

A Study on Vehicle Tire Inflation and Fuel Consumption

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This white paper reports on an empirical case study to examine the impact of tire pressure on vehicle fuel consumption.

Low tire pressures of a vehicle could be the cause for an increase in its fuel consumption.

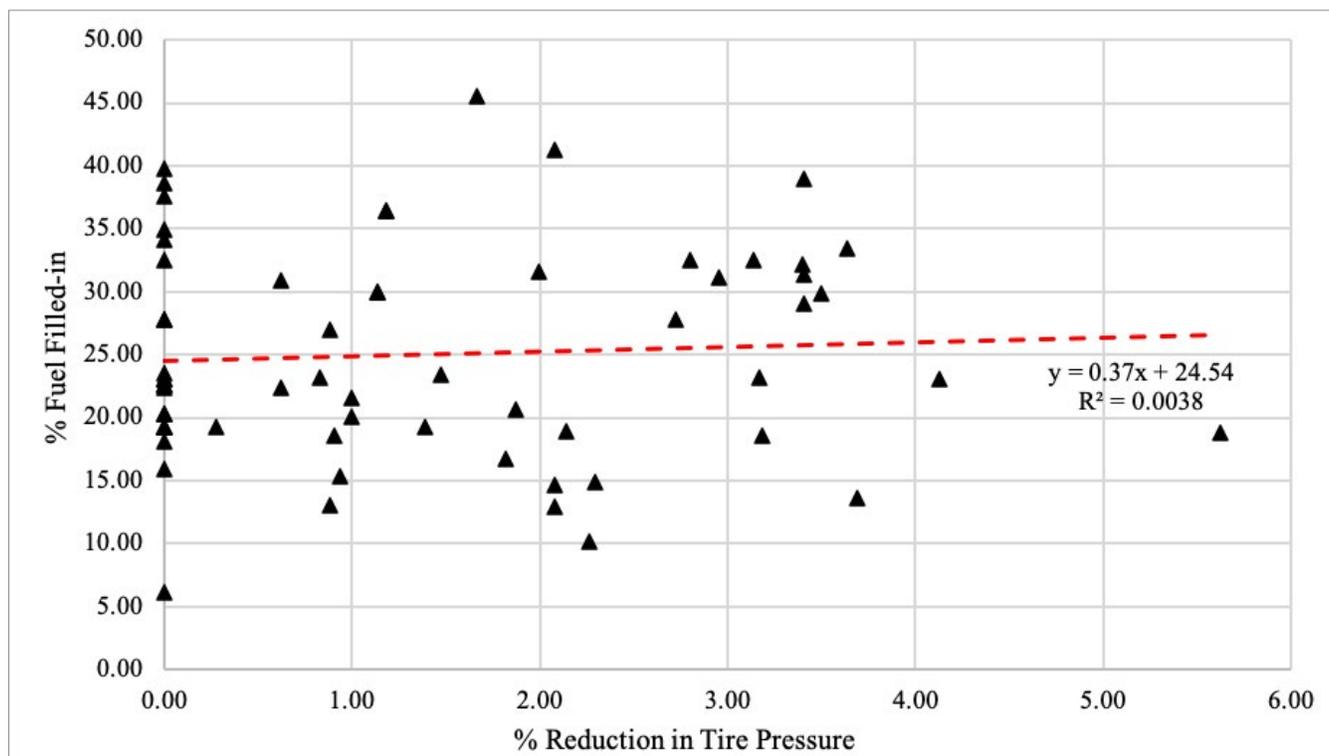
Study Methods

A case study is carried out with data obtained from Booster Fuels on tire pressure levels and the amount of fuel consumed by vehicles. The data comprised the make/model, license plate number, wheel tire pressure, fuel pumped-in, and the VIN for 30 vehicles for 2019, with information on at least two instances of tire pressure readings and fuel pumped-in. An 'instance' was defined when both the fuel pumped-in and tire inflation were performed during one service event. The percentage of fuel filled-in and the percentage drop in tire pressures

compared to the recommended pressures were calculated for each service event. A regression analysis between the percentage change in tire pressures and the fuel-filled percentage revealed a weak correlation. The Density-Based Spatial Clustering of Applications with Noise (DBSCAN) algorithm was used to minimize the effect of outliers on the correlation observed.

Findings

The data collected from Booster Fuels showed a very weak increasing trend when analyzed for collinearity between tire pressures and vehicles' fuel consumption, signifying that low tire pressures can potentially cause an increase in fuel consumption. The weak collinearity is thought to be the consequence of insufficient data points used in the analysis.



Plot of Percentage Reduction in Tire Pressure vs. Percentage Fuel Filled-In After Eliminating Outliers

Policy/Practice Recommendations

More data is needed to strengthen the linear relationship between the tire pressures and fuel consumption of a vehicle, which has been well-established in several other empirical studies.

About the Authors

Dr. Chandra is an associate professor in the Department of Civil Engineering and Construction Engineering Management at California State University, Long Beach (CSULB) and has expertise in transportation engineering, policy, and planning. Dr. Vahid Balali, is an assistant professor in the Department of Civil Engineering and Construction Engineering Management at CSULB.

To Learn More

For more details about the study, download the full report at transweb.sjsu.edu/research/2006



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