

Earth, People, and Society

# QUALITY IMPROVEMENT

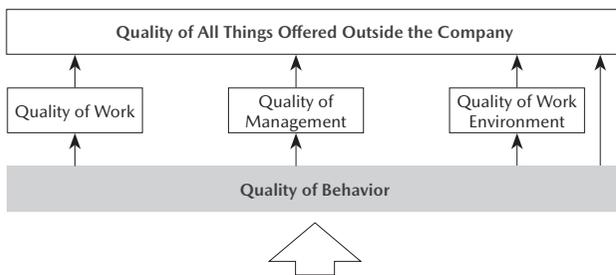
## Basic Approach

Toward the realization of its Corporate Vision,\*1 Mazda believes that it is important to enhance the quality of "all things offered outside the Company," including products and services, to satisfy customers. The Company defines the Five Types of Mazda Quality: "quality of work," "quality of management," "quality of work environment," "quality of behavior," and "quality of all things offered outside the Company," which is underpinned by the preceding four. In line with its quality policy, Mazda further advances the efforts it has made and promotes united collaboration among all areas, continuing to enhance Mazda's unique value.

### Mazda Quality Policy

To enrich the lives of our customers by providing products and services that reflect steady and uncompromising work

[Five Types of Mazda Quality]



[Mazda Way]

Integrity, Basics/Flawless Execution, Continuous Kaizen, Challenger Spirit, Self-Initiative, Tomoiku, One Mazda

## Approach to Quality Improvement

To deliver customers safety, trust and excitement through automotive lifestyles, and to have customers continuously realize the value of its products, Mazda positions customers as the starting point of all of its business activities and makes Groupwide efforts based on the three principles below:

1. Establishing consistent quality, from planning to production
  2. Early detection and early solution of market problems
  3. Quality assurance does not conclude unless the quality includes not only the outward appearance of products but also the processes used by customers
- To put the above into practice, Mazda works hard to develop personnel who thoroughly understand its customers, and can think and act in accordance with the belief that everything starts with the customer.

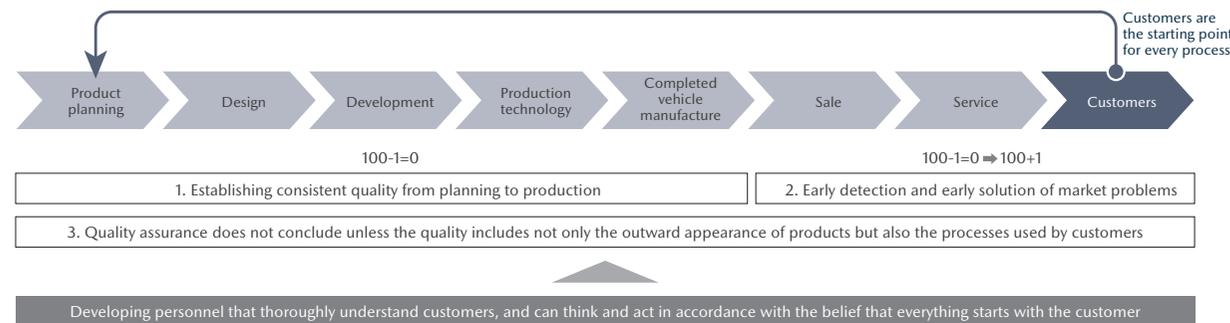
### Vision for Quality Assurance

Vehicle production based on the "100-1=0" belief

1. Establishing consistent quality from planning to production: "100-1=0" expresses Mazda's strong desire to provide good quality to all customers under the belief that if even only one out of 100 vehicles is found to be defective, the car has no value for the customer. Mazda pursues a kind of vehicle production that respects each vehicle as a certain customer's "one-and-only," and aims to achieve zero defects. In keeping with the basic principles of manufacturing and based on a full understanding of its mechanisms, all related departments work in close collaboration to establish consistent quality in all processes, from planning to production.

Initiative for the process to change "100-1=0" to "100+1"

2. Early detection and early solution of market problems: If an unpredictable problem arises in the market, it may result in loss of trust from customers ("100-1=0"). To avoid this, Mazda promotes quality assurance activities for the early detection and early solution of any trouble pointed out by customers.
3. Quality assurance that covers every process up to use by the customer: To provide customers with satisfaction through an enriching car ownership experience, Mazda values customer voices all over the globe as its greatest asset. The Company is working to store this feedback in knowledge databases, and to reflect it in product planning, development, and elsewhere.



\*1 [https://www.mazda.com/globalassets/en/assets/sustainability/policy/corporate\\_vision\\_e.pdf](https://www.mazda.com/globalassets/en/assets/sustainability/policy/corporate_vision_e.pdf)

### | Mazda Quality Management System (M-QMS)\*1

To make faithful and unceasing efforts and constantly ensure quality in products, sales and after-sales services that can always satisfy the expectations and trust of customers, Mazda has established the Mazda Quality Management System (M-QMS) based on ISO 9001,\*2 and has applied it to the series of processes from product development to production, sales and after-sales services. At overseas production sites, Mazda also promotes the establishment of systems that encourage local employees of new sites to make self-reliant efforts to improve quality, and encourages them to acquire ISO 9001, thereby promoting the quality improvement of Mazda vehicles, which are produced and sold worldwide.

#### Acquisition of ISO 9000 Series

Year of Acquisition	Types of ISO Certification	Certified Organization, Product, Service, Etc.
1994	ISO 9002	Mazda Motor Corporation: Vehicles produced at Hiroshima Plant and Hofu Plant (First to be certified as Japanese automaker)
1996	ISO 9001	Mazda Motor Corporation: Engineering, product development, manufacturing and after-sales service
2001	ISO 9001	Mazda Motor Corporation: Accessories, KD, product planning, design Mazda Engineering & Technology Co., Ltd.: Specially equipped vehicles (TESMA), etc. (Application range expanded) Auto Alliance (Thailand) Co., Ltd.
2007	TS 16949 (ISO 9001 Sector certificate)	Changan Ford Mazda Automobile Co., Ltd. (now Changan Mazda Automobile Co., Ltd.), Changan Ford Mazda Engine Co., Ltd. (now Changan Mazda Engine Co., Ltd.)
2015	ISO 9001	Mazda de Mexico Vehicle Operation, Mazda Powertrain Manufacturing (Thailand) Co., Ltd.
2016	ISO 9001:2015	Mazda Sollers Manufacturing Rus LLC
2018	ISO 9001:2015	Mazda Motor Corporation: Head Office, Hiroshima Plant and Hofu Plant, Mazda de Mexico Vehicle Operation, Auto Alliance (Thailand) Co., Ltd.
	IATF 16949:2016 (ISO 9001 Sector certificate)	Changan Mazda Automobile Co., Ltd., Changan Ford Mazda Engine Co., Ltd. (now Changan Mazda Engine Co., Ltd.)

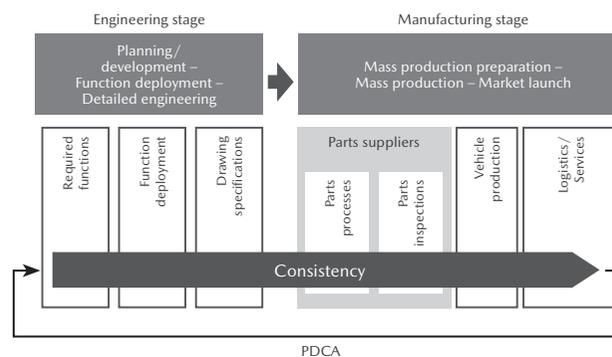
### Establishing Consistent Quality, from Planning to Production

To satisfy the diverse needs of customers and offer greater trust, joy and excitement, Mazda is engaged in establishing a consistent quality level to be assured at all stages from planning/development to the delivery of products to customers.

#### | Establishing Stable Quality

Not only to improve the performance of products but also to enhance the quality of new technologies to respond to regulations and electrification, Mazda is committed to “process assurance.” Process assurance is the approach of ensuring a consistent quality level at all stages from engineering (planning, product development) to manufacturing (purchasing, vehicle production, logistics, after-sales services). Based on the correct understanding of customer needs and expectations, the important elements necessary to ensure each function and performance are identified. The Company has established a system to maintain and manage them in every stage from engineering to manufacturing. Furthermore, to allow customers feel the joy of driving through its products, Mazda identifies the functions and performance that embody the joy of driving for each stage from before getting in the car to after starting driving, so as to enhance consistency in establishing quality.

#### Consistent Process Assurance Based on Major Characteristics



### | Monotsukuri Innovation

Looking five to ten years into the future, Mazda has implemented Monotsukuri Innovation for efficiently developing and manufacturing products. Shared 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 for 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 manner. Mazda is aiming to raise operational efficiency by 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, the Company's products since the CX-5, launched in 2012, and Skyactiv Technology have achieved the efficiency improvement 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, the Company is working to enhance the efficiency of development processes through bundled planning and computer modeling-based development.

\*1 M-QMS: Stands for Mazda Quality Management System

\*2 ISO: Stands for International Organization for Standardization. ISO 9001 is a set of international standards for quality management and assurance.

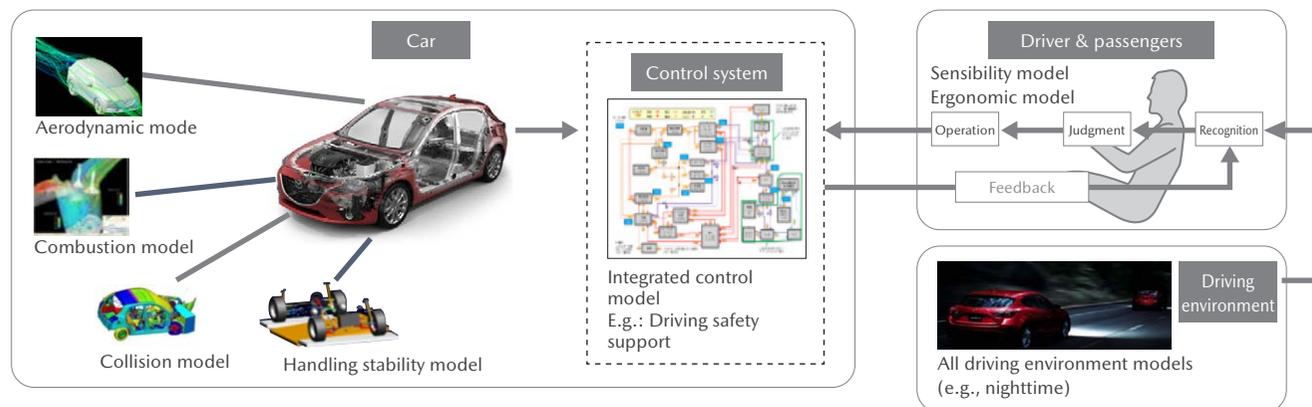
## Model-Based Development (MBD)

Cars are being called on to provide increasingly advanced and diverse functions, while vehicle architecture and control systems are becoming more and more complex. Model-based development, which uses computers to efficiently replicate development processes, is essential to keep developing complex systems quickly and with limited resources. Model-based development involves creating computer models of the vehicle, control systems, drivers, passengers, driving environments and other development subjects, and conducting development via thorough computer simulation. It is an efficient method of optimization. By carrying out model-based powertrain and vehicle development through simulations from design to vehicle evaluation, Mazda strives to reduce the number of prototype parts and actual unit verification, in

order to develop complex, highly sophisticated technologies and products with minimum resources while also ensuring quality. Mazda believes that to further promote model-based development, universities working on cutting-edge technologies, automobile manufacturers and suppliers that cooperate in manufacturing must concretize the SURIAWASE 2.0 concept (P85), which seeks to enhance development efficiency by using virtual models across the engineering chain. To that end, Mazda is taking an active role in activities by the Japan Automotive Model-Based Engineering center (JAMBE). To spread the SURIAWASE 2.0 concept (P92) throughout the automobile industry nationwide, Mazda is engaged in joint activities with OEM companies and suppliers.

### Model-Based Development

A technique to develop outstanding products by modeling (quantifying) and connecting all four elements of (1) the car, (2) control systems, (3) the driver & passengers, and (4) the environment without using an actual vehicle



### TOPICS

#### Mazda receives an award from the Minister of Education, Culture, Sports, Science and Technology in 2023

In April 2023, Mazda received the Award for Science and Technology (Development Category) of the 2023 Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology for its development of rust-prevention evaluation technology. This year was the first time Mazda received a commendation in three years, and the eighth time overall.

The technology that earned this award is a way to establish consistent quality in all processes, from planning to production, and was developed to revolutionize the rust-prevention development process. It rates the rust-prevention capabilities of painted components using an electrochemical method, which enables the required functions to be quantified and as a result can make technical development more efficient. This helps to make Model-Based Development (MBD)\*<sup>1</sup> possible. Another advantage is that by using computer modeling, manufacturers can predict quality defects and aggregate big data. While this technology was developed for vehicles, it was recognized by the ministry due to expectations for its application in a wide range of other fields, including transport, electrical appliances, factories, civil engineering, and housing.

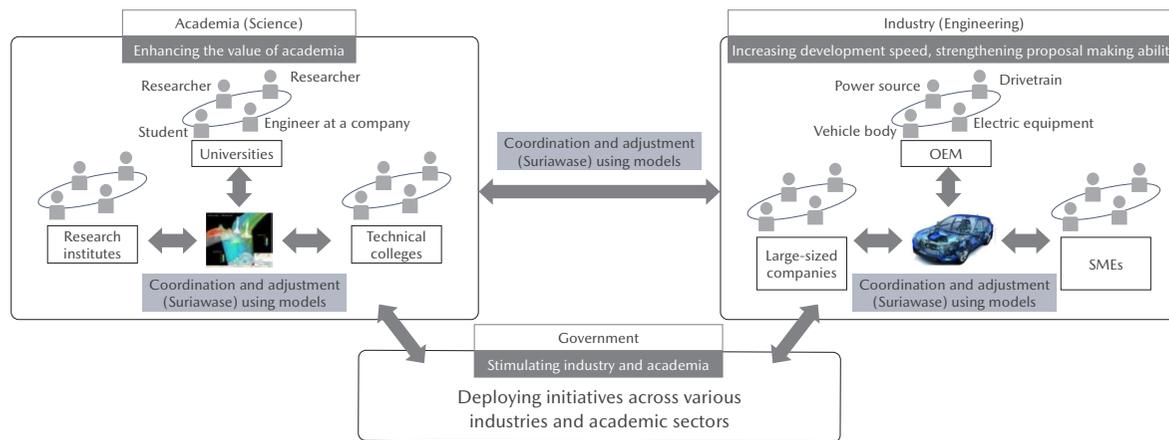
\*<sup>1</sup> An efficient method of optimization that involves creating computer models of vehicles, control systems, drivers, passengers, driving environments and other development subjects, and conducting development via thorough computer simulation

 [Commendation for Science and Technology in 2023 from the Minister of Education, Culture, Sports, Science and Technology \(Japanese only\)](#)

### What is Advanced Matching Development SURIAWASE 2.0?

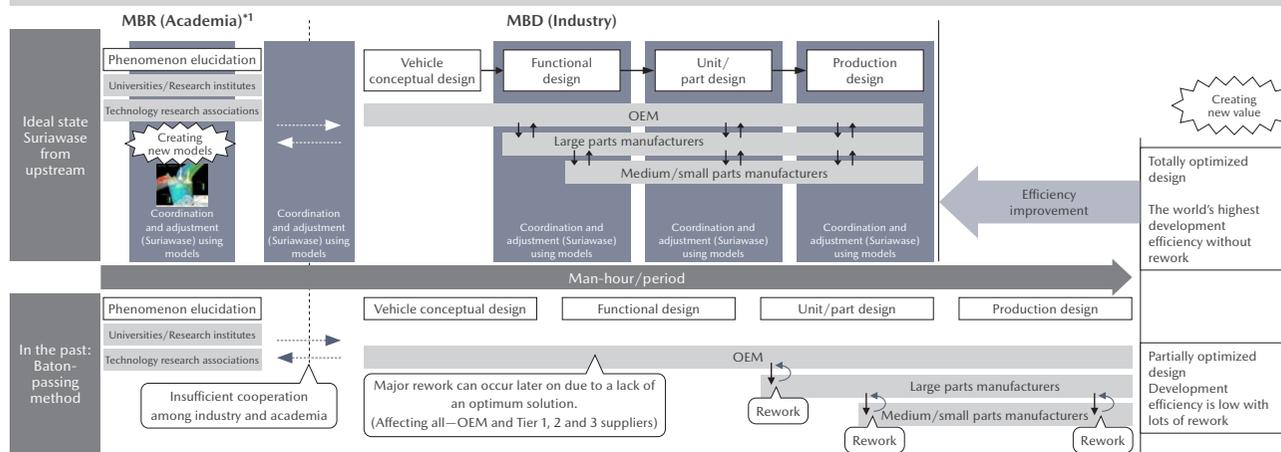
Created based on the SURIAWASE 2.0 concept presented in the materials prepared by the Ministry of Economy, Trade and Industry of Japan in 2017

SURIAWASE 2.0 is an initiative to enable academia and businesses (parts manufacturers and OEMs of all sizes) to share digital models across the board, linking academic research with development of parts, systems and vehicles, thereby allowing both sides to coordinate and make adjustments (Suriawase in Japanese) digitally from the initial stages of development, without using physical machines. This approach makes it possible to create the most-advanced development community in the mobility sector, able to carry optimal and high-grade monozukuri (engineering and manufacturing) efficiently and without rework.



### Goal: Concretize SURIAWASE 2.0

Achieve the most efficient development processes in the world and create new value by innovating the research, development and production processes



\*1 Model-Based Research: An approach that applies model-based concepts to research

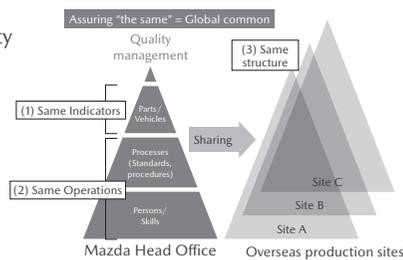
Referred to the October 2022 issue of "Introduction to JAMBE"

### Global Quality Assurance

To ensure the same quality on a global scale, Mazda has adopted the “global common” concept, under which overseas production sites establish the same quality by employing the same indicators, the same operations, and the same structures as those of the Mazda Head Office.

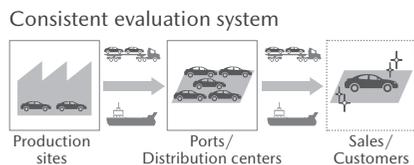
With the aim of achieving and maintaining the same quality into the future, the roles and responsibilities of the Mazda Head Office and overseas production sites have been clarified for management. As part of its efforts to secure the same quality on a global basis, Mazda works to establish common indicators of quality achievements and processes (standards and procedures) to be shared when conducting quality control of purchased parts or quality evaluation of finished vehicles. At the same time, initiatives are under way to develop human resources who can properly operate these processes. As part of its global quality assurance efforts, in cooperation with Mazda North American Operations, Mazda has developed a quality assurance system for Mazda Toyota Manufacturing, U.S.A., Inc. (MTM) in the United States. Under this system, Mazda commenced mass production of a new model in 2022.

Initiative for Global Quality Assurance



### Quality Assurance after Shipment

To ensure that the high quality at factory shipment is maintained until delivery to customers around the world, Mazda has introduced the same quality evaluation indicators to be applied, from production plants to distributors and dealers, with the aim of delivering products maintaining high quality to customers around the world under a consistent evaluation system.



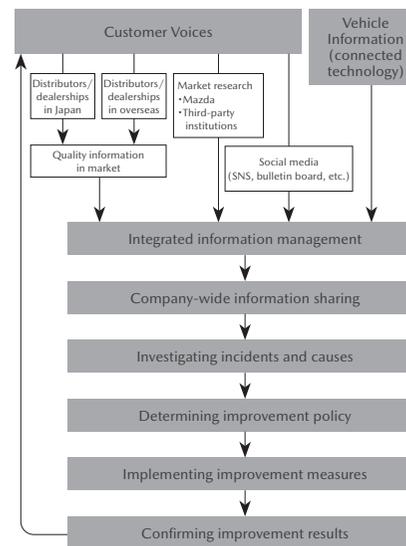
### Early Detection and Early Solution of Market Problems

Mazda strives to offer an enriched car ownership experience, in which customers can feel satisfied with the car and realize the value of the product. While respecting each vehicle as a certain customer’s “one-and-only,” the Company endeavors to ensure stable and speedy quality improvement and enhance the quality of present and future products.

### Comprehensive and Speedy Quality Improvement

To enable early detection and early solution of market problems, Mazda has established a system for unified management of all items of quality information. Such information is gathered from distributors and dealerships in Japan and overseas and by employing the results of surveys by external institutions and conducting the Company’s own market research. Under the system, the collected information is shared company-wide in real time. By using the system and closely monitoring daily progress, Mazda investigates quality related incidents and their causes, determines and implements improvement measures, and confirms the results. In

Quality Improvement System



this manner, Mazda works to achieve comprehensive and speedy improvement.

The Company also carries out quality improvements, capitalizing on the vehicle information collected through the utilization of connectivity technologies, in addition to conventional initiatives based on customer input.

#### <Examples of Surveys/Analyses>

- Gathering customer voices through Mazda-unique market survey
- Market surveys conducted by third parties
- Analysis of customer voices on social media
- Analysis of vehicle information obtained through connected technologies

### Corporate Activities with Highest Priority on Customer Safety and Comfort

Mazda prioritizes safety and comfort of vehicles above all. Under a strict quality assurance system, Mazda conducts inspections on conformity with laws and regulations of each country and on functions to be used by customers, with a view to manufacturing vehicles that customers feel safe using.

This quality assurance system is maintained and managed by the development, production and quality divisions auditing each other from independent standpoints.

#### Recall Procedures (Overview)\*1

- Registration with authorities in each jurisdiction, according to the laws and regulations of each country and region
- Disclosure to customers via direct mail, telephone, and other methods, and explanations at dealerships
- Disclosure of information on recalls on the Mazda Official Website

Number of recalls in FY March 2023: Japan (P121)

\*1 Recall procedures may vary among countries/regions.

## Quality Assurance That Covers Every Process up to Use by the Customer: Developing Personnel That Thoroughly Understand Customers, and Can Think and Act in Accordance with the Belief That Everything Starts with the Customer

To provide customers with satisfaction through an enriching car ownership experience, Mazda has to gain a deeper understanding of the ways in which customers use their cars and the value they expect. Mazda values customer voices all over the globe as its greatest asset. The Company is working to store this feedback in knowledge databases, and to reflect it in product planning, development, and elsewhere. Moreover, through activities such as those to educate about or raise awareness of quality, Mazda strives to continue developing personnel who think of customers as their first priority and think and act accordingly.

### <Understanding Customers>

#### Activities to Turn Customer Voices into Knowledge

Customer voices from all over the globe are fed into a knowledge database, Mazda is working toward vehicle development that reflect these quality criteria and optimization of product quality standards.

### Sharing Past Cases

Mazda has undertaken an initiative to share lessons learned from past cases through exhibits of actual defective products and videos. This program is intended to encourage employees to think about past issues as issues concerning themselves and to improve their attitudes and behavior. Since its launch in FY March 2019, a total of 27,000 employees have experienced this initiative.



Employees share past cases

### <Think from the Customer's Perspective> Quality Awareness-Raising Activities

Mazda holds quality meetings on a regular basis. At these meetings, top management communicate their commitment to compliance and quality in their own words to all employees. This provides opportunities for individual employees to reflect on and think about their work, thereby enhancing their compliance and quality awareness.

### Quality Education

For the purpose of developing human resources capable of proactively finding/solving problems from a customer viewpoint and working for continuous improvement, quality control education is provided for employees. Quality education courses taught by internal instructors are offered, and employees take appropriate courses when their job type or management level changes.

#### Group-wide Quality Education Courses

	Course	Objective (FY March 2023)
1	Quality education program for freshmen	To understand basic quality control concepts (customer-oriented attitude, continuous improvement efforts)
2	Quality education by level	To understand quality management approaches tailored to different management levels or job roles
3	Quality management methods course	To become capable of applying and practically implementing specialized quality management techniques

### <Behavior That Puts the Customer First> QC (Quality Control) Circle Activities

Mazda promotes QC circle activities to encourage members of each workplace to find and solve problems by themselves. QC circle activities, which have been implemented for over 60 years as key activities for the company, have evolved into global activities, being conducted not only inside Mazda but also at its suppliers and dealerships. The All-Mazda QC Circle Competition held



FY March 2023 All-Mazda QC Circle Competition President's Award  
Tool & Die Production Department Speed Circle

every year at the Head Office in Hiroshima is now participated in by QC circles of Japanese dealerships and overseas sites such as those in China, Thailand, and Mexico; it is taking root as a truly global initiative.

## Results of Quality Improvement Initiatives

Mazda's initiatives to improve quality have been highly praised worldwide.

### FY March 2023 Results

Country	Name of the Study	Vehicle Type and Rankings <sup>1</sup>	Name of Company
Japan	2022 IQS <sup>1</sup>	4th of 14 brands	J. D. Power
		Mazda3: 3rd among mid-size vehicles	
	2022 APEAL <sup>2</sup>	CX-5: 3rd among mid-size SUVs	
		CX-3: 3rd among compact SUVs	

<sup>1</sup> The J.D. Power Japan 2022 Initial Quality Study<sup>SM</sup> (IQS) is based on responses from around 20,000 purchasers of new cars. The study was carried out between May and June 2022.

<sup>2</sup> The J.D. Power 2022 Japan Automotive Performance Execution and Layout (APEAL) Study<sup>SM</sup>, is based on responses from around 20,000 purchasers of new cars. The study was fielded between May and June 2022.