International Congress
Motor Vehicles & Motors 2012

SUSTAINABLE DEVELOPMENT OF AUTOMOTIVE INDUSTRY

Proceedings of Papers

October 3rd - 5th, 2012
Kragujevac, Serbia

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Publisher: Faculty of Engineering, University of Kragujevac
Serbia, 34000 Kragujevac, Sestre Janjić 6

For Publisher: Prof. Dr Miroslav Babić - Dean

Editors: Prof. Dr Radivoje Pešić
Prof. Dr Jovanka Lukić

Technical preparation: M.Sc. Dragan Taranović

Picture on the cover: Nemanja Lazarević

Print CD: Faculty of Engineering, University of Kragujevac

ISBN 978-86-86663-91-7

Year of publication: 2012

Number of copies printed: 200

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

629.3(082)(0.034.2)
621.43(082)(0.034.2)

INTERNATIONAL Congress Motor Vehicles & Motors (2012 ; Kragujevac)
Sustainable Development of Automotive Industry [Elektronski izvor] : proceedings of papers / International Congress Motor Vehicles & Motors 2012, October 3rd-5th, 2012., Kragujevac, Serbia ; [congress organizers Faculty of Engineering ... [et al.] ; editors Radivoje Pešić, Jovanka Lukić]. - Kragujevac : Faculty of Engineering, 2012 (Kragujevac : Faculty of Engineering). - 1 elektronski optički disk (DVD) ; 12 cm

Sistemski zahtevi: Nisu navedeni. - Nasl. sa naslovnog ekrana. – Tiraž 200. - Bibliografija uz svaki rad

ISBN 978-86-86663-91-7
1. Faculty of Engineering (Kragujevac)
a) Моторна возила - Зборници b) Моторни са унутрашњим сагоревањем - Зборници
COBISS.SR-ID 193560076

Publishing of this book is supported by:

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International Congress Motor Vehicles & Motors 2012

Kragujevac, October 3rd-5th, 2012

MVM2012-069

Jasna Glišović[1]
Miroslav Demić[2]
Jovanka Lukić[3]
Danijela Miloradović[4]

DYNAMOMETER FOR TESTING HIGH-FREQUENCY NOISE OF DISC BRAKES

ABSTRACT: Brake squeal phenomenon has been studied for nearly 70 years now. During this period, majority of tests were based on subjective assessments and measurements with a moving vehicle on the road. Over the years, many laboratory tests have been developed with a wide range of options and approaches. The modern brake noise dynamometer has become a sophisticated test platform for the identifying the propensity of a brake to generate squeal and diagnosing squeal noise problems. Re-creating brake squeal is not an easy task. In many cases, brake noise occurs only during a portion of the process of deceleration or during braking with maintaining a constant speed - drag. Brake components often have to work in exactly the right conditions. These conditions may include speed, temperature, humidity, pressure and brake wear.

KEYWORDS: disc, brake, noise, laboratory, testing

INTRODUCTION

Even if every noise during a vehicle test is recorded with a data acquisition device, the majority of the release procedures of a new brake system - at least in Europe - are based solely on the subjective noise ratings of the drivers during a vehicle test. The best known tests for researching the brake noise in road conditions are the Los Angeles City Traffic test (LACT) in urban conditions in the United States and Mojacar test in Europe. The length of Los Angeles City Traffic test is normally 5000 miles or 8000 km. An average of 250 miles or 400 km is driven per day. Some tests might run for more or less days than the normal 20 day length. On average, the number of braking per mile is 4 to 5. This is a slightly higher brake application rate than normal city traffic. As a result of years of experience, this test was unanimously accepted between automotive manufacturers and their suppliers in the United States. These vehicle tests can fully assess the actual brake noise performance and are very representative in terms of the end customer perception. However, all of these vehicle tests are expensive, time consuming, and usually occur too late to affect any structural changes if noise is detected on a test vehicle brakes. That's why the leading manufacturers have developed laboratory dynamometer tests that can shorten the brake noise development cycle and provide accurate and objective statistical data to evaluate brake noise performance. Results from the laboratory can be used to quickly affect the structural changes to optimize the brake noise performance.

[1] *M. Sc. Jasna Glišović, assistant, University of Kragujevac, Faculty of Engineering, Sestre Janjić 6, Kragujevac, jaca@kg.ac.rs*
[2] *Ph.D Miroslav Demić, full professor, University of Kragujevac, Faculty of Engineering, Sestre Janjić 6, Kragujevac, demic@kg.ac.rs*
[3] *Ph.D Jovanka Lukić, full professor, University of Kragujevac, Faculty of Engineering, Sestre Janjić 6, Kragujevac, lukicj@kg.ac.rs*
[4] *Ph.D Danijela Miloradović, assistant professor, University of Kragujevac, Faculty of Engineering, Sestre Janjić 6, Kragujevac, neja@kg.ac.rs*