ID-0066 - FATIGUE DAMAGE IN AISI/SAE 8620 STEEL

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Abstract. Step-stress experiments are described in which the fatigue damage of an AISI/SAE 8620 steel is found to vary with stress sequence application. The fatigue behavior is studied by using experimental results of Fatigue Limit Resistance before and after imposing damage on several specimens. The influence of the order of application of various stress levels was investigated. For this purpose, increasing and decreasing stress sequences with four steps were applied on the specimens. Besides, damage evaluation was also performed using Barkhausen effect.

Keywords. Fatigue damage, cumulative damage, step-stress tests, fatigue failure, Barkhausen noise.

ID-0072 - A NEW APPROACH TO CALCULATE THE TRANSMISSION ERROR OF HELICAL GEAR PAIRS WITH MODIFIED TOOTH SURFACE

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Abstract. This paper describes a procedure to calculate static transmission error of helical gears under load, eliminating the assumption that the tooth contact occurs on the plane of action. Lead and profile modifications, manufacturing errors and tooth deflections under load are considered in the procedure. The method of influence coefficients is employed to calculate the tooth deflections and a method to determine the load distribution on gear meshing is developed. The procedure is implemented through a computer code and some numerical examples are verified. The results are analyzed and compared to the results of other reliable computer program called LDP (developed by The Ohio State University). The differences between the results are discussed and their causes are investigated.

Keywords. Transmission error, tooth contact, gear, gear noise, gearbox.

ID-0091 - DYNAMIC BEHAVIOR STUDY OF A PASSENGER CAR DURING HANDLING MANEUVERING

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Abstract. The objective of the present research is the comprehension of the real and physical phenomena associated with the dynamic behavior of a moving passenger vehicle, its effects on handling qualities, data acquisition and analysis of car mobility data, the practical training with instrumentation. A tendency analysis of the handling behavior on a ride test, based on a modification of the mechanical characteristics of suspension component is also a relevant part of this study. In order to make it feasible, this study was divided into three parts; a theoretical study phase, data acquisition, and analysis of handling. First, the theoretical study was based on a literature review concerning suspension, steering systems, and tires. During the experimental work, the characteristics of springs, anti-roll bars (stabilizer), and shock absorber were changed. The individual response of changing parts was analyzed to reach the final objective. The outcome analysis is highlights to importance of reducing the development time on the final ride and handling tests, and it also shows the main points that must be changed to obtain the best dynamic performance on handling maneuvers.

Keywords. passenger car, dynamic behavior, handling maneuvering.

ID-0163 - ERRORS IN TRANSMISSION LOSS PREDICTION - THE BISPECTRUM AND KURTOSIS APPROACHES

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Abstract. The measurements of the acoustic performance of automotive mufflers are influenced by the wave propagation with reflection and absorption. This way, the measured signal can have linear and nonlinear interactions of the wave components. The bispectrum, which is the measure of the phase relationship between three spectral components, has been shown to be a useful tool in the study of linear and nonlinear wave interactions. The bicoherence spectrum may be used to discriminate between nonlinearly coupled waves and spontaneously excited waves. At the same time, the kurtosis parameter is used as an indicative of the signals of microphones. The performances of two different physical models (bipartite chamber and a chamber with concentric perforated tube)