7

Safety

Material Issues

- Reducing traffic fatalities
- Applying automation and information technologies to everyday life

Basic Approach

Toward a Collision-Free Mobile Society

As exemplified by the words of the Company's founder Soichiro Honda that "as long as we are handling a mode of transportation, we are entrusted with human lives," Honda is, on the basis of the concept of "Safety for Everyone," aiming at a collision-free mobile society, where not only drivers and riders, but indeed everyone sharing the road, can safely and confidently enjoy the freedom of mobility.

Honda has a long history of safety dating back to the 1960s when it started traffic safety promotion initiatives, the first of their kind for motorcycle/automobile manufacturers. Honda has since been proactively undertaking safety awareness activities in many countries and regions while extending the scope from drivers and riders to all people involved in the traffic society, from children to senior citizens. Honda has also developed and released a number of new technologies before anyone else in the world, setting higher targets exceeding regulatory requirements and in a spirit that "if it does not exist, we will make it."

Now, the advancement of the Internet and other technologies has enabled people to gather information from across the world, meet many people and obtain things without having to move around. However, Honda believes that feeling a new world with one's five senses based on curiosity is one of people's invaluable joys. As such, the Company will continue to value "real" experiences and expand the freedom of mobility and its potential across the world.

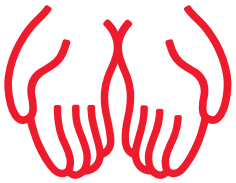
A collision-free mobile society envisioned by Honda is a society where all people can follow their curiosity and go anywhere freely with a total sense of security. In April 2021, Honda announced that it "will strive for zero traffic collision fatalities involving Honda motorcycles and automobiles globally by 2050." Not only to fulfill one of its social responsibilities but also to fabricate a joyous future, Honda will work toward a collision-free mobile society and continue to proactively evolve its traffic safety initiatives based on the actual accident situations unique to each region.

Global Safety Slogan

Safety for Everyone

Honda dreams of a collision-free mobile society where our customers, and everyone sharing the road, can safely and confidently enjoy the freedom of mobility.

As Honda respects individuality, it regards society as "a group of individuals," not as "a bundle of people." Not only does Honda's slogan "Safety for Everyone" embrace its approach of pursuing safety matching to each individual but also follows its belief that ensuring the safety of each member of society will consequently make the entire society safer and mark a step forward to a collision-free mobile society.



Basic Approach

Direction of Activities

Honda is working on traffic safety with a focus on the three elements: human ability (awareness-building activities), performance of mobility (technological development) and traffic ecosystem (collaboration, and development of systems/services).

Human Ability

Honda believes that efforts are needed to support the enhancement of human ability, ranging from driving skills to psychological and mental aspects, such as cognition, judgment and compassion toward others, for all people involved in the traffic society. Honda will translate these efforts into awareness-building activities matched to individual awareness, experience levels and physical capabilities.

Performance of Mobility

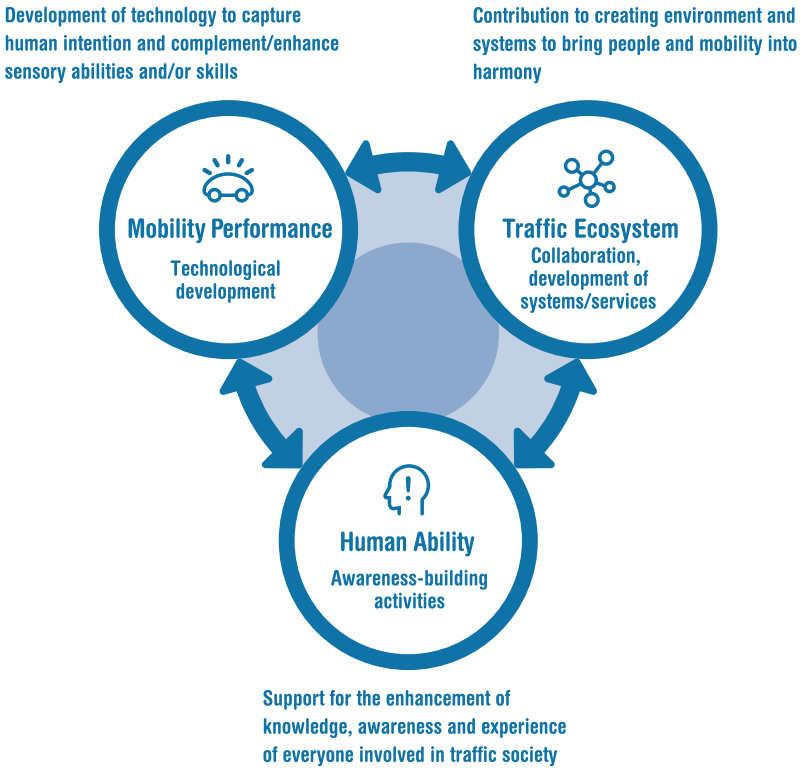
Honda believes that a mix of capabilities is needed to appropriately complement or augment human ability. These include a capability to protect the human body, a capability to avoid collisions to the extent possible and a capability to capture the intention of a person and convey it to the vehicle and other people. Honda intends to gain an even deeper understanding of the human body and consciousness and evolve its efforts to develop more people-oriented technologies.

Traffic Ecosystem

The traffic environment changes constantly due to traffic congestion, bad weather and various other factors. Honda believes that preventing accidents or mitigating their damage in such a traffic environment require dynamically understanding its holistic picture ("traffic ecosystem"). It encompasses the interrelation among diverse elements*1 constituting the environment and letting these elements connect organically*2. Honda will proactively work toward this goal through an open approach, including cooperation with various countries and regions and collaboration with other companies, and contribute to the healthy functioning of the traffic society.

As many traffic accidents are caused by very complex factors, Honda will both promote the individual evolution of technologies and activities of the three elements and ensure strong collaboration and coordination among them.

Three elements of safety



*1 Including roads, telecommunication infrastructure, automobiles, motorcycles and pedestrians
*2 Can be achieved by an approach that involves the development of technologies for systems and services related to roads and the traffic society, maintenance and improvement of roads themselves and formulation of relevant traffic rules.

safety

Basic Approach

Toward the Realization of Zero Traffic Collision Fatalities by 2050

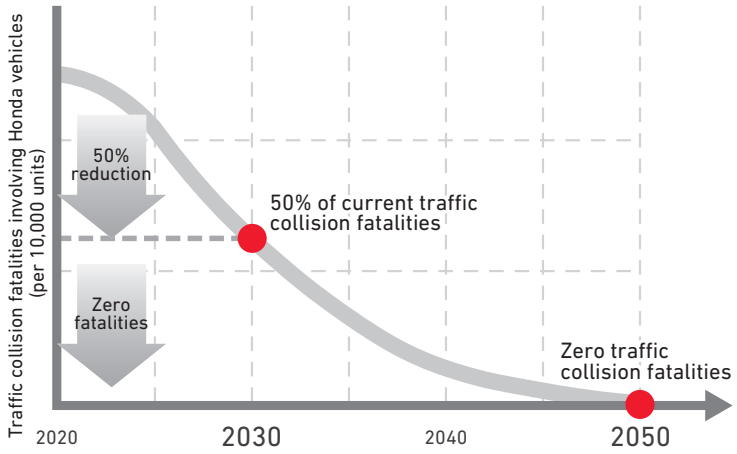
In April 2021, Honda announced that it "will strive for zero traffic collision fatalities involving Honda motorcycles and automobiles globally by 2050.*" In achieving this goal, Honda has also set a milestone of reducing global traffic collision fatalities involving Honda motorcycles and automobiles by half globally by 2030. This applies not just to new models but also to Honda motorcycles and automobiles already on the market. A major challenge in achieving this goal is fatal collisions caused by motorcycles in emerging countries. Honda has a social responsibility as the manufacturer that sells the majority of motorcycles.

Since automobiles are also involved in many fatal collisions of motorcycles, from the perspective of enhancing its safety technologies, Honda will evolve the currently available Honda SENSING and expand the introduction of Honda SENSING 360 to all models to go on sale in all major markets by 2030. Honda SENSING 360 is an advanced omni-directional safety and driver-assistance system for automobiles that utilizes Honda's expertise and know-how cultivated in the research and development of the Level 3 automated driving system. Furthermore, in order to realize a society with zero traffic collision fatalities, it is also necessary to consider accidents caused by apparent erroneous driving on the part of the driver. Accordingly, Honda has been working to develop two crucial technologies. One is the Intelligent Driver-Assistive Technology, which aims for zero human error when driving and provides each individual driver total peace of mind. The other is the Safe and Sound Network Technology that averts various risks by connecting people, mobility and infrastructure through telecommunications and enables coexistence among all road users.

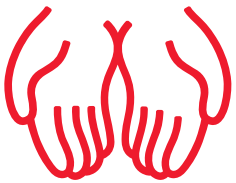
As a company involved in both motorcycle and automobile businesses, Honda will continue to strengthen its research on safety technologies that enable motorcycles and automobiles to safely coexist. However, technological research alone will not achieve zero traffic collision fatalities.

Particularly in emerging countries, there are many collisions that can be prevented through traffic safety education activities and by approaching the issue from the perspective of infrastructure and government policies. These are also the areas Honda will focus on. Honda will leverage its strengths to continue leading the way in realizing a collision-free society from the standpoints of both hardware and software.

Honda's safety targets



* Traffic collision fatalities involving Honda motorcycles and automobiles: Traffic collisions while riding/driving Honda motorcycles/automobiles and those involving pedestrians and cyclists (road users excluding those intentionally and seriously violating the related rules or those not responsibly able to do so)



Safety Initiatives

Human Ability

Honda's Approach

In 1970, Honda established the Traffic Safety Promotion Operations in Japan and subsequently a department dedicated to promoting activities overseas within the operations in 1972. Since then, Honda has been reinforcing its efforts overseas by establishing Traffic Education Centers* in various countries and cooperating with local dealers. As of 2021, Honda is carrying out traffic safety promotion activities in 43 countries and regions throughout the world including Japan.

Honda's activities are based on the ideas "To pass on safety education from person to person" by conveying the importance of traffic safety directly to customers at dealers and "To provide a participatory hands-on education program" under the guidance of expert instructors.

In Japan, Honda has provided education and actual training for traffic safety to more than 6.66 million customers to date in cooperation with Honda Traffic Education Centers, motorcycle and automobile dealers, local corporations and schools.

Overseas, particularly in emerging countries, there are areas where regulations, traffic rules and road infrastructure are not yet ideal despite the fact that motorization is rapidly progressing. As such, an increase in the number of fatal traffic accidents has become a social issue. Therefore, Honda is undertaking activities matched to the traffic situation of each country while collaborating with local governments and relevant organizations.

Countries and regions engaged in traffic safety activities

* Honda facilities where internal and external instructors on traffic safety are trained and driving safety education is provided to corporations, schools and individual customers

safety

Safety Initiatives

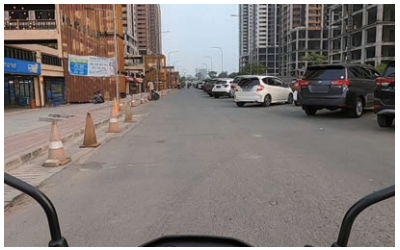
FY2022 Activities

Working to Expand KYT Education in Asian Countries

There is a strong need for the further evolution of Honda's traffic safety promotion activities in Asian countries, where the rapid progress in motorization has resulted in an increase in traffic fatalities. In response, Honda cooperated with the Regional Operations (Asia and Oceania) and started providing support for more comprehensively promoting hazard prediction training (*kiken yosoku* training – KYT) programs within the region.

Specifically, Honda created a video compiling its know-how on and points to be noted when developing KYT materials appropriate to the local conditions and traffic environment in each country and region, such as the need to select example cases among actual accident and potentially serious near-accident cases. Honda also provided advice on how to utilize the resulting materials in implementing the training.

As a result, 11 Honda subsidiaries are now in the process of creating their own KYT materials matched to the respective local traffic environment. Among these subsidiaries, P.T. Astra Honda Motor in Indonesia, which is engaged in the sales of motorcycles, has combined KYT lectures and practical training using motorcycles in its curriculum and is making preparations for launching it as a new program.




KYT program of P.T. Astra Honda Motor, a Honda subsidiary selling motorcycles in Indonesia

Collaboration with Traffic Education Centers

In Japan, Honda provides participatory hands-on education matched to the needs of companies, organizations and individuals.

At Honda's seven traffic safety education centers nationwide, expert instructors train traffic safety leaders. In order to increase safety awareness and improve riding/driving skills, they also provide classroom lectures and safety training using actual vehicles for employees of companies, organizations, schools and individuals at dedicated facilities. In 2021, Honda provided education to some 50,000 persons.

In Asian countries, traffic education was provided to approximately 1.24 million persons to raise safety awareness. Honda will continue to offer support matched to local needs, including its traffic safety know-how amassed in Japan and human resources development.

TOPICS

Local Subsidiaries in Thailand and Taiwan Receiving an Award from the Respective Governments

In 2021, Thai Honda Manufacturing Co., Ltd.,* a Honda subsidiary in Thailand selling motorcycles, and Honda Taiwan Co., Ltd., another Honda subsidiary in Taiwan, received an award from the respective governments for their efforts to improve the local traffic environment.

Thai Honda Manufacturing received the National Treasure Award from the Office of the Permanent Secretary under the Office of the Prime Minister for its Honda Safety Thailand Project, an activity to instill safe riding practices, as it has contributed to the social development and a better quality of life.

Honda Taiwan also received the Top Honor Award under the Golden Safety Award program from the Ministry of Transportation and Communications of the Taiwanese government for its efforts for improvement of the traffic environment. The award was granted as a result of the voting by experts and scholars.

Thai Honda Manufacturing at the award ceremony

Honda Taiwan at the award ceremony

* The company name was changed to Thai Honda Co., Ltd. on June 1, 2022.

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Safety Initiatives

Collaboration with Local Communities

In Japan, Honda offers educational programs and teaches instruction techniques to traffic safety instructors and employees of partner companies responsible for conveying traffic safety in each local community.

At this time, Honda validated if the use of its educational programs has led to changes in participants' behavior.

Specifically, a check was performed in Shizuoka Prefecture in cooperation with first to sixth graders, who have participated in either the "Learn about Traffic Safety with 'Dekiru-nyan' Cat" ("Walking along Roads" version for children in lower grades) or the "For the Children Who Will Star in the Societies of the Future" (targeting children in middle to upper grades and junior high school students).

Specifically, Honda observed how the children walked to a crossing on their way home and if they took safety action when crossing the street before, on the day of, one week and one month after the corresponding traffic safety class.

The results of the observation of first and second graders showed that the program was effective to a certain degree as everyone stopped rushing into a street and more children raised a hand when crossing the street immediately after the class. However, their behavior diminished after one week and one month, returning to the level observed before the class. Thus, the results revealed the necessity to educate children on a continuous basis.

Among the upper grade children, there was no discernible change in their behavior before and after the class. This was likely because the content covered broader, additional topics, such as riding bicycles safely as well as rules and etiquette they should observe as a member of the traffic society, and because they felt embarrassed to raise their hand while crossing the street.

An expert commented on the effort made by Honda, saying: "Gauging the effectiveness of the programs, creating them and implementing them at school is also very meaningful." Based on the validation results, Honda will work to create programs that are easier to provide on a regular basis.

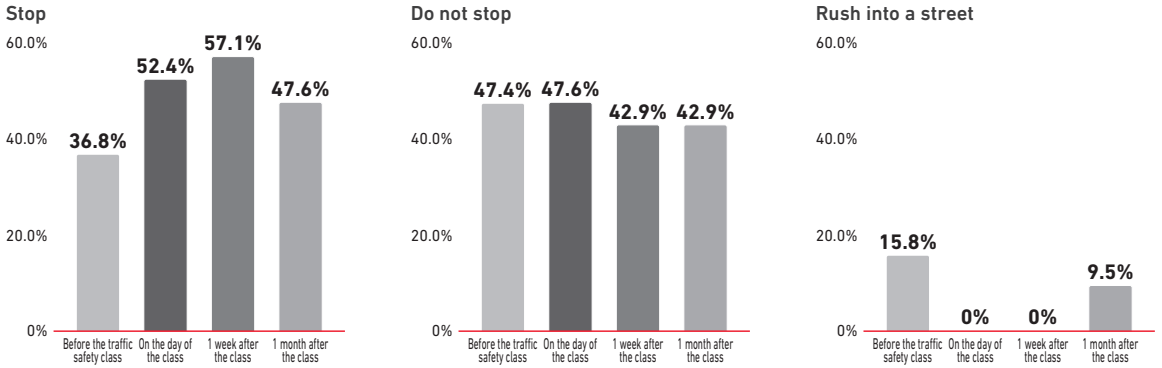
PDF

Survey results of the effectiveness of traffic safety education programs, spring 2022 issue (No. 508) of SJ, Honda's traffic safety information magazine (in Japanese)

> https://www.honda.co.jp/safetyinfo/sj/contents/pdf/2022SJspring_1to2.pdf

Verifying changes in children's behavior

Changes in behavior of first graders when crossing the street



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Safety Initiatives

Collaboration with Relevant Organizations

Honda proactively fosters collaboration with local governments and relevant organizations to achieve zero traffic collision fatalities.

As an example, Honda's Safety Map was created based on three sources of information. These are information on areas prone to emergency braking, collected through "Internavi," Honda's original car navigation system; accident black spot information possessed by the police; and road hazard information posted by local residents. Anyone can freely access the map to obtain the necessary information. Companies, the police and other road management organizations are also using the map to improve road environments.

Recently, the Chiba Prefectural Police Headquarters carried out road maintenance such as the addition of deceleration marks and road markings based on information on areas prone to emergency braking.

Honda has also cooperated in running the 51st National Police Motorcycle Safe Riding Competition of Japan's National Police Agency. Also, through participation in activities of the Japan Automobile Manufacturers Association and other industrial organizations, Honda has been providing a broad range of cooperation. Examples of such activities include proposing traffic safety measures to the governments, holding riding/driving safety seminars for high school students, adults and senior citizens, hosting awareness-building events and developing instructors.

Example of improvements made based on areas prone to emergency braking provided on Honda's Safety Map

Before improvement: The "STOP" marking was fading.

After improvement: The "STOP" line and letters were repainted and colored pavement within the intersection were added.

Safety Initiatives

Development of Educational Equipment

Honda leverages its know-how on riding/driving safety and hazard prediction training (*kiken yosoku* training – KYT) accumulated over the years and develops and promotes the widespread use of educational equipment, including simulators, which assumes actual traffic conditions and enables people to experience hazards in a safe equipment.

In April 2021, Honda significantly upgraded its Driving Simulator. It now has a seat and steering wheel used in an actual vehicle as well as an enhanced software program. Realizing greater user-friendliness and low cost, the simulator is used by driving schools nationwide.

Besides the simulator, Honda offers a lineup of equipment matched to diverse participants, such as a Riding Simulator for motorcycle KYT difficult to conduct on the road; Bicycle Simulator to learn safe bicycle riding; Movie KYT that enables a large group of persons to experience hazard prediction; and Riding Trainer*1 that offers hazard perception training for motorcycle riders by operating the equipment themselves and that can be easily relocated to overseas facilities.

Training using Driving Simulator Type DB Model-S

Activities in the Welfare Field

In addition to the development of welfare vehicles, Honda provides support in terms of "software" by providing Training Support Program for Driving Rehabilitation*2 for persons with disabilities who want to drive again; a simulator and evaluation software to evaluate driving ability at hospitals and other facilities; and Safety Training Program for Operating Nursing Vehicles*3 for drivers providing pickup and drop-off services for senior citizens and persons with disabilities.

*1 Available in eight languages, approximately 6,000 units of the Riding Trainer are used worldwide, with some 3,000 units in Asia and Oceania alone.
*2 A program offered at Honda Traffic Education Centers as a means to evaluate the driving competence of people with higher cerebral dysfunction wishing to resume driving. It is used to check their current ability to drive an actual vehicle and train them to overcome the identified issues.
*3 A program offered at Honda Traffic Education Centers for welfare facility drivers providing pickup and drop-off services. It provides advice on preventing accidents during these services as well as training to facilitate an understanding of the importance of giving due consideration to their passengers.

TOPICS

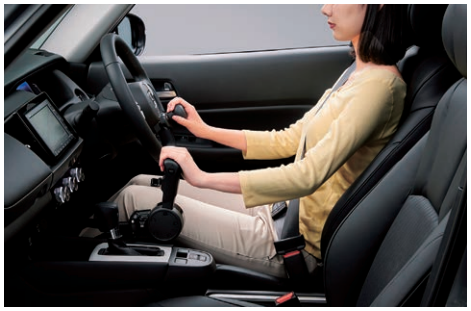
Sale of Honda Franz System

The Franz System is a driving assist system developed by Eberhard Franz, a German engineer with disabilities in both arms, to drive a car with his feet. Honda received technical guidance directly from Mr. Franz, and after augmenting the system with its original technology, released the Honda Franz System in 1982. At present, Honda is the sole provider of the system in Japan.

In 2021, Honda Access Corp. initiated sales of the updated Honda Franz System with greater convenience and comfort for the Fit e:HEV. The company has also started leasing training vehicles equipped with the system to support customers wishing to obtain a driver's license.

In addition, Honda has also developed the Honda Techmatic System series of various driving assist devices and has been selling them through Honda Cars dealers nationwide. By doing so, Honda supports the social engagement of persons with physical disabilities.

An example of a vehicle equipped with Honda Franz System (steering pedal)



An example of a vehicle equipped with Honda Techmatic System Type D (manual driving assist device)

WEB
Honda's welfare vehicles (Japanese only)
> https://www.honda.co.jp/welfare/

WEB
Stories to Pass on: Development of a Vehicle Equipped with Honda Franz System (Japanese only)
> https://www.honda.co.jp/50years-history/challenge/1982franzsystemcar/

safety

Safety Initiatives

Performance of Mobility

Honda's Approach

Honda believes that the damage of accidents can be effectively reduced by fully understanding the real accident situations in a real-world traffic environment comprising multiple types of road users, including motorcycles and automobiles, and by conducting detailed analysis on accident mechanisms. The Company has engaged in technological development accordingly.

To date, Honda has developed the world's first pedestrian dummy*1, an anthropomorphic model used to reproduce the human body's kinematics during vehicle-to-pedestrian collision. Its aim was to identify the portions of the vehicle body most often resulting in injuries and to reduce pedestrian head injuries during the collision with a vehicle. The Company has also established the world's first indoor omni-directional crash test facility to conduct research into more realistic crash configurations. As for pedestrian dummies, in order to enhance safety for the traffic society as a whole, their use is not only limited to the development of Honda's products. They are also leased to other companies and research institutions across the world, widely contributing to studies on pedestrian protection.

In addition to the above, Honda has become the first company in the world to provide a number of new technologies. These include the driver-side SRS airbag, Advanced Compatibility Engineering (ACE) body structure*2, Collision Mitigation Braking System (CMBS) and "Honda SENSING/AcuraWatch" advanced safety and driver-assistance system.

Going forward, Honda will apply the Honda SENSING 360 omni-directional safety and driver-assistance system and technologies for pedestrian protection, enhanced collision mitigation and advanced, automatic reporting system of collisions (including those involving pedestrians), which fully cover fatal collision situations, to all automobile models to be released in major markets by 2030. In emerging countries, Honda will equip more motorcycles with its advanced braking system and headlights that provide better visibility to riders and make them more visible by other road users.

Moreover, Honda installed Honda SENSING capable of detecting motorcycles to the Vezel released in 2021 and will progressively expand its use in subsequent models. This is one of the Safety for Everyone technologies that make the most effective use of Honda's characteristics of manufacturing both motorcycles and automobiles.


Pedestrian dummy


Indoor omni-directional crash test facility


SRS airbag


Advanced Compatibility Engineering (ACE) body structure


Collision Mitigation Braking System (CMBS)

*1 Anthropomorphic models used to reproduce the human body's kinematics during vehicle-to-pedestrian collision with the aim of identifying parts of the vehicle body most often resulting in injuries and reducing pedestrian head injuries during the collision with a vehicle. The current third-generation dummies have a more "realistic" neck, back and thighs in addition to the head, thus offering more accurate pedestrian kinematics after a collision and allow realistic collision analysis.

*2 A safety body structure that efficiently distributes and absorbs frontal crash energy through the engine room. It offers significantly greater occupant protection and reduces damage to the other impacted vehicles.

safety

Safety Initiatives

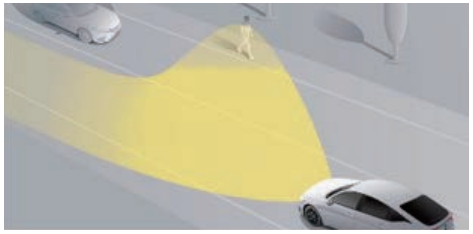
FY2022 Activities

The “Honda SENSING/AcuraWatch” advanced safety and driver-assistance system continues to be used in an increasing number of models. In Japan, Honda has installed this system in more models in the mini-vehicle and compact vehicle categories, such as the N-BOX and Fit.

In Japan, Honda installed the Traffic Jam Assist for the first time in the Civic in September 2021. The Civic also became the first Honda vehicle to be equipped with an adaptive driving beam system. While driving using the high beams, this function automatically controls the area being illuminated depending on the circumstances when detecting a car ahead or an oncoming car. It also ensures the visibility for the driver without blinding pedestrians.

In October 2021, Honda unveiled its Honda SENSING 360, which has been developed by leveraging the expertise and know-how accumulated through the research and development of Level 3 automated driving technologies. The Company intends to install the system in all models to be released in major markets by 2030.

In many countries and regions, including India, which is the world’s largest market for motorcycles, Honda will increase the number of models equipped with an advanced braking system, such as the Combined Brake System (CBS) that ensures coordinated, more efficient operation of the independent front and rear brakes. Honda is also equipping more models with LED headlights. Boasting a long life and high resistance to impact, these lights are less prone to burning out and can serve to reduce riding motorcycles without headlights. In addition to the increased visibility for riders themselves, encouraging the use of headlights during daytime will make them more visible from surrounding automobiles and pedestrians. Honda believes that this improved mutual visibility will help prevent collisions.



Adaptive driving beam system

Advanced braking system

LED headlights

safety

Safety Initiatives

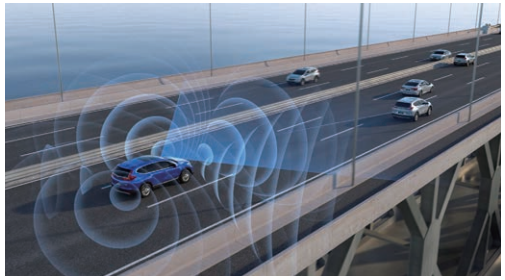
TOPICS

Unveiling Honda SENSING 360 Omni-Directional Safety and Driver-Assistance System

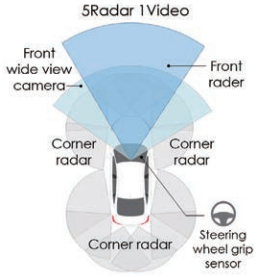
In October 2021, Honda unveiled the new Honda SENSING 360*1 omni-directional safety and driver-assistance system, which eliminates blind spots around the vehicle and contributes to collision avoidance and the reduction of driver burden while driving. Further evolved from the previous system, Honda SENSING 360 features an expanded sensing range not only in the front and rear, but omni-directionally around the vehicle. Application of Honda SENSING 360 will begin in 2022 with automobiles to be introduced in the Chinese market. Honda will strive to expand the application to all models to go on sale in all major markets by 2030.

Since its introduction in 2014, the Honda SENSING*1 advanced safety and driver-assistance system has been further advancing its functions, expanding its application to mass-production models globally and supporting Honda customers in a variety of driving situations.

Honda SENSING 360 realized 360-degree sensing*2 by adding a total of five units of millimeter-wave radar in front and at each corner of the vehicle, in addition to the monocular camera*3 that is used by the current Honda SENSING. This expanded sensing range covers blind spots around the vehicle, which are difficult for the driver to visually check, and contributes to the avoidance of collisions with other vehicles and pedestrians as well as a reduction of the driver burden. For the development of Honda SENSING 360, Honda leveraged its expertise and know-how amassed through the research and development of Level 3 automated driving technologies.



Notional image of Honda SENSING 360



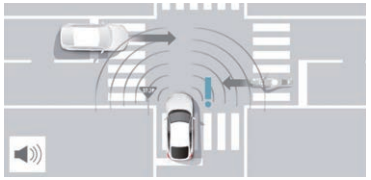
5 radar units and 1 video recorder

Key features of Honda SENSING 360

Collision Mitigation Braking System (CMBS)

Enhanced functionality
Intersection: Entering the intersection at the same time from different directions
Pedestrian: Detecting vehicles coming from sides or oncoming

Detecting automobiles and motorcycles crossing in front of the intersection



Detecting pedestrians crossing the intersection when turning right or left

Lane change collision mitigation

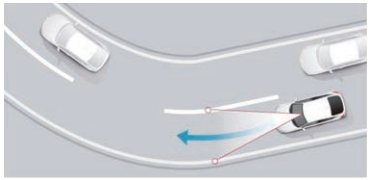
Assisting steering for collision avoidance

Front cross traffic warning

Notifying information about approaching vehicles to cross the intersection when driving at a low speed or starting when stopped

Cornering speed assist

Adjusting vehicle speed by detecting the curvature of the lane before reaching the curve



Active lane change assist

Steering assisted by the system when changing the lane

*1 There is a limit to the capabilities (e.g., recognition capability and control capability) of individual functions of Honda SENSING and Honda SENSING 360. It is necessary to not overestimate their capabilities and drive safely while maintaining a good driving posture, paying constant attention to one's surroundings.

*2 There is a limit to the detection performance of Honda SENSING 360. The 360-degree sensing does not eliminate the need for visual confirmation by the driver.

*3 Depending on the sales period and models, some Honda SENSING systems feature a camera which is not monocular.

Safety Initiatives

TOPICS

Intelligent Driver-Assistive Technology Eliminating Human Errors When Driving

In November 2021, Honda held a world premiere of its advanced future safety technologies currently under development. These technologies aim to realize a society where everyone sharing the road will be free from the risk of traffic collisions and enjoy the freedom of mobility with total peace of mind. The Intelligent Driver-Assistive Technology, which is one such technology, is the world's first*1 artificial intelligence (AI)-powered next-generation technology providing assistance that is suited to the ability and situation of each individual to reduce driving errors and risks, helping the driver achieve safe and sound driving.

With the goal to unravel the underlying causes of driving errors that make the driver feel anxious, Honda has been conducting research and development of "technologies to understand people" with an original method that utilizes fMRI*2. In addition to technologies to understand human behavior and conditions, which Honda has amassed to date, the Intelligent Driver-Assistive Technology uses ADAS sensors and cameras to recognize potential risks in the vehicle's surroundings, which enables AI to detect driving risks. At the same time, AI will determine optimal driving behavior on a real-time basis and offer assistance suited to the cognitive state and traffic situations of each individual driver.

<Three values Honda will offer with its next-generation driver assist technology>

1. No driving operation errors (Operational assist): Vehicle offers AI-based assist to reduce drifting and prevent a delay in operations.
2. No oversight/No prediction errors (Cognitive assist): Vehicle communicates risks with visual, tactile and auditory sensations.
3. No errors due to daydreaming and careless driving (Attentiveness assist): Vehicle helps reduce driver fatigue/drowsiness.

Going forward, Honda will further advance the Intelligent Driver-Assistive Technology and continue making progress in development with the goal to establish underlying technologies during the first half of the 2020s. Honda will thereafter launch practical applications during the second half of the 2020s.

With this technology, Honda will advance the conventional driver assist that helps the driver avoid risk while it is occurring to the AI-powered driver assist. This in turn will keep the driver away from the risks and aim to eliminate human errors, which are the cause of over 90% of traffic collisions*3.


Briefing to present Honda's safety vision and technologies


Cognitive assist (image)

Vehicle equipped with the Intelligent Driver-Assistive Technology

*1 Survey by Honda
*2 Functional magnetic resonance imaging (one of the methods to obtain images of brain's functioning areas based on changes in blood flow)
*3 Source: "Number of Fatalities in Traffic Accidents By Type of Violations of Laws," White Paper on Traffic Safety in Japan 2017

Safety Initiatives

Traffic Ecosystem

Honda's Approach

In 1998, Honda started to offer "Internavi," a car navigation system equipped with communication functions, in Japan. Through the system, Honda has been providing drivers with information on traffic congestion, weather and disasters by using driving data gathered from Honda vehicles. In this way, Honda has helped them drive more safely and comfortably.

In 2003, Honda became the first automaker in the world to commercialize a Congestion Prediction function that can predict congestion while foreseeing changes in traffic patterns. Following the 2011 Great East Japan Earthquake, Honda made available information on passable roads for use by people traveling in disaster-affected areas on the map provided on a special disaster information website of Google Crisis Response*1. In doing so, Honda centrally aggregated its collected driving track data into actual traffic records to extract information on passable roads. Honda provided similar information after the 2016 Kumamoto earthquakes on Google Maps and Yahoo! Maps.

In 2013, Honda launched a Safety Map service that integrates and analyzes various information, such as emergency braking information collected through the Internavi system, information on traffic accidents provided by the police and local governments and traffic information provided by local residents. A map of accident-prone areas is shown on Honda's website for drivers to check in advance. Since 2013, a cumulative total of more than 150 road improvements, such as adding road markings, have been made by the local governments and other organizations based on this Safety Map.

In addition, Honda is participating in D-Call Net®*2 in Japan, a system commonly referred to as an Advanced Automatic Collision Notification (AACN), which uses connected car technology. The system automatically analyzes the vehicle data upon a collision using an algorithm based on the database of some 2.8 million accident cases in Japan and estimates the probability of death or serious injury. It then reports the accident automatically from the vehicle to fire departments and cooperating hospitals. The plan for the future is to develop a system that also covers collisions involving pedestrians and those with motorcycles to save even more lives.

Going ahead, in order to realize zero traffic collision fatalities involving Honda motorcycles and automobiles globally by 2050, Honda will strive for a collision-free traffic society for anyone sharing the road by leveraging its Safe and Sound Network Technology that connects all road users through telecommunications.

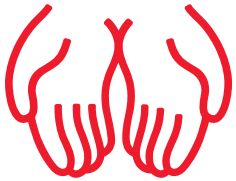
FY2022 Activities

The utilization of communication technologies is one initiative to contribute to the sound development of a traffic ecosystem.

In Japan, since installing a Honda CONNECT on-board communication module in the Fit released in February 2020, Honda also fitted the module in the Vezel and Civic released in April and September, respectively, in FY2022.

The on-board communication module will be gradually equipped in new automobiles, connecting the vehicle directly to a support center in case of an emergency such as a traffic accident. This will in turn make it possible for the support center operator to send vehicle and location information simultaneously to the police, fire station and insurance company, enabling prompt and proper responses.

In the area of motorcycles, the Connected Motorcycle Consortium (CMC) Next, which is jointly promoted by Yamaha Motor Co., Ltd., BMW Motorrad, KTM AG and other companies, analyzed collision situations based on accident data and identified particular scenarios in which collisions have happened because motorcycles were not recognized by other vehicles. The consortium also created use cases on how vehicle-to-x (V2X) solutions should be used to prevent such accidents. In FY2023 onward, the CMC Next will leverage these outcomes to explore more concrete specifications of solutions targeting motorcycles.



*1 Google Crisis Response is a registered trademark of Google LLC.
*2 D-Call Net® is a registered trademark of the NPO Helicopter Emergency Medical Service Network (HEM-Net).

Safety Initiatives

TOPICS

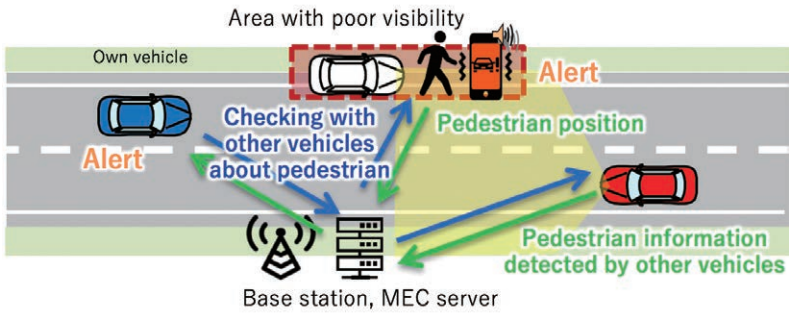
SoftBank and Honda Conducting Use Case Based Verification on Technologies to Reduce Collisions between Pedestrians and Vehicles Utilizing 5G SA and Cellular V2X

Honda R&D worked with SoftBank Corp. to conduct a use case based verification of technologies to reduce collisions between pedestrians and vehicles using a 5G standalone mobile communication system (5G SA)*1 and a cellular V2X communication system*2 in an effort to realize a society where both pedestrians and vehicles can enjoy mobility safely and with total peace of mind.

The verification was conducted by using SoftBank's 5G SA experimental base station installed at Honda R&D's Takasu Proving Ground (located in Takasu Town, Hokkaido Prefecture) and Honda R&D's recognition technology for the following use cases.

1. Reduce collisions involving pedestrians who are visible to vehicles
In an environment where a pedestrian can be seen from the moving vehicle, and when the vehicle's on-board camera recognizes the risk of a collision such as the pedestrian entering the roadway, the vehicle sends an alert to the pedestrian's mobile device directly or via a multi-access edge computing (MEC) server*3. This will enable the pedestrian to take evasive action to prevent a possible collision with the vehicle.

2. Reduce collisions involving pedestrians who are not visible to vehicles
This case involves an environment where a pedestrian cannot be seen from the moving vehicle due to obstacles such as parked cars along roadsides. If there is a pedestrian present in the area with poor visibility, the system notifies the pedestrian of the approaching vehicle and also notifies the vehicle of the pedestrian from the pedestrian's mobile device. When there is a second vehicle in a position to see the pedestrian, a collision will be prevented by high-speed data communications between the moving vehicle, pedestrian and other vehicle.



Sharing information on an area not visible from one's own vehicle (image)


Identifying a pedestrian showing hazardous behavior using an on-board camera (image)

Human-machine interface (HMI) on pedestrian's device

*1 Standalone 5G is a cutting-edge technology that combines new 5G dedicated core equipment and 5G base stations, unlike the conventional standalone system that uses 4G core equipment and combines it with 5G base stations

*2 A communication standard established by 3GPP (a standardization organization that formulates standards for mobile communication systems), which is a technology that uses mobile networks for vehicle-to-vehicle, vehicle-to-infrastructure, vehicle-to-network and vehicle-to-pedestrian communications

*3 A technology that optimizes and accelerates communications compared to cloud servers by deploying data processing functions in locations close to terminals, such as base stations

Safety Initiatives

TOPICS

Unveiling Safe and Sound Network Technology Connecting All Road Users through Telecommunications

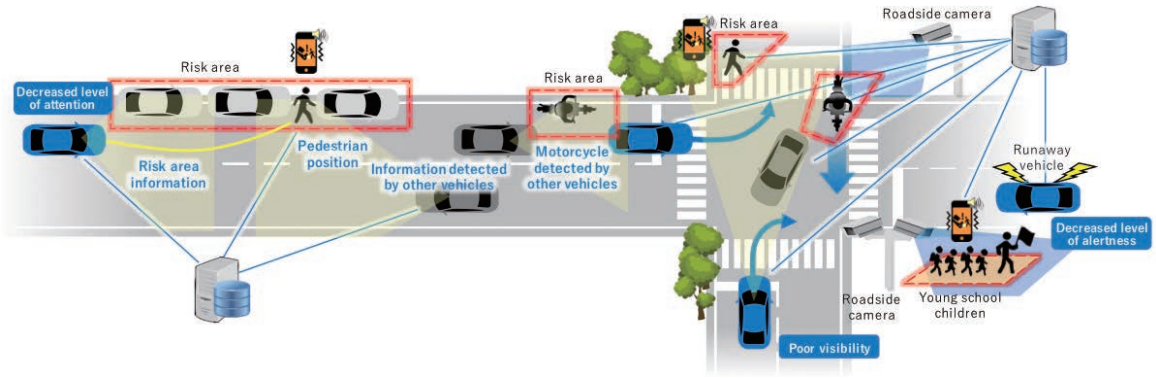
Toward realizing zero traffic collision fatalities by 2050, Honda unveiled for the first time in the world its Safe and Sound Network Technology at a briefing to present Honda's safety vision and technologies held in November 2021. This technology connects all road users, both people and mobility products, through telecommunications, making it possible to predict potential risks and help people avoid such risks before collisions actually occur.

As an effort to realize a collision-free traffic society for all road users, Honda is striving to create a "cooperative safety society" where utilization of telecommunication technologies will enable everyone sharing the road to be connected and coexist.

With the Safe and Sound Network Technology, potential risks in the traffic environment will be detected based on information obtained from roadside cameras, on-board cameras and smartphones. Such potential risks include senior citizens falling ill, inexperienced young or novice drivers, fatigue, drowsiness, driving idly, a sense of urgency or impatience resulting in a decreased level of attention or alertness as well as the risk of small children on their way to kindergarten or school rushing into the street. The information will be aggregated in the server to reproduce that traffic environment in the virtual space.

In that virtual space, in consideration of the conditions and characteristics of each individual road user, the system predicts and simulates the behaviors of road users at high risk of a collision. Then, the system derives the most appropriate support information to help the road users avoid risks. Such support information will be communicated intuitively to automobile drivers, motorcycle riders and pedestrians through "cooperative risk human-machine interface (HMI)," which will make it possible for the system to encourage road users to take action to avoid a collision before it happens.

Aiming for real-world implementation of this technology after 2030, Honda will build the system and complete verification of its effectiveness in the first half of the 2020s, then accelerate industrywide and public-private collaboration with an aim to standardize the technology in the second half of the 2020s.



Safe and Sound Network Technology (image)

safety

Safety Initiatives

Third-Party Evaluations

Honda's Approach

Many of Honda's models have achieved high safety assessments from NCAP*1 in various regions.

Results of key third-party evaluations (tests conducted in FY2022)

Country / Region	Third-party evaluation		Model
Japan	JNCAP	5 ★	Vezel
Europe	Euro NCAP	5 ★	Performance not evaluated in FY2022
China	C-NCAP	5 ★	Fit
	C-IASI*2	GGG	Performance not evaluated in FY2022
U.S.A.	NCAP	5 ★	Acura MDX / Acura TLX
	IIHS*3	TSP+	Acura RDX / Acura TLX / Accord / Insight / Odyssey / Acura MDX / Civic sedan / Civic hatchback
		TSP	CR-V
Australia	ANCAP	5 ★	Performance not evaluated in FY2022
Southeast Asia	ASEAN NCAP	5 ★	Civic sedan
Latin America	Latin NCAP	5 ★	Performance not evaluated in FY2022

*1 This refers to New Car Assessment Program. This is a program that tests and evaluates the safety performance of cars, which is performed by public organizations in various regions. Testing and evaluation methods are different for each region. Ratings range from 0★ to 5★ (5★+ is the highest rating in some regions).
*2 This refers to China Insurance Automotive Safety Index. It tests and assesses the safety performance of vehicles, in which the four grades of G (excellent), A (good), M (general) and P (poor) are used. The purpose of the assessment is to improve the safety of vehicles and reduce the insurance premium.
*3 The organization conducts the car assessment that tests and evaluates the safety performance of various cars. IIHS only awards TSP and TSP+ to vehicles that achieved excellent test results. TSP refers to Top Safety Pick.
*4 Six awards won by Honda: Best Forward Facing Child Occupant Protection 2017–2020; Safety Technology Award; Excellent Award – Consistent 5-Star (Honda City); Excellent Award – Consistent 5-Star (Honda Civic); The Most 5-Star Car 2012–2016 (Adult Occupant Protection); and Best Road Safety Partner

TOPICS

Civic Receiving a Five Star Rating from ASEAN NCAP

In October 2021, the Civic (released in Thailand in August 2021) received a Five Star rating from ASEAN NCAP, a third-party safety evaluation program in the ASEAN region. Under the newly launched 2021–2025 Protocols, vehicles need to receive an excellent rating in the category of motorcyclist protection in addition to the categories of adult occupant protection, child occupant protection and safety assist. The Civic became the first vehicle to receive the rating among vehicles equipped with an Autonomous Emergency Braking System (AEBS) capable of detecting motorcycles.

Civic

Honda Receiving Six Awards at the 10th Anniversary Ceremony of ASEAN NCAP

In December 2021, a ceremony to celebrate the 10th anniversary of ASEAN NCAP was held in Malaysia. During the ceremony, awards were granted to automakers that have endeavored to ensure the safety performance of vehicles over the decade.

Honda received six awards*4, the highest number among other automakers, including the Safety Technology Award (for the Civic equipped with an AEBS capable of detecting motorcycles) and Best Road Safety Partner.

Receiving six awards at the ceremony held by ASEAN NCAP