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Preface

Journal of Industrial Research and Innovation Volume 17 No 2 April 2023 edition is still managed to publish. This volume presents various fields of transportation and material sciences. Transportation engineering nowadays is among the priority programs in Indonesia, which emphasize in Infrastructures development. Material sciences are therefore very relevant in supporting this theme. Thanks to continuous submission from contributors and hardwork of editor teams.

Research and assessment were conducted by various institutions researchers in those fields. In this edition, the journal publishes important and interesting papers related to Transportation engineering, such as : crashworthiness analysis of the impact modules of Indonesian high-speed train considering EN 15227, a gravimetric methodology for measuring fuel mass flow rate in a no-load engine operating at various rpms, and Modeling Indonesian motor vehicle tax coefficients based on machine learning emission data. Another paper published related to renewable energy: Advancements in machine learning modeling of co-firing systems: A mini review.

The editors always do their best to improve the quality of the Journal; especially now that we are heading towards an English language journal to increase the impact and citations. The next publication is scheduled with new appearance on December 2023. As closing remarks, the editors always call for critics and suggestions to further improve this Journal.

The Editors

Majalah Ilmiah Pengkajian Industri
(Journal of Industrial Research and Innovation)

Crashworthiness Analysis of the Impact Modules of Indonesian High-Speed Train Considering EN 15227

Yohanes P.D.S.Depari, Achmad Syaifudin, Yunendar. A. Handoko,
Adhi D Permana, Hendrato, Beny Halfina, Jean M Valentino

Abstract

A crashworthiness structure is being developed for the passive safety system of the Indonesian High-speed Train design. It is made up of an anti-climber, a crash buffer, and a honeycomb in sequential arrangement. The issue addressed in this research is the need for thorough verification of the design of impact modules and the supporting frame for compliance with the EN 15227 standard. The finite element method approach is used to analyze the feasibility of a collision in a high-speed train's passive safety system. The geometry of the finite element model is constructed as a surface element and refers to the model designed by the National Research and Innovation Agency (BRIN) and the Indonesian Railways Company (PT. INKA). In accordance with the train design plan, aluminum 6005A-T6 is implemented. Simulations were conducted at initial velocities of 10 m/s using the LS-DYNA solver. The time interval during which the velocity changes is considered the time when the kinetic energy of the collision is completely absorbed. The simulation results indicate that the kinetic energy can be effectively absorbed by the crash module and the mask-of-car frame, as long as the initial contact between the trains occurs at the anti-climber. The impact kinetic energy stored in the crash buffer system is 63%, equivalent to 959 kJ, while the remaining 37%, amounting to 561 kJ, is absorbed by the cab and honeycomb frame structure. Thus, the crash structure being developed complies with the crashworthiness standard.

Keywords: Crashworthiness; EN15227; High-Speed Train; Mask of Car; Passive Safety.

A Gravimetric Methodology for Measuring Fuel Mass Flow Rate in a No-Load Engine Operating at Various RPMs

Henry Nolandy, MSK Tony Suryo Utomo, Berkah Fajar Tamtomo Kiono, Mokhtar, Respatya Teguh Soewono, Kurnia Fajar Adhi Sukra, Didi Tri Wibowo, Misbah Khudin

Abstract

The pursuit of performance tests that are both cost-effective and equipped with state-of-the-art technology stands as a vital objective. Among these tests, fuel consumption assessments emerge as crucial parameters in engine and vehicle evaluations. The main aim of this study is to establish a gravimetric methodology for quantifying fuel usage. The objective is to develop a methodology that is both uncomplicated and simple to use, while simultaneously ensuring the instrument's mobility. This study involves experiments on engines using B30 fuel. Recorded data is analyzed and compared with the flow meter. The research focuses on the KUBOTA D722 engine's operation without load across various RPM settings. The comparative results reveal disparities in measurement outcomes, with variations of 0,66 g/s, 0,93 g/s, and 0,31 g/s observed for engine rotation speeds of 1500, 1900, and 2200 RPM, respectively.

Keywords: gravimetry; volumetry; loadcell; flowmeter; Arduino

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