

INFLUENCE OF VENTILATION FLOW LOSS ACCORDING TO SEATING POSITION FOR DRIVER IN ELECTRIC VEHICLE

Kyungtae Lee¹⁾ and Kwonse Kim^{2)*}

¹⁾Department of Global Industry Engineering, Daejeon Institute of Science and Technology, Daejeon 35408, Korea

²⁾Department of Automotive Engineering, Ajou Motor College, Boryeong 33415, Korea

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ABSTRACT—The main goal of this paper is to analyze flow loss of the ventilated seats by seating position for driver. Also, this work includes the method of analysis as to body pressure distribution, ventilation performance, subjective valuation, and flow loss. The experiment is conducted with a male who is 75 kg of weight and 177 cm of height corresponding AM 50 % (American model) and the evaluation of the vehicle seat is conducted through the regular inspections after mass production system. As far as the seating positions as experimenter preference is concerned, it is verified to stress the load at cushion and back from the body pressure. The trend of ventilation performance is shown to be highly at internal temperature sensors attached to face of the vehicle seat without working ventilation. Consequently, the temperature range of cushion and back of vehicle seat is increased in order of lay down < lean(rest) < normal conditions.

KEY WORDS : Ventilation performance, Air flow loss, Seating position, Body pressure distribution (BPD), Temperature sensor, Vehicle cushion and back

1. INTRODUCTION

An influence according to the climate environment change has a very close relation in terms of convenience and comfort to drivers within vehicle (Litzenberger *et al.*, 2015). Nowadays, the function of heat rays and ventilation applies to driver convenience. Besides, vehicle seats belong to part of compositions directly connected to driver. With regards to the vehicle seats, it performs a significantly important role to provide convenience along with stability (Lennon *et al.*, 2008). The convenience and technology in vehicle seats have developed currently by human friendly including artificial intelligence and healthcare (Reed *et al.*, 2022). Particularly, research and development of emotional quality using an electric control are continuously attempted. Thus, the function of automatic seat device, heat control, ventilation system with air conditioner is applied to vehicle seats.

When it comes to the ventilation system of vehicle seats, it is using the annexation technology to improve the temperature performance with air conditioner system and thermoelement (Jin *et al.*, 2016). These technologies can make a driving environment to have a comfortability through applied technology. Therefore, the seat offered to drivers could become an influence for good in case of the introduction of new technology because of emotional difference that drivers can be recognized, easily.

As far as the previous researches on ventilation system of vehicle is concerned, a result of performance analyzed by design and control on temperature using a thermoelement was shown. In addition, in order to verify the ventilation performance of vehicle seats, it can be shown that various researches were attempted as following;

- Experiment according to different material for vehicle seats (Fang *et al.*, 2016).
- Analysis on driver comfort according to changes in temperature and humidity in vehicle (Wang *et al.*, 2014).
- A study on positional change to prevent heat flow loss in vehicle seats (Tu *et al.*, 2018).
- Analysis on performance comparison which applied with leather material and mash hole using thermoelectric element (Hu *et al.*, 2017).

In succession, the air deformed by element of thermoelectric device is closely connected with seat performance of ventilation including an air conditioning and heating at seating a human. This study was investigated to have flow loss of ventilation during seating a human (Low *et al.*, 2017). In order to better transfer the ventilation effect to driver, it is classified to minimize flow loss or to improve performance. The method to increase the ventilation performance is to reinforce absorptive power by a blower motor but, it can't be increased because the working noise is increased by ventilation device (Fasulo *et al.*, 2019).

The main goal of this paper is to analyze flow loss of the ventilated seats by seating position for driver. Also, this work includes the method of analysis as to body pressure

*Corresponding author. e-mail: kskim84@motor.ac.kr