

عنوان مقاله:

Investigating the effect of tire pressure on fuel consumption

محل انتشار:

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خلاصه مقاله:

In this study, the effect of tire pressure on parameters such as tire rolling resistance, fuel consumption, deflection rate and stability was investigated. The effect of tire pressure on car handling and ride characteristics was also investigated. The car model was developed in Matlab/ Simulink software to use this model to investigate the effect of tire pressure on car fuel consumption, car handling and ride characteristics. The most important findings of the present study are summarized below. Fuel consumption of a complete model of a medium-sized passenger car can be achieved in Simulink using the QSS TB toolbox designed by ETH Zurich. In this toolbox, the rolling resistance value of the tire is modeled as a linear function of the vertical load of the tire. However, more advanced models have been introduced that also take into account the effect of vehicle speed, load and tire pressure. This data has been experimental in order to present a mathematical function that the regression data method has been used to estimate the data. First, the share of tires in the amount of energy loss in the car is estimated using the QSS tool. In the QSS model, tire pressure and load on the tire are considered as inputs, and as a result, fuel consumption is given as output as per 100 kilometers per liter. When the model was implemented for the inner-city driving cycle, it was found that 27% of total energy losses were related to tires. It was stated that although it is not possible to eliminate all these 27% of casualties, it can be improved. Investigators also showed that by increasing the tire pressure from the nominal value of 2.2 times to 3 times, fuel consumption can be reduced by 4.4%. Also, by increasing the tire pressure from 2 times to 3 times, the reduction in fuel consumption was calculated to be 5.2%. These results were in accordance with the findings presented in the maximum research, which in fact indicates the accuracy and precision of the model.

کلمات کلیدی:

fuel consumption, tire pressure, TPRS system

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