

Application of Industrial Ergonomics in Vehicle Service System Design

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Abstract : More and more interactive devices are used in the transportation service system. Our mobile phones, on-board computers, and Head-Up Displays (HUDs) can all be used as the tools of the in-car service system. People can access smart systems with different terminals such as mobile phones, computers, pads and even their cars and watches. Different forms of terminals bring the different quality of interaction by the various human-computer Interaction modes. The new interactive devices require good ergonomics design at each stage of the whole design process. According to the theory of human factors and ergonomics, this paper compared three types of interactive devices by four driving tasks. Forty-eight drivers were chosen to experience these three interactive devices (mobile phones, on-board computers, and HUDs) by a simulate driving process. The subjects evaluated ergonomics performance and subjective workload after the process. And subjects were encouraged to support suggestions for improving the interactive device. The result shows that different interactive devices have different advantages in driving tasks, especially in non-driving tasks such as information and entertainment fields. Compared with mobile phones and onboard groups, the HUD groups had shorter response times in most tasks. The tasks of slow-up and the emergency braking are less accurate than the performance of a control group, which may because the haptic feedback of these two tasks is harder to distinguish than the visual information. Simulated driving is also helpful in improving the design of in-vehicle interactive devices. The paper summarizes the ergonomics characteristics of three in-vehicle interactive devices. And the research provides a reference for the future design of in-vehicle interactive devices through an ergonomic approach to ensure a good interaction relationship between the driver and the in-vehicle service system.

Keywords : human factors, industrial ergonomics, transportation system, usability, vehicle user interface

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