Journal of Engineering and Technological Sciences

Journal of Engineering and Technological Sciences welcomes full research articles in the area of Engineering Sciences from the following subject areas: Aerospace Engineering, Biotechnology, Chemical Engineering, Civil Engineering, Electrical Engineering, Engineering Physics, Environmental Engineering, Industrial Engineering, Information Engineering, Mechanical Engineering, Materials Science and Engineering, Manufacturing Processes, Microelectronics, Mining Engineering, Petroleum Engineering, and other application of physical, biological, chemical and mathematical sciences in engineering. Authors are invited to submit articles that have not been published previously and are not under consideration elsewhere.

Starting from Vol. 35, No. 1, 2003, full articles published are available online at http://journals.itb.ac.id/index.php/jets, and indexed by Scopus, Web of Science (Emerging Source Citation Index)-Clarivate Analysis, Ei Compendex, Google Scholar, Index Copernicus, DOAJ, ASEAN Citation Index, The Elektronische Zeitschriftenbibliothek EZB by University Library of Regensburg, EBSCO Open Science Directory, Chemical Abstract Service (CAS), Zurich Open Repository and Archive Journal Database, Indonesian Publication Index(IPI) and Science and Technology Index (SINTA),

Publication History

Currently known as:

Journal of Engineering and Technological Sciences

Formerly known as:

- ITB Journal of Engineering Science (2007 2012)
- Proceedings ITB on Engineering Science (2003 2006)
- Proceedings ITB (1961 2002)

Editorial board of Journal of Engineering and Technological Sciences Chief Editor

Chief Editor			
Tjandra Setiadi Faculty of Industrial Technology, ITB, Indonesia	Deddy Kurniadi Faculty of Industrial Technology, ITB, Indonesia Dudy Darmawan Wijaya,	Suwarno School of Electrical Engineering and Informatics, ITB, Indonesia	Jeong-Guon Ih Korea Advanced Institute of Science and Technology, South Korea
Editorial Board Aiqin Wang Center for Eco-material	Faculty of Earth Science and Technology, ITB, Indonesia	Tobias Nilsson GFZ German Research Centre for	M Akbar Rhamdhani Department of Mechanical and
and Green Chemistry, Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences , P.R. China	Judha Purbolaksono Faculty of Engineering, Universiti Teknologi Brunei, Brunei Darussalam	Geosciences, Potsdam, Germany Mark van Loosdrecht	Product Design Engineering, Swinburne University of Technology, Australia
Satria Bijaksana, Faculty Mining and Petroleum Engineering, ITB, Indonesia	Tatacipta Dirgantara Faculty of Mechanical and Aerospace Engineering, ITB, Indonesia	Faculty of Applied Sciences, Delft University of Technology, The Netherlands	Chien Ming Wang School of Civil Engineering, The University of Queensland, Australia
Masyhur Irsyam Faculty of Civil and Environmental Engineering, ITB, Indonesia	Indah Rachmatiah S. Salami Faculty of Civil and Environmental Engineering, ITB, Indonesia	Taufik CalPoly, Department of Electrical Engineering, San Luis Obispo, United States	Shuren Wang School of Civil Engineering, Henan Polytechnic University, China

Publication assistant: Dini Sofiani Permatasari & Yuliah Qotimah. Address: *ITB Journal Publisher*, LPPM ITB, Center for Research and Community Services (CRCS) Building 6th & 7th Floor, Jl. Ganesha No. 10 Bandung 40132, Indonesia, Tel. +62-22-86010080, Fax.: +62-22-86010051; e-mail: jets@lppm.itb.ac.id.

Distribution: Distributed to other universities and research institutions for exchange publications, and to regular subscribers. Subscription per issue: Rp 100.000,- (domestic) and \$50 (overseas). Order form for subscription should be sent to the editorial office.

Reg. No. 691-SIC-UPPGT-SIT-1963, Accreditation No. 30/E/KPT/2018 (Vol. 50 No.1, 2018 - Vol. 54 No.6, 2022)

Published by *ITB Journal Publisher*, The Institute for Research and Community Services, Institut Teknologi Bandung, in collaboration with Indonesian Engineering Association (Persatuan Insinyur Indonesia - PII).

Cover Design by Chandra Tresnadi.

Table of Contents		İ
	Table of Contents	

1.	Scaling Up of the Pyrolysis Process to Produce Silica from	
	Rice Husk Casnan, Erliza Noor, Hartrisari Hardjomidjojo, Irzaman & Eti Rohaeti	747
2.	Finite Element Analysis of Reinforced Concrete Coupling Beams Bambang Budiono, Nyoman Triani Herlina Dewi & Erwin Lim	762
3.	Seismic Response Validation of Simulated Soil Models to Vertical Array Record during a Strong Earthquake Rena Misliniyati, Lindung Zalbuin Mase, Masyhur Irsyam, Hendriyawan & Andhika Sahadewa	772
4.	Structural Topology Optimization of Brake Disc Using the Equivalent Moving Load Method Shengfang Zhang, Jian Yin, Yu Liu, Fujian Ma, Zhihua Sha & Dapeng Yang	791
5.	Results Comparison for Hat-shaped, Double-notch and Punch Testing of Split Hopkinson Shear Bar Technique Bagus Budiwantoro, Iffah Faizah, Dini A. Prabowo, Burhan Febrinawarta & Muhammad A. Kariem	805
6.	Determination of Site Amplification Deep Soil Layers using 1-D Site Response Analysis (Case Study: Jakarta City, Indonesia) Delfebriyadi, Masyhur Irsyam, Bigman M. Hutapea, Iswandi Imran & Muhammad Asrurifak	824
7.	An Intelligent Incentive Model Based on Environmental Ergonomics for Food SMEs Mirwan Ushada, Nur Achmad Sulistyo Putro & Nafis Khuriyati	839

8.	A Collaborative System to Manage Information Sources	
	Improving Transport Infrastructure Data Knowledge	
	Salvatore Cafiso, Alessandro di Graziano &	855
	Giuseppina Pappalardo	
9.	Theoretical Beam Hardening Correction for Industrial X-ray Computed Tomography	
	Osama M. H. Ahmed, YuShou Song &	869
	Zhaoyang Xie	