Mazda is promoting safety initiatives, aiming to achieve a safe and accident-free automotive society from the three viewpoints of vehicles, people, and roads and infrastructure.

**SAFETY**

CSR Targets for FY March 2019

<table>
<thead>
<tr>
<th>Items</th>
<th>FY March 2018 targets</th>
<th>FY March 2018 results</th>
<th>Self-assessment</th>
<th>FY March 2019 targets</th>
<th>ISO 26000 core subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Further evolve, and expand the introduction of i-ACTIVSENSE, which is a series of advanced safety technologies developed in line with Mazda Proactive Safety, the Company’s safety philosophy.</td>
<td>□: Coincided with</td>
<td>○: Accomplished</td>
<td>○: Accomplished</td>
<td>○: Accomplished</td>
</tr>
<tr>
<td>Safety</td>
<td>Obtain high ratings in the new car assessment programs (NCAPs) of respective countries.</td>
<td>□: Coincided with</td>
<td>○: Accomplished</td>
<td>○: Accomplished</td>
<td>○: Accomplished</td>
</tr>
</tbody>
</table>

- Expanded the introduction of i-ACTIVSENSE in the Japanese market. For all the vehicle types and models, excluding the Roadster (MX-5 overseas), the technologies that qualify for the “Wide” Suppo Car S (Safety Support Car S) category were applied as standard equipment. Specifically, six technologies qualifying for the “Wide” Suppo Car S category were made standard equipment for all the vehicle types and models other than the Roadster (MX-5 overseas). Other i-ACTIVSENSE features that have become standard are Blind Spot Monitoring (BSM), which supports drivers in confirming safety when changing lanes, and Rear Cross Traffic Alert (RCTA), which helps drivers confirm safety when backing out of a parking space or garage.

- Obtained the highest ratings in the new car assessment programs (NCAPs) of each country as follows:
  - J-NCAP collision safety performance evaluations: CX-5 and CX-8 obtained “S5”, the highest rating.
  - J-NCAP Advanced Safety Vehicle (ASV) Technology Assessment: CX-5 and CX-8 obtained “ASV++”, the highest rating.
  - Euro-NCAP safety performance evaluations: CX-5 obtained “S5”, the highest rating.
  - U.S.-NCAP collision safety performance evaluations: CX-5 obtained “5”, the highest rating.
SAFETY INITIATIVES

Mazda’s Basic Approach to Safety

Aiming to achieve a safe and accident-free automotive society, Mazda promotes safety initiatives from the three viewpoints of vehicles, people, and roads and infrastructure. In March 2007, Mazda announced its long-term vision for the technology development: “Sustainable Zoom-Zoom.” The basic policy of the vision is to “provide all customers who purchase Mazda vehicles with driving pleasure as well as outstanding environmental and safety performance.”

In August 2017, a decade after the original and in light of the rapid changes taking place in the automotive industry, Mazda announced “Sustainable Zoom-Zoom 2030.” This new vision for technology development takes a longer-term perspective and sets out how Mazda will use driving pleasure, the fundamental appeal of the automobile, to help solve issues facing people, the earth and society (see pp. 5-6). Mazda believes its mission is to bring about a beautiful earth and to enrich people’s lives as well as society. The company will continue to seek ways to inspire people through the value found in cars. In the realm of society, which encompasses safety, “Sustainable Zoom-Zoom 2030” demonstrates Mazda’s determination to leverage cars and a society that provide safety and peace of mind, to create a system that enriches people’s lives by offering unrestricted mobility to people everywhere.

Initiatives in Vehicles

Mazda will address the issue of traffic safety, which requires a multi-faceted, balanced, and comprehensive approach, by providing all its customers with excellent safety performance, through vehicle engineering, the field in which Mazda can take the initiative. While continuing to keep abreast of the latest safety advancements, Mazda works on technology development with the belief that technologies will demonstrate their true value only when their use becomes widespread.

Mazda Proactive Safety: Mazda’s Safety Philosophy

Mazda’s safety philosophy, which guides the research and development of safety technologies, is based on understanding, respecting and trusting the driver.

To drive safely it is essential to recognize potential hazards, exercise good judgment and operate the vehicle in an appropriate fashion. Mazda aims to support these essential functions so that drivers can drive safely and with peace of mind, despite changing driving conditions.

Since drivers are human beings, and human beings are fallible, Mazda offers a range of technologies which help to prevent or reduce the damage resulting from an accident.
By providing a good driving environment and excellent handling stability to support the drivers’ safer driving, Mazda aims to maximize the range of ordinary driving conditions in which the driver can concentrate on driving without anxiety or stress. If the risk of an accident increases, the sensing functions on the vehicle provide hazard alerts to help the driver avoid danger, thereby supporting safer driving. Moreover, understanding that human nature means that mistakes cannot be totally eliminated, Mazda offers safety functions on its vehicles that help prevent such human errors as much as possible, and if an error occurs, help prevent an accident or reduce the resulting damage.

While implementing measures appropriate for each accident risk so as to reduce the risk as soon as possible, Mazda places the highest focus on improving ordinary driving conditions to remove possible causes of an accident rather than on a “what if”-based approach (preparing for possible results). Through providing these safety technologies based on a respect and understanding of human nature, Mazda supports safer and secure driving.

**Continuously Evolving Basic Safety Technologies as Standard for All Vehicles**

Aiming to achieve a safe and accident-free automotive society, Mazda promotes continuous evolution of basic safety technologies, such as the ideal driving position and pedal layout, excellent visibility, and active driving display, and will install these in all vehicles as standard.

**Ideal Driving Position**

In the new-generation models*, the major driving operation devices, including the pedals and the steering wheel, which are interface between man and vehicle, are located in an ideal position for a driver to operate them with ease and without fatigue. **Pursuing the Ideal Joint Angle for Comfortable Driving**

The driving position is designed based on the theory of the “comfortable joint-link angle,” the joint angle at which the driver of any physical type can exert strength quickly and properly. One such example is Demio/Mazda2 equipped with a telescopic steering wheel*2 as standard equipment, which is a rare case in the segment of compact car.

**Ideal Pedal Layout**

The front wheels were repositioned farther forward and pedal shapes and spacing were optimized to realize a pedal layout that enables the driver to extend their leg and reach them more naturally. This helps enable finer pedal control and smooth foot transfer to the brake pedal. It is an ideal pedal layout that allows comfortable operation, even on long drives, and contributes to error-free operation, even when braking in an emergency. **Organ-Type Accelerator Pedal**

With an organ-type accelerator pedal, the driver’s heel is placed on the floor, and the driver’s foot and the pedal follows the same trajectory. This makes accelerator pedal control easier because the heel position is stabilized. The accelerator pedal is positioned where the driver’s foot naturally rests while sitting in the seat. This reduces both driving fatigue and the chances of the driver stepping on the wrong pedal when reacting quickly.

---

*1 The new products that have incorporated Mazda’s innovative base technology SKYACTIV TECHNOLOGY and Mazda’s new design theme “KODO-Soul of Motion” Applied models (as of March 31, 2018): Demio/Mazda2, Axela/Mazda3, Atenza/Mazda6, CX-3, CX-4, CX-5, CX-8, CX-9, Roadster/MX-5

*2 A mechanism to move the steering wheel back and forth.
Excellent Visibility

In the new-generation models*, Mazda considers it important to secure good visibility to help the driver prevent accidents by supporting his/her ability to predict and avoid his/her surroundings, such as road environment, other vehicles, obstacles, and pedestrians including children. The A-pillar is positioned about 100 mm rearward from its position in the previous model to expand the visible angle from the front seat by 1.8 degrees to both the right and the left. Moreover, to expand the vision through the door mirror so as to improve the visibility of pedestrians and obstacles, door mirrors are installed on the outer door board in a lower position. Visibility for children is specially cared.

“HMI Concepts” to Minimize Causes of Careless Driving

Human Machine Interface (HMI) refers to the equipment and mechanisms to facilitate transmission of various information between the driver and the vehicle. Mazda’s HMI helps drivers to maintain a stable driving position and concentrate on driving safely, even while dealing with a variety of information. The thoroughly human-centered cockpit design enables the driver to concentrate during driving and minimizes the three factors that cause careless driving: inattentive looking, inattentive thinking, operation in an unstable position. Mazda has adopted this cockpit design in the new-generation models* since 2013.

Concept: Heads-Up Cockpit

In designing the cockpit, Mazda places importance on ensuring that various information communication functions are used safely and comfortably. Aiming at helping the driver concentrate on driving safely in a correct posture while dealing with many kinds of information, this HMI concept has achieved minimum visual distraction and posture change.

1. Reducing cognitive distraction
   Driving information is displayed directly in front of the driver to minimize the distance their eyes must travel. To minimize cognitive distraction, the layout separates important driving-related information from other types.

2. Reducing visual distraction
   The center display has been moved as high as possible, without blocking the driver’s view. The Company has developed an Active Driving Display that projects driving information on the windshield within the driver’s effective field of view.

3. Reducing manual distraction
   In addition to working as a touchscreen, the center display can be controlled safely by a commander control designed to be operated entirely by feel.

i-ACTIVSENSE Advanced Safety Technologies**

Mazda is committed to continuous evolution of i-ACTIVSENSE advanced safety technologies, to deliver safer, more reliable cars to a greater number of customers, from beginners to elderly drivers. Mazda’s i-ACTIVSENSE is an umbrella term covering a series of advanced safety technologies, developed in line with Mazda Proactive Safety. They include active safety technologies that support safer driving by helping the driver to recognize potential hazards, and pre-crash safety technologies which help to avoid collisions or reduce their severity in situations where they cannot be avoided.

The Company has completed application of six technologies, including the collision damage reduction brake (Advanced Smart City Brake Support), for all the seven major models sold in Japan, as standard equipment. Under the new vehicle safety concept “Safety Support Car S (Suppocar S)” promoted by the Ministry of Economy, Trade and Industry and the Ministry of Land, Infrastructure, Transport and Tourism, these models qualify for the “Wide” Suppocar S category (as of August 2018).

1 The new products that have incorporated Mazda’s innovative base technology SKYACTIV TECHNOLOGY and Mazda’s new design theme “KODO-Soul of Motion”
2 Technologies made standard equipment on the seven major models sold in Japan (For details, see p. 48.)

* The new products that have incorporated Mazda’s innovative base technology SKYACTIV TECHNOLOGY and Mazda’s new design theme “KODO-Soul of Motion”
* Applied model (as of March 31, 2018): Demio/Mazda2, Axela/Mazda3, Atenza/Mazda6, CX-3, CX-4, CX-5, CX-9, and Roadster/MX-5
* Advanced Smart City Break Support (A-SCBS)*
* AT Acceleration Control
* Lane Departure Warning System (LDWS)*
* Adaptive LED Headlights (ALH)* or High Beam Control (HBC)* (either according to the grade)
* Blind Spot Monitoring (BSM)
* Rear Cross-Traffic Alert (RCTA)
* Technologies to be equipped to qualify for the “Wide” Suppocar S category

** Technologies to be equipped to qualify for the “Wide” Suppocar S category
## i-ACTIVSENSE technologies

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Effective when</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALH</td>
<td>Adaptive LED Headlights</td>
<td>Driving</td>
<td>Detects oncoming traffic and vehicles in front, automatically controlling the area illuminated by the high beams to maintain maximum visibility.</td>
</tr>
<tr>
<td>BSM</td>
<td>Blind Spot Monitoring</td>
<td>Driving (changing lanes)</td>
<td>Alerts the driver to the presence of vehicles in the blind spot with an icon in the wing mirror. If the driver indicates to change lanes, the icon flashes and a warning beep sounds.</td>
</tr>
<tr>
<td>DAA</td>
<td>Driver Attention Alert</td>
<td>Driving</td>
<td>Monitors the vehicle’s behavior and recommends a rest stop if signs of driver fatigue or reduced concentration are detected.</td>
</tr>
<tr>
<td>HBC</td>
<td>High-Beam Control</td>
<td>Driving at night</td>
<td>Detects oncoming traffic and vehicles in front, automatically switching between high beam and low beam settings.</td>
</tr>
<tr>
<td>LAS</td>
<td>Lane-Keep Assist System</td>
<td>Driving</td>
<td>Provides steering assistance to return the vehicle toward the center of the lane if the driver starts to stray from the lane.</td>
</tr>
<tr>
<td>SBS</td>
<td>Smart Brake Support</td>
<td>Driving</td>
<td>Works at lower speeds to automatically apply the brakes when there is a risk of frontal collision.</td>
</tr>
<tr>
<td>SCBS F</td>
<td>Smart City Brake Support</td>
<td>Driving</td>
<td>Works at lower speeds to automatically apply the brakes when there is a risk of frontal collision. This helps to avoid collisions or reduce the severity if one does occur.</td>
</tr>
<tr>
<td>MRCC</td>
<td>Mazda Radar Cruise Control</td>
<td>Driving</td>
<td>Measures the distance to the car ahead and controls speed to maintain a safer following distance.</td>
</tr>
<tr>
<td>MRCC</td>
<td>Mazda Radar Cruise Control with Stop &amp; Go function</td>
<td>Driving</td>
<td>Measures the distance to the car ahead and maintains a safer following distance. Now features stop &amp; go functionality.</td>
</tr>
</tbody>
</table>

## Hazard Recognition Support

- **BSM** (Blind Spot Monitoring)
- **RCTA** (Rear Cross Traffic Alert)
- **DAA** (Driver Attention Alert)
- **I-ACC** (Intelligent Adaptive Cruise Control)
- **MRCC** (Mazda Radar Cruise Control)

## Collision Avoidance / Damage Reduction Support

- **SBS** (Smart Brake Support)
- **SCBS F** (Smart City Brake Support)

## Environmental Protection

- **ALH** (Adaptive LED Headlights)
- **HBC** (High-Beam Control)
- **LAS** (Lane-Keep Assist System)
- **SBS** (Smart Brake Support)
- **SCBS F** (Smart City Brake Support)
- **Advanced SCBS** (Advanced Smart City Brake Support)
- **SCBS R** (Smart City Brake Support)
- **MRCC** (Mazda Radar Cruise Control)
- **MRCC** (Mazda Radar Cruise Control with Stop & Go function)

---

Advanced safety technology “i-ACTIVSENSE” reference website:
The Mazda Co-Pilot Concept: Human-Centered Autonomous Driving

The Mazda Co-Pilot Concept is Mazda’s development concept for human-centered self-driving technology. Based on this concept, people enjoy driving and are revitalized mentally and physically through the process. Meanwhile, the car knows all the movements of the driver and the car is driving “virtually” in the background at all times. If the unexpected occurs, such as the driver suddenly losing consciousness, the car takes control to help prevent endangering vehicle occupants and passersby. It also automatically contacts emergency services and drives safely to an appropriate location.

The Company aims to make the Mazda Co-Pilot Concept, which uses autonomous driving technologies to allow drivers to enjoy any drive with peace of mind, standard by 2025.

Mazda Co-Pilot Concept

When the driver’s condition is normal
Under normal conditions, drivers can enjoy driving themselves while the car constantly monitors their condition and conducts “virtual driving,” meaning it is ready to drive itself at any time.

When the driver cannot operate the vehicle in a normal manner
When it is determined that the driver cannot operate the vehicle normally, the car overrides the driver to avoid collisions and moves to a safe location to stop the vehicle.

EMPLOYEE’S VOICE

Forging ahead with research to offer safer and more reliable vehicles that make customers feel driving pleasure

I have been working on research into technologies for the early detection of drivers’ abnormal conditions, including a sudden change in their physical condition during driving. I attempt to develop technologies that can be applied to all vehicles, for example, ones for detecting drivers’ abnormal conditions without using a special sensor, but based on their driving behaviors. Through collaborative research with doctors, we have developed models of drivers’ behaviors in both normal and abnormal conditions, and so we are in the process of embodying these technologies. I remain committed to research activities to realize the Mazda Co-Pilot Concept for human-centered, autonomous driving technologies, thereby providing customers with safer and more reliable cars that make them feel driving pleasure.

Junichiro Kuwahara
Technical Research Center
Passive safety technologies help mitigate injuries to the driver and passengers if an accident should occur. Mazda does not simply comply with the laws of each country and region and NCAP test, but also conducts tests*1 for various types of potential collisions that might occur on the road, and has made steady progress in developing passive technologies to better protect passengers and drivers.

Major passive safety technologies are as follows:

SKYACTIV-BODY:
Mazda has developed SKYACTIV-BODY, a new-generation body structure with lightness and high rigidity, by revisiting the basic principles and reviewing every element of the structure, production method and materials.

Multi-Load Path Structure
Disperses the impact of a crash in multiple directions throughout the framework instead of absorbing it at specific portions.

Bumper Beams
The front and rear bumper beams adopt 1,800 MPa ultra-high tensile steel with the world's highest level of rigidity among mass production vehicles.

Cross-Shaped Front Frame
Based on the characteristic of the crash energy transferred mainly along the ridge lines of an object, the front tip of the front frame was molded into a cross shape, so as to increase ridge lines to twelve from four in a conventional square section. This helps the shock to disperse more widely, improving the energy absorption efficiency.

Pedestrian protection:
Mazda uses various methods to reduce injury to pedestrians in the event of a collision.

Impact-Absorbing Bonnet
To mitigate the impact and reduce injury if a pedestrian’s head hits the bonnet (hood), an energy-absorbing space is created beneath the bonnet. An energy-absorbing structure is adopted in various parts, including the bonnet hinge.

Impact-Absorbing Bumpers
Energy absorbing materials are used in the front part of the vehicle which hits pedestrians’ knees to mitigate the severity of pedestrian knee injuries, which may seriously affect their ability to walk. Also, stiffening reinforcement is placed at the bottom of the bumper to better prevent a pedestrian's leg from going under the vehicle.

Active Bonnet
At certain vehicle speeds, when sensors detect an impact exceeding a defined level, the rear end of the bonnet is raised. This creates a space between the bonnet and the engine which acts to absorb the energy of impact and reduces the severity of head injuries in collisions involving pedestrians. This design has been adopted since July 2012, for sport cars, such as Roadster/MX-5, whose bonnet is set in a low position.

Website on Technologies to Mitigate Injuries in an Accident

*1 Collision test and evaluation, rollover test, roof strength test, etc.
Mazda has earned high evaluations for its safety technologies.

### Third Party Safety Evaluations

**Ratings by vehicle model** *(As of August 31, 2018)*

<table>
<thead>
<tr>
<th>Rating</th>
<th>Mazda6</th>
<th>Axela</th>
<th>Demio</th>
<th>Roadster</th>
<th>CX-5</th>
<th>CX-3</th>
<th>CX-9</th>
<th>CX-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>J-NCAP*1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US-NCAP*2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IIHS*3</td>
<td>18TSP</td>
<td>18TSP</td>
<td>18TSP</td>
<td>18TSP</td>
<td>18TSP</td>
<td>18TSP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IIHS*3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euro-NCAP*4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Change in rating in the last three years**

<table>
<thead>
<tr>
<th>Rating</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>J-NCAP*1</td>
<td>5-Star</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>US-NCAP*2</td>
<td>5-Star</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>US-NCAP*2</td>
<td>4-Star</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Euro-NCAP*4</td>
<td>5-Star</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Euro-NCAP*4</td>
<td>4-Star</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

*1 Japan New Car Assessment Tests: Vehicle collision safety performance evaluations conducted by the National Agency for Automotive Safety and Victims’ Aid. For collision safety performance, 5-Star is the highest possible rating.

*2 National Highway Traffic Safety Administration’s 5-Star Safety Ratings program. 5-Star is the highest possible rating.

*3 Insurance Institute for Highway Safety: Safety performance evaluations by an independent, nonprofit organization funded by auto insurers. Top Safety Pick + (Plus) is the highest possible rating.

*4 European New Car Assessment Programme: An independent agency comprised of the transport authorities of European countries, etc. 5-Star is the highest possible rating.

*5 Not introduced as of August 31, 2018.

*6 Not evaluated.

*7 As of the end of August 2018. New-generation models were the target of evaluation.

---

### Initiatives with People

It is said that most traffic accidents are caused directly or indirectly by human behavior. Mazda endeavors to raise safety awareness among adults and children through various means of communication.

#### Raising Traffic Safety Awareness

In cooperation with local municipalities and organizations, Mazda and its Group companies in Japan and overseas conduct various activities to raise safety awareness. The Company hosts safety-related exhibitions at the Mazda Museum in the Hiroshima Head Office, the "Kids' Quiz on Traffic Safety" website for children, and other projects. In April 2018, Mazda held a program for experiencing the collision damage reduction brake as part of the Sustainable "Zoom-Zoom" Forum 2018 at the Mazda R&D Center Yokohama (MRY). The Company also organized other various events to promote understanding of Mazda’s safety technologies.

#### Safe Driving Demonstration

Starting from FY March 2015, Mazda has held the Mazda Driving Academy, an experience and training program to help customers in Japan learn the theories and techniques to control their cars easily, comfortably and safely. A variety of curriculums tailored to the needs and level of the customers are offered, from basic driver training of drive, turn, and stop, to the exciting experience of driving on a racing circuit, with the aim of improving their driving skills and raising the awareness of safe driving. In FY March 2018, the Mazda Driving Academy was held 11 times.