

F2010-C-044

THE HUMAN THERMAL COMFORT EVALUATION INSIDE THE PASSENGER COMPARTMENT

¹Ivanescu, Mariana *, ²Neacsu, Catalin, ¹Tabacu, Stefan, ¹Tabacu, Ion

¹University of Pitesti, Automotive Department, Romania, ² Auto Chassis International Romania - Groupe Renault, Romania

KEYWORDS – thermal comfort, DTS, TS, PMV - PPD indices, numerical simulation,

ABSTRACT - As many people spend several hours a day in cars, buses or trains, it is important to provide a good thermal environment, which gives comfort and optimizes performance for both drivers and passengers.

The thermal comfort sensation is assured by the factors that depend on the heat exchange between the human body and the ambient environment.

It is well known that one of the requirements to be fulfilled is that a person to be in thermal neutrality according to the comfort equation. This is described and evaluated by the following indices: DTS (**D**ynamic **T**hermal **S**ensation), TS (**T**hermal **S**ensation), PMV (**P**redicted **M**ean **V**ote) and PPD (**P**redicted **P**ercentage of **D**issatisfied).

This paper shows the influence of the different parameters and situations on the thermal human comfort prediction of passengers' compartment starting from the body's energy balance based on Fiala's manikin (which provides all the thermo-physiological effects of the human body model) by THESEUS-FE software.

On the other hand, this simulation is likened to the temperature values which are measured in four different points of passenger compartment (two airzones) that were obtained by experimental way.

Consequently, this paper will presents the different aspects of the global and local thermal comfort prediction, based on mathematical models from literature, as well as using simulated skin and cloth temperatures result to a quite simple-to-use method of assessing local thermal comfort at given boundary conditions, typical for a vehicle simulation.