A STANDARDIZED METHODOLOGY FOR CREEP GROAN INVESTIGATION ON A DYNAMOMETER

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ABSTRACT

Research and /or Engineering Questions/Objective: (max. 100 words)
One of the predominant driving conditions in nowadays cities is frequent starting and stopping in the increasing number of traffic jams during the rush hour. In these situations, the vehicle brakes are subjected to very slow pressure releases and applications, which permanently keep the friction pairs just between slipping and sticking. In conjunction with the drive torque of automatic transmissions or the downhill torque on a decline, this instable condition often is the root cause for the creep-groan noise of brake systems. Due to the continuously raising acceptance of automatic transmission vehicles this phenomenon has become a major topic within the NVH development of brake systems in the recent years.

Methodology: (max. 150 words)
This paper describes a standard methodology for the preselection of optimized formulas to prevent the creep-groan phenomenon. The test procedure will evaluate the sensitivity to noise generating stick-slip events at low pressures under static torque and low speeds in different temperature and humidity conditions. The potential quality to avoid that aspect is summarized into creep groan indices for the various conditions. The friction pairs will be tested on an inertia dynamometer under reproducible climate conditions and on standard rigid fixtures. The main indicator for the creep groan performance is the torque variation during the starting and stopping phases of the applications. This presentation will discuss the consecutive steps of that procedure along with the method, the signals are analyzed and the indices are evaluated. Based on a typical application exemplary curves will be shown and the conclusion will be discussed.

Results: (max. 150 words)
A standard test procedure has been developed to judge the potential creep-groan performance of a specific friction pair.

Limitations of this study: (max. 100 words)
The applied procedure is mainly suitable to perform comparative judgements. Absolute creep-groan ratings can not be expected with this methodology as the suspension and body structure of the vehicle is not included in the evaluation.

What does the paper offer that is new in the field in comparison to other works of the author: (max. 100 words)
No other works of the authors on this topic so far.

Conclusion: (max. 100 words)
This approach allows a first preselection for components to be finally confirmed in vehicle evaluations and thus avoids unnecessary and expensive loops of testing on the road.