

Design Philosophy of Honda WANDER STAND CONCEPT

Takehiro MIYOSHI*

Takao KANKI*

Shigeru WATANUKI*

Masahiro SAGAWA*

Yu OWAKU*

Asagi MIWA*

ABSTRACT

Anticipating changes in mobility needs stemming from changes in living environments and the further evolution of technology, Honda has examined the value of new forms of personal mobility, and has proposed the Honda WANDER STAND CONCEPT as a mobility aid embodying the concept of making the process of getting from place to place using the device as enjoyable as taking a stroll. The Honda WANDER STAND CONCEPT is a small, automated-driving electric vehicle that can be quickly and easily ridden by any user, and that makes it possible to comfortably move from place to place without any of the concerns associated with driving.

A working model of the Honda WANDER STAND CONCEPT was exhibited at the Tokyo Motor Show held in November 2015, and visitors were asked to complete a questionnaire regarding the unit. The results of this questionnaire demonstrated that the public was receptive to the styling and the concept proposed for the unit.

1. Introduction

Today, rapid changes are occurring in living environments in the advanced nations, and the nature of our daily activities and the form of the towns and cities in which we live are also beginning to change. These changes are diverse, and include the rapid decline of birthrates and the aging of populations, growing environmental awareness and the entrenchment of measures to reduce CO₂ emissions, the concentration of populations in cities⁽¹⁾, the consequent design of urban spaces to reduce dependence on cars⁽²⁾, and the evolution of IT services that make it possible to perform tasks without leaving the home. In Japan, although attempts are being made to promote mobility among citizens, such as an effort to increase pedestrian space in Kyoto⁽³⁾, reports indicate that both old and young throughout the country are less mobile⁽⁴⁾.

Analysis of “mobility” has indicated two main types of human mobility: Mobility as a derivative demand, involving travel to necessary destinations such as work or school; and mobility as a self-motivated demand, engaged in for the purpose of movement itself, for example going on drives and taking trips⁽⁵⁾. Modalities of public transport in cities where the population is concentrated, such as trains, buses, and taxis, were developed in order to satisfy the former demand. Compared to the state of provision of public transportation, the provision of infrastructure (including roads and parking facilities) necessary for transportation by

car, a personal mobility modality, tends to be inadequate. In addition, the abovementioned evolution of IT services is reducing the amount of mobility as a derivative demand, and is considered to be producing a movement away from the use of automobiles⁽⁶⁾.

The focus was therefore placed on mobility as a self-motivated demand.

Honda has been conducting actual proof experiments⁽⁷⁾ of next-generation personal mobility modalities as an initiative to increase value in the area of mobility as a self-motivated demand. The company has positioned increased quality of life (health, vitality, a sense of satisfaction, etc.) as a value for mobility. The research discussed in this paper focused on strolling as one of the values offered by mobility and embodied and verified the concept in a vehicle. It proposes a concept of mobility in which going where one wishes while enjoying urban spaces and making new discoveries within everyday scenes is positioned as the value of mobility.

2. WANDER Concept

The representative users of this form of mobility were projected to be people who want to make new discoveries as they wander the city streets, whether they are residents of the city or come from outside.

The projected areas for use of the vehicle were city areas mainly used by pedestrians, and it was therefore designed

* Automobile R&D Center

as a two-person mobility modality more compact than a normal car. The necessary elements for enjoyment of urban spaces were considered to be:

- (1) Operability using automated driving, to allow users to enjoy the scenery without the nuisance of operating the vehicle;
- (2) Sufficient compactness to allow the vehicle to enter narrow alleys; and
- (3) Maneuverability making it possible to stand still and turn around in the same way as pedestrians.

The speed range for use of the vehicle was projected as ranging from ultra-low speeds to around 30 km/h.

Because the word “wander” encompasses the three elements above and incorporates the sense of freely moving from place to place as one does when strolling, the concept was termed “WANDER.”

3. WANDER STAND Concept

3.1. Packaging and Applied Technologies

Automated driving research at Honda is currently focusing on efforts to realize a mobile, accident-free society⁽⁸⁾. In Japan, there is also discussion of certain “National Strategic Special Zones” being dedicated to fully automated driving⁽⁹⁾. The development of the new vehicles assumed a scenario in which fully automated driving would be allowed in such National Strategic Special Zones within Tokyo by the time of the 2020 Tokyo Olympics. This provided a vision of easier mobility based on automated driving.

Turning to Honda’s thinking regarding the size and maneuverability of the vehicle, while ultra-compact vehicles for urban use frequently feature a tandem-seat layout to reduce overall width, the new concept prioritized conversation and the sharing of experience, and projected a two-person vehicle in which the occupants would sit side-by-side, with a compact layout of a total length of 2000 mm and a total width of 1250 mm. In terms of the drive system employed, the vehicle would be an electric vehicle fitted on all four wheels with Honda Omni Traction Drive⁽¹⁰⁾ (termed “HOT Drive” below) to allow the freedom of motion, like walking, appropriate to the WANDER concept. In order to make fully automated driving compatible with the parallel motion and turning operations available from HOT Drive, rather than a steering wheel, accelerator, and the other elements of the existing man-machine interface, an interface of a type available only in a vehicle capable of fully automated driving was devised. This did away with the need for the operation of pedals, contributing to an increased degree of freedom in terms of potential sitting postures.

It was considered that increasing the ease of entering and exiting the vehicle would be an important factor in making it easy to use. The vehicle was provided with an ultra-low floor and a front-opening door (taking the flow of entering and exiting the vehicle into consideration) to help facilitate quick entry. A high seat position was employed in order to minimize changes in posture when entering and exiting the

vehicle. A tall body was employed to make it comfortable for users of any height to ride in the vehicle, and the cabin was provided with a full head-up display to enable for users to monitor navigation data while also enjoying the scenery in all directions (Fig. 1).

3.2. Styling Design

Because the purpose of the vehicle was to offer free mobility in the streets via automated driving, attempting to ensure that both occupants and surrounding pedestrians felt secure was a priority. The vehicle was designed based on the styling concept “simple, clean, and modern” in order to help ensure that it would blend into both historical streetscapes and modern urban areas and occupants would not look unnatural when riding in it. The design sought to ensure that pedestrians and others around the vehicle would feel safe despite the fact that it was driven automatically. The use of a design in which the rear of the vehicle is more broadly covered than the front and the sides boosts visibility from other vehicles and offers a sense of security (Fig. 2). The synchronization of the lights at the front and rear with the operation of the vehicle makes



Fig. 1 Final rendering



Fig. 2 Final exterior

it possible for people to see when the WANDER STAND CONCEPT has switched to automatic operation. To help ensure that pedestrians are not intimidated by the wheels, the design has concealed the tires, a strongly iconic feature of conventional vehicles, and established a connection between sensors and lights. This gives an impression of advancement, and projects a sense of security to pedestrians (Fig. 3). This design was achievable because the use of HOT Drive made it unnecessary to impart a steering angle to the wheels.

The extended vertical headlight emphasizes the tall packaging which is a distinctive feature of the vehicle, and provides an iconic representation of the fact that it represents a modern concept of mobility, different from conventional vehicles (Fig. 4).

3.3. Interior Design

The design of the vehicle was not predicated on driving, but rather assumed scenarios in which passengers enjoyed the scenery while stopping here and there as they would when strolling, occasionally enjoying conversations with other people on the street. The design therefore set the occupants' eye-point at a height that would offer occupants of all statures the same line of sight as pedestrians, and an angled riding posture, making it possible for users to easily enter and exit the vehicle. To help enable this riding posture, the WANDER STAND CONCEPT uses seats fitted with slides

that enable them to be moved up and down and a layout in which the table is like a bar counter (Fig. 5). Anticipating the use of the vehicle on shopping excursions, the layout features space at the occupants' feet for storage of bags and packages.

The interface design helps to ensure that users are able to enjoy the scenery without being distracted by driving operations or focusing on maps. Two interface systems have been employed. The main source of information for occupants is a head-up display that provides a variety of information linked to changes in the external scenery. The vehicle has also been provided with a large center display that offers operating data and enables communication between the vehicle and the occupants. A universal joystick control has been positioned in the center of the table as an interface to assist the automated driving function, allowing anyone, whether right- or left-handed, to freely and intuitively guide the vehicle's motion. This welcoming space, easy to use by all, has been designed to provide an interior that will continue to inspire users to take the vehicle out again and again (Figs. 6 and 7).



Fig. 3 Light on corner



Fig. 5 Modern sliding seat



Fig. 4 Iconic headlight



Fig. 6 Universal instrument panel

3.4. Color and Material Design and Interior/Exterior Coordination

The color concept for the vehicle was set as “Japanese Modern,” with the aim that overseas visitors using the vehicle to get around would experience a sense of Japanese tradition and Japanese hospitality. Given that one of the characteristics of the vehicle was that the interior can be viewed at a glance from the exterior, three colors – white, vermillion, and black – have been used to achieve a seamless coordination of interior and exterior. On the exterior of the vehicle, the use of a white color in which golden highlights shine not only emphasizes the distinctive styling of the vertical keynotes, but offers a texture in which the color also appears to change depending on the viewing angle, making the unique movement that HOT Drive gives the vehicle visible even from a distance (Fig. 8). Vermillion has been used as the floor and seat color to offer users a welcoming impression, as if they were on a red carpet, until they take their seats. The distinctive seat fabric is jointly manufactured with Hosoo Co., Ltd., a company that possesses extensive textile manufacturing technologies, located in Kyoto’s Nishijin district. Skillful weaving of multiple threads with differing textures produces a design in which the pattern changes minutely with the viewing angle (Fig. 9). This is also an element that promotes enjoyment of the unique vehicle motion offered by HOT Drive.

As another feature to give the vehicle a uniquely



Fig. 7 Center display and joystick controller



Fig. 8 3D white color

Japanese feel, the exterior front center and rear center sections, the interior door panels, and the roof feature a triangular pattern based on the design of a traditional Japanese transom (Fig. 10).

3.5. Public Receptiveness to Vehicle Concept and Styling

The Honda WANDER STAND CONCEPT and WANDER WALKER CONCEPT were exhibited at Tokyo Motor Show 2015 (Fig. 11). Visitors were invited to take a questionnaire survey in order to help enable study of public



Fig. 9 Textiles for seat fabric

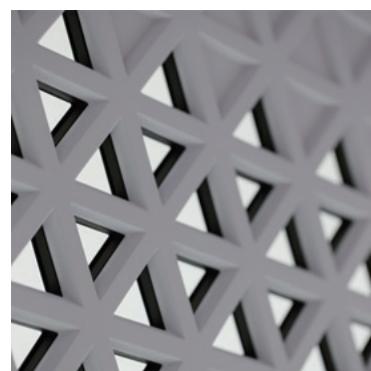


Fig. 10 Triangle pattern



Fig. 11 Tokyo Motor Show 2015

receptiveness to the concepts and styling that had been applied. Figure 12 shows the survey results. A total of 215 responses were received, with 94 comments concerning the Honda WANDER STAND CONCEPT.

When asked which vehicle they would prefer to ride a bicycle, a motorized bicycle, the WANDER STAND, or the WANDER WALKER (a one-person personal mobility aid), more than 60% of respondents selected the WANDER STAND. Asked for what kind of situation they would use the WANDER STAND, approximately half responded “For travel” or “For leisure.” Five comments related to receptiveness to the concept, for example asking when the vehicle would be mass produced and indicating a desire to ride in one. Eleven comments concerned automated driving, for example indicating a desire to try it, and commenting that using the vehicle looks effortless. Nine comments concerned the compactness of the two-person vehicle, indicating, for example, that a couple, or a couple with a child, could enjoyably ride in it. Four comments mentioned technological issues, for example anxiety regarding automated driving technology. Expressions of anxiety regarding automated driving had been anticipated, but overall, most comments were hopeful regarding future prospects, and the survey verified that the public would be receptive to the concept and styling of the Honda WANDER STAND CONCEPT.

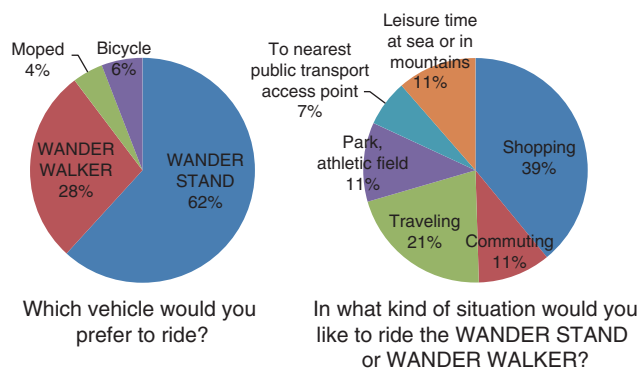


Fig. 12 Questionnaire result (215 respondents)

4. Conclusion

Conventional personal mobility modalities have been designed to satisfy the conditions for mobility as a derivative demand, and their designs have sought to realize efficiency. The WANDER CONCEPT has been proposed in order to stimulate and increase the desire for mobility as a self-motivated demand, and the concept has been embodied in projected vehicles. The public's receptiveness to this new concept and its styling was demonstrated when these vehicles were exhibited at Tokyo Motor Show 2015.

Honda will continue to advance its research and development towards the realization of a society in which

all people are able to move freely, wherever they wish, with a feeling of complete security.

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■ Author ■



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