



Intercultural Differences of HVACs' Sound Quality Perception in Cars' Cabin. —Comparison between Internal Combustion and Electric Vehicles

Massimiliano MASULLO, Federico Cioffi, Luigi MAFFEI
Università degli studi della Campania Luigi Vanvitelli, Italy

Katsuya Yamauchi, Minori Dan
Kyushu University

The Heating, Ventilation and Air-Conditioning (HVAC) systems are fundamental to set and to maintain the microclimatic control inside the car's cabin or its portions providing optimal thermal comfort for occupants. At the same time, these systems represent the most annoying noise sources for car drivers and passengers. This is particularly true in idling or at low vehicle's speed and low engine rpm.

The role of the HVAC on the noise comfort in the car's cabin is becoming more crucial as the number of hybrid and full electric vehicles (HEVs/EVs) is recently increasing. Indeed, the lack of engine noise due to the internal combustion engine (ICE) dramatically changes the background noise aboard the vehicle. In a previous research conducted within the collaborative research project "HVAC sound quality inside car cabins" between the Università degli Studi della Campania and the Kyushu University, it has been shown that the most remarkable differences of annoyance and discomfort appear at low airflow rates (AFR) inside the HEVs and that this is considerably lower than in ICE vehicles. The differences decrease as the AFR increases. This paper compares the results of two parallel experiments conducted in Italy and Japan to explore the role of the differences between Italian and Japanese culture on the sound quality perception of HVAC sound in cars cabin.