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Analysis of simply supported MR fluid sandwich beam

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Vibrations are no longer desired in most of the day today usage especially in mechanical machines, civil structures, aerospace industries and automotive parts. It is usually to get the rid of these vibrations by using magneto rheological fluids. A magneto rheological fluid provides viscous damping which gets added up when magnetic field is applied. The damping properties of fluid get multiplied and natural frequency of the body under observation also changes, using this technique the three layered MR fluid sandwich beam was fabricated and tested it for undamped and damped conditions. The controllability of variations in the various dynamic parameters like natural frequencies, vibration amplitudes and damping factors was observed.

Keywords: Magnetorheological fluid, MRFluid sandwich Beam, Natural frequency, Damping factor, Damping coefficient.

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Effect of cobalt based catalysts on the production of hydrogen from catalytic water reforming of glycerol

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The aim of the present work is the study of hydrogen production over cobalt-based catalysts from reforming of glycerol. Reforming of glycerol took place at temperatures in the range 700 - 850 K under catalytic supercritical water. Various supports including zirconia, La_2O_3 , $\text{g-Al}_2\text{O}_3$ and $\text{a-Al}_2\text{O}_3$ for CO catalyst deposition were investigated. It was found during the experiment that the conversion of glycerol increased by increasing the operating temperature. But, system operation failure was also noted due to carbon formation at high temperatures for $\text{a-Al}_2\text{O}_3$ and $\text{g-Al}_2\text{O}_3$. The most efficient performance for the production of hydrogen was found for the Co catalyst supported on zirconia. The decrease in the amount of liquid products and the increment in glycerol conversion were observed at high operating temperature or high loading of cobalt catalyst. Very less study has been done on the production of hydrogen from glycerol because most of the work were focused on the production of hydrogen from steam reforming process.

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Finite-element modeling with experimental validation of laser welding of galvanized high-strength steel (DP980) in a butt joint configuration

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A three dimensional (3D) finite element (FE) model was applied to investigate the optimal laser welding parameters for joining galvanized high-strength steel in a butt joint configuration. The experiments have been prepared under different values of laser power and speed. A rotary Gaussian volumetric heat source model was used to describe the laser energy heat input. The temperature data were recorded by obtained by the thermocouples at placed along the joint in order to verify the results of heat distribution of the FE thermal analysis. Full penetration, cross-section, weld pool size, and temperature history distribution were studied in the experimental analysis of the welds. Tensile tests were performed for the butt welded coupons. The micro-hardness of the welds was studied across the cross-section of the welds. The results show that the numerical analysis can be used to predict the temperature history of the welding process. The tensile stresses and micro-hardness of the joints in the optimal condition reached to the values of 941.0 MPa and 450 HV, respectively.

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