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Preface

Journal Volume 16 No 2 Agustus 2022 edition is still provided 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 materials engineering : A Rare Earth Oxides-Containing Internal Reference Material of Purified Monazite from Bangka Island, The Influence of Padeye Placement on Ship Block Lifting and Cyclic Oxidation Behavior of HVOF Thermally Sprayed WC Cermet Based on AISI 1045 Steel.

The others published also about transportation engineering, such as: Commercialization Study of Technological Product Innovation Using Business Model Canvas : Innovation Case of Mobile Laboratory, The Effect of Corner Radius of Square Thin-Walled Structures on Crashworthiness Indicators and Data Exploratory Analysis and Feature Selection of Low-Speed Wind Tunnel Data for Predicting Force and Moment of Aircraft

The editors always do their best to improve the quality of the Journal; especially now that we are heading towards an English language journal in order to increase the impact and citations. The next publication is scheduled with new appearance on December 2022. 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 Technology Assessments)

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A Rare Earth Oxides-Containing Internal Reference Material of Purified Monazite from Bangka Island

Ronaldo Irzon, Agus D. Haryanto, dan Kurnia

Abstract

Monazite mineral contains a sufficient composition of rare earth elements which are currently required widely in modern industries. Reference materials are needed to validate the measurement results, including the rare earth elements analysis. This study presents the processing of purified monazite from the PT Timah Metallurgical Unit in Muntok to become low-cost and rare earth oxides-containing internal reference material. Eight X-ray fluorescence measurements of four splits of the monazite were done for precision test and to establish its information values. The high CeO₂ and LaO₂ composition (>10%) implies the economic worth of the studied sample. Based on the acceptance criteria of RSD_{experimental} <10%, RSD_{experimental} ≤66%×CV_{Horwitz}, and Horrat <2, the concentration of fourteen analytes is acceptable to be set as information values. The studied monazite content resembles the other purified one of Myanmar. Its much lower phosphate composition signifies that the sample is more precious than refined monazites from Iran and Australia..

Keyword : *Monazite, Internal reference material, XRF, REE.*

The Influence of Padeye Placement on Ship Block Lifting

Andi Mursid Nugraha Arifuddin, Muhammad Uswah Pawara

Abstract

Nowadays, steel ship construction in Indonesia is dominated by the hull block construction method. This method can reduce man-hours as the ship is manufactured by a division of the hull into several sections/blocks; here, it can be worked in parallel. Once work is finished on these blocks and then proceeding to the main hull for assembling, the lifting operation is performed on the blocks during this erecting process. Lifting of ship blocks must be planned safely to avoid damage. One of the items that must be considered is the position of the padeye. The placement or installation of the padeye in the block during the lifting operation plays a vital role in the deformation and working stress of the block structure. Consequences if this is not observed, which can cause misalignment in the welding joint path on ship blocks due to excessive plastic deformation and stress. Therefore, this study aims to simulate the placement of a padeye that results in minimum deformation and structural stress. The method used in this research is the stiffness method applied in computer programs. In this studied, it had been recorded that the structure on the ship blok is deformed and stressed at each padeye position. Based on the simulation from 23 positions of the padeye, the optimal position of the pad eye is at position 10 in simulation 2 with deformation of x, y, and z coordinates which are 7 mm, 2 mm, and 7 mm, respectively. Generally, In this case shown the deck girder and longitudinal beam structure is dominantly subjected to high deformation and stress in several position.

Keyword : *Padeye, Ship Block, Lifting, Deformation, Stress.*

Commercialization Study of Technological Product Innovation Using Business Model Canvas: Innovation Case of Mobile Laboratory

Subiyanto, Miranti Budi Kusumawati, Sri Wijayanti, Unik Setiawati

Abstract

A premise states that the success of product technology innovation determines the economic growth of a country. On the other hand, the commercialization of technological product innovations has low success, and one of the reasons is the lack of careful planning. This study discusses the Business Model Canvas (BMC) concept for the commercialization of technological product innovation, using a mobile laboratory (Mobile Laboratory Bio-Safety Level 2/MBSL-2) as a sample product of innovation. MBSL-2 is one of the national technological product innovations initiated by the Agency for the Assessment and Application of Technology (BPPT) in early 2020 and developed as a solution to control the spread of COVID-19. The objective of this study is to evaluate the suitability of the BMC concept as an instrument policy for planning the commercialization of technological product innovation in government research institutions. Nine BMC elements are elaborated, namely customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partners, and cost structure. The results of the discussion show how BMC works in a systematic, structured, and measurable way so that it can explain the arguments and objectives for each element of the business process, as well as the harmonization of business strategy with technology strategy. The BMC display is simple but contains important business aspects, making it easier for all parties to understand the business concept of technological product innovation. This study recommends that government research institutions promote the use of BMC as a supporting instrument for researchers in designing a proposal for technological product innovation.

Keyword : Technological product, mobile laboratory, commercialization of product innovations, business model

Cyclic Oxidation Behavior of HVOF Thermally Sprayed WC Cermet Based on AISI 1045 Steel

Muhamad Walidi, Helmi Bagas Samudra, Ahmad Maulana Arkan Leksana, Djoko Hadi Prajitno, Haris Tjahaya

Abstract

Thermal spray coating technology by High-Velocity Oxygen Fuel (HVOF) has become a solution for metal protection and part reconditions that work in critical environments such as oxidative, erosive, and corrosive. Thermal spray coating (TSC) application has been carried out to improve the oxidation resistance of the Induced Draft Fan (IDF) as a part of a coal-fired steam power plant unit. Cermet WC10Co4Cr and WC17Co were intended to sustain the AISI 1045 steel substrate against the oxidative environment. In this work, cyclic oxidation at a temperature of 500°C was conducted to reveal the oxidation resistance behavior of the coatings. Several mechanical tests were also presented, including surface roughness of the coatings, coatings microhardness, and coatings adhesion. The coatings morphology was also characterized using an SEM microscope, as well as X-ray diffraction (XRD) for phase analysis after the oxidation test. However, spalling occurred on WC10Co4Cr coatings in the 4th cycle. It is noted that the WC17Co has better characteristics compared to WC16Co4Cr coatings, as evidence: a more stable oxidation rate and lower accumulation of oxide thickness, as well as no spalling at the interface on substrate and coating.

Keyword : HVOF, Oxidation resistance, Induce draft fan

The Effect of Corner Radius of Square Thin-Walled Structures on Crashworthiness Indicators

Jos Istiyanto, Harry Purnama, Joko Triwardono, Jekki Hendrawan

Abstract

Generally, the crash box on automobile vehicles is a thin-walled structure with a square cross-section. The majority of research was carried out for a long time to find the optimum crashworthiness indicator. In this study, numerical simulations and experimental tests are used to investigate the effect of the corner radius of a square cross-section thin-walled structure on crashworthiness indicators. Quasi-static analysis with mild steel material produces the mean force (P_m) error value is less than 3% while varying the corner radius ranging from zero to 1 mm, 2 mm, and 3 mm shows energy absorption (EA) and peak force (P_{max}) decreased.

Keyword : *Thin-walled square tube, Mild steel, Numerical simulation, Experimental test, Crashworthiness indicators*

Data Exploratory Analysis and Feature Selection of Low-Speed Wind Tunnel Data for Predicting Force and Moment of Aircraft

Fitra Hidiyanto, Shabrina Leksono, Rizqon Fajar, Sigit Tri Atmaja

Abstract

This paper discusses exploratory data analysis (EDA) and feature selection of aircraft test results in Indonesia's low-speed wind tunnels (ILST). First, we briefly explain input and output parameters and data processing to make readable and higher accurate data. Then, we used feature selection using embedded and random forest methods to find parameters that most affect the force coefficient of aircraft. The research activities carried out in this study are to review literature from either scientific journals, the internet, or books and interview with an engineer who tests aircraft models at ILST. Then create a program for processing data from test results, such as data extraction, data cleaning, exploratory data analysis, and feature selection with python. After applying the feature selection method, we found that all the methods show similar results and have succeeded in separating the powerful features from the weak ones with a significant score difference. We decide to use the Random Forest method. The three most strongest features in the coefficient of an aircraft model in the ILST test (C_L , C_D , C_{M25} , C_{YAW} , C_{ROLL} and C_Y) are the following: for C_L are ALFA (0.984), T0 (0.008), P0 (0.004), on for C_D is are ALFA (0.965), T0 (0.009), RE (0.007), in C_{M25} are ALFA (0.416), P0 (0.285), T0 (0.168), in C_{YAW} are BETA (0.44), T0 (0.141), ALFA (0.141), in C_{ROLL} is BETA (0.79), ALFA (0.091), P0 (0.036), and in C_Y are BETA (0.842), ALFA (0.114) and T0 (0.014). The results of this paper can be used to help build a model for the coefficient of aircraft design using machine learning based on the data from the ILST test more effectively and efficiently

Keyword : *Machine Learning, Feature Selection, Exploratory Data Analysis, Aircraft Modeling.*