

## 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

|   |  |   |   |
|---|--|---|---|
| Endra Gunawan<br>Faculty Mining and<br>Petroleum Engineering, ITB,<br>Indonesia | Masyhur Irsyam<br>Faculty of Civil and<br>Environmental Engineering,<br>ITB, Indonesia | M Akbar Rhamdhani<br>FPD Group, FSET, Swinburne<br>University of Technology,<br>Australia | Bayu Jayawardhana<br>FSE, University of Groningen,<br>Netherlands |
|---|--|---|---|

#### Associate Editor

|  |   |  |   |
|--|---|--|---|
| Afriyanti Sumboja<br>Faculty of Mechanical and<br>Aerospace Engineering, ITB,<br>Indonesia | Firman Bagja Juangsa<br>Faculty of Mechanical and<br>Aerospace Engineering, ITB,<br>Indonesia | Jeong-Guon Ih<br>Korea Advanced Institute of<br>Science and Technology,<br>South Korea | Walter Timo de Vries<br>SED, Technical University of<br>Munich, Germany |
|--|---|--|---|

#### Khoiruddin

|   |   |  |  |
|---|---|--|--|
| Faculty of Industrial<br>Technology, ITB, Indonesia | Yuniati<br>Faculty of Civil and<br>Environmental Engineering,<br>ITB, Indonesia | Mark van Loosdrecht<br>FAD, Delft University of<br>Technology, The Netherlands | Yusaku Ohta<br>Graduate School of Science,<br>Tohoku University, Japan |
|---|---|--|--|

#### Editorial Board

|  |   |   |   |
|--|---|---|---|
| Tjandra Setiadi<br>Faculty of Industrial<br>Technology, ITB, Indonesia | Heri Andreas,<br>Faculty of Earth Science and<br>Technology, ITB, Indonesia | Ramaraj Boopathy<br>Department of Biological<br>Sciences, Nicholls State<br>University, United States | Massoud Sofi<br>Departement of Infrastructure<br>Engineering, The University of<br>Melbourne, Australia |
|--|---|---|---|

#### Suwarno

|  |   |   |
|--|---|---|
| School of Electrical<br>Engineering and Informatics,<br>ITB, Indonesia | Rizki Armanto Mangkuto<br>Faculty of Industrial<br>Technology, ITB, Indonesia | Prakash Thamburaja<br>Universiti Kebangsaan<br>Malaysia, Malaysia |
|--|---|---|

Publication assistant: Yuliah Qotimah. Address: *ITB Journal Secretariat*, LPPM ITB, Center for Research and Community Services (CRCS) Building 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. 225/E/KPT/2022 (Vol. 54 No.4, 2022 - Vol. 59 No.3, 2027)

Published by The Institute for Research and Community Services, Institut Teknologi Bandung.

Cover Design by Chandra Tresnadi.

## Table of Contents

---

|  |         |
|--|---------|
| 1. Interpreting Arc and Line Shapes in the Fault Ruptures of the 2016 Mw7.8 Kaikoura, New Zealand and the 2023 Mw7.8 and Mw7.6 East Anatolian Fault, Turkey-Syria Earthquakes: A Theoretical Approach<br>Mudrik Rahmawan Daryono, Gino de Gelder & Adi Patria  | 679-691 |
| 2. Properties of Hydrochar Derived from Arabica Coffee Agro-Industry Residues under Wet Torrefaction Method<br>Nyakty Shalihah, Adi Setiawan, Muhammad Muhammad & Shafira Riskina  | 692-703 |
| 3. Experimental Investigation of Ammonia/Oxygen/Argon Combustion: The Role of Equivalence Ratio and Nozzle Shape in a Constant Volume Combustion Chamber with Sub-chamber<br>Mitsuhisa Ichiyanagi, Emir Yilmaz, Takuma Ohashi, Masato Sanno, Guansen Lin, Sebastian Gunawan, Henry Widjaja, Leon Jonathan, Gabriel Jeremy Gotama, Willyanto Anggono & Takashi Suzuki | 704-715 |
| 4. Evaluation of Mechanical Properties of Warm-Mix Asphalt Mixtures Prepared with Sasobit and Zeolite Additives<br>Wshyar M. Hasan, Rana A. Yousif, Saeid Hesami, Sady A. Tayh, Abbas F. Jasim & Hawkar H. Ibrahim   | 716-726 |
| 5. Role of Deagglomeration in Particle Size and Antibiofilm Activity of ZnO Nanoparticles Synthesized with Averrhoa bilimbi Extract<br>Vita Wonoputri, Tjokorde Walmiki Samadhi, Shafira Khairunnisa & Eka Rahayu  | 727-741 |
| 6. Optimization of Ultrasonic and Microbubble Disinfection for Escherichia coli and Staphylococcus aureus: Experimental Design and Effectiveness Evaluation<br>Siwasit Pitjamit, Norrapon Vichiansan, Komgrit Leksakul & Dheerawan Boonyawan   | 742-755 |
| 7. Fatigue Evaluation of Steel Truss Arch Bridge Based on Traffic Load Simulation Using Weigh-in-Motion Data: Case Study of Rumpiang Bridge<br>Rio Pramana & Ivan Sandi Darma  | 756-770 |
| 8. Utilization of Syngas as Co-firing Fuel for Carbonization of Arabica Coffee Pulp<br>Rizqon Hasibuan, Adi Setiawan & Faisal Faisal   | 771-780 |
| 9. Improved Risk Assessment of TBM Tunneling Collapse Based on Nonlinear-Cloud Model<br>Longjiang Wang, Tian Xu, Dachao Zong, Qiang Han, Yongjin Zhao, Zhanping Song & Yongli Zhangna,   | 781-792 |
| 10. Comparative Seismic Evaluation of Building Codes: A Case Study on Structural Performance and Safety<br>Jovan Thierry Salim & Indra Djati Sidi  | 793-807 |

Index of Author

iii

Index of Subject

v

List of Reviewers

x