In Search of a Comfortable In-vehicle Environment

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Since a train car represents a closed space inhabited by passengers for some time, it is important for them whether the space is comfortable or not. However, little studies have been made to clarify this subject based on numerical data, because it depends heavily on differences among individual passengers. We judge on a given situation by receiving stimuli from the external world via our sensory organs. We think of something as uncomfortable if it causes some stress, and as comfortable if it suits our taste. The difficult point is that whether something suits to someone's taste depends on his individual likings. For instance, even the scent of a perfume is perceived as offensive by some people. Also, sounds emitted by an electronic device are judged differently by different people.

As a train car is used by many passengers of various social standings, it cannot be designed to suit only the taste of a particular generation, sex or preference. Therefore, the design of a comfortable car conventionally involves creating a space that at least does not give rise to strong stimuli. Requirements for such a space include a moderately bright lighting, moderate visual stimuli, the absence of loud sounds and offensive odors, a temperature that is neither hot nor cold, and the lack of pressure on human bodies. In other words, the minimum required train comfort can be ensured by creating a space that is free of any stressful stimuli for passengers.

A train car is a vehicle that runs in a particular area. Unlike automobiles, it should not be designed for worldwide acceptance; in designing a train car, differences in comfort criteria, resulting from the diversity of ethnicity or other local characteristics, must also be taken into consideration. Even among different areas in Japan, preferences for the compartment color or air conditioner settings vary according to local tastes. This is another instance of difficulties in ensuring train comfort, a task that cannot be fulfilled based on a single set of criteria.

The elimination of stress factors requires enormous efforts, for a train car, as a vehicle, cannot be entirely free of such factors. Improvements on this point have been made over a long period of time since the first train cars came into the world. However, we may be entering an age in which we must strive for train comfort through a more positive approach. For instance, if we cannot eliminate any vibrations or shakings, we may have to search for vibrations that are comfortable. Likewise, if noises cannot be deadened completely during a run, we may have to be after noises that are comfortable for our ears. Is there a color that is soothing for the greatest possible number of people? Also, it may be time to explore possibilities of a lighting design that is equally satisfactory for those who want to rest and others who want to read. We must continue our efforts to ensure comfort for various passengers, including the handicapped, based on technology and design.

Discomfort causes stress that, in turn, leads to fatigue. It is also necessary to design the in-vehicle space as an environment free of fatigue factors. Especially, considerations, including ones from the viewpoint of ergonomics, must be made to ensure comfort in the driver's cab, which represents a work space critical to the safety of train operation.

We think that manufacturers should regard it as their duty, to design train comfort based on the psychology of users. It should also be one of their important objectives in developing next-generation train cars.