

## **Computational fluid dynamics investigation on the use of heat shields for thermal management in a car underhood**

### **Abstract**

Temperature variations inside a car underhood are largely controlled by the heat originating from the engine block and the exhaust manifold. Excessive temperatures in the underhood can lead to the faster deterioration of engine components and may affect the thermal comfort level inside the passenger cabin. This paper presents computational fluid dynamics investigations to assess the performance of a heat shield in lowering the peak temperature of the engine components and firewall in the underhood region of a typical passenger car. The simulation used the finite volume method with the standard k- $\epsilon$  turbulence model and an isothermal model for the heat transfer calculations. The results show that the heat shield managed to reduce the peak temperature of the engine components and firewall by insulating the intense heat from the engine block and exhaust and regulating the airflow inside the underhood region.

**Keywords;** Car underhood; CFD; Heat shield; Numerical simulations