

Study on the Development of a Mathematical Estimation of Brake Pedal Pulsation

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Abstract : With the addition of comfort features & functions in the automotive domain, brake NVH has gained an appreciable level of expectations and requirements from customer comfort experience, amongst which brake pedal pulsation is of prime importance. Unlike brake squeal noise and brake groan noise, brake pedal pulsation is a phenomenon that is felt by the driver alone. Identifying the pedal pulsation phenomenon at an earlier phase of product development calls for perilous subjective skill levels of the test evaluator, as quantifying this phenomenon objectively is challenging. This paper aims to understand the pedal pulsation phenomenon framework and provides a mathematical model to predict the amount of pedal pulsation with the amount of DTV (Disc Thickness Variation) and also to study the influence of wheel end camber stiffness on brake pedal pulsation intensity of the vehicle. This paper also provides a methodology that defines a way to measure pedal pulsation on the vehicle level and strives to quantify the subjective feel of customers on brake pedal pulsation and is used as a tool to establish the correlation with the developed mathematical model. This eventually aids in earlier mitigation and development of pulsation solutions during the initial development phases of the system/vehicle. This paper also provides a test case for the correlation established between the end user's feel to the objective measurement conducted at the pedal end.

Keywords : disc thickness variation, mathematical model, NVH, pedal pulsation

Conference Title : ICANVC 2025 : International Conference on Automotive Noise and Vibration Control

Conference Location : Tokyo, Japan

Conference Dates : February 24-25, 2025