum resources while also ensuring quality.

In the development of Skyactiv Technology, which started in 2006, we pursued development that fully leveraged computer modeling with the aim of realizing the world’s best fuel economy and driving performance. We completely revised our control systems from square one and have developed combustion systems that achieve similar combustion characteristics regardless of engine displacement. With Skyactiv Technology, we have been able to realize engines, transmissions, and vehicle bodies with outstanding driving and fuel economy performance, including Skyactiv-G, which boasts the world’s best high compression ratio*.

Computer modeling-based development will play a vital role in realizing our vehicle development across multifaceted areas with limited resources. These include our multiple solutions strategy for powertrains, including the further evolution of Skyactiv Technology, autonomous driving technology, and the development of common architecture for small and large architecture products.

* As of November 2012, based on our in-house research

EV C.A. Spirit Co., Ltd.

In September 2017, Mazda, Denso Corporation, and Toyota Motor Corporation signed a contract to jointly develop basic structural technologies for electric vehicles (EVs), and established a new company EV C.A. Spirit as a joint development center. Other automakers who share same vision have participated and have been jointly developing fundamental EV technologies. To ensure flexible and rapid response to market trends, research of optimum performance and functions of EVs capable of covering a wide variety of vehicle segments and types is undertaken through bundled planning and common architecture at EV C.A. Spirit. At the same time, computer modeling-based development is used to realize efficient product development at each company.

https://www.ev-cas.co.jp/