



ScienceDirect

Procedia Engineering

Open access

Menu



Search in this journal

The 3rd International Conference on Sustainable Civil Engineering Structures and Construction Materials - Sustainable Structures for Future Generations

Edited by Tam Chat Tim, Tamon Ueda, Harald S. Müller

Volume 171,

Pages 1-1550 (2017)

[< Previous vol/issue](#)

[Next vol/issue >](#)

Editorial *Open access*

Preface

Pages 1-4

[Download PDF](#)


Research article *Open access*

FEEDBACK

Next Generation Wireless Smart Sensors Toward Sustainable Civil Infrastructure

B.F. Spencer, J.-W. Park, K.A. Mechitov, H. Jo, G. Agha

Pages 5-13

[!\[\]\(99f58673407353e96a019fbca558fd72_img.jpg\) Download PDF](#) [Article preview](#) 

Research article *Open access*

Sustainable Construction for Singapore's Urban Infrastructure – Some Research Findings

Khim Chye Gary Ong

Pages 14-21


[!\[\]\(3211b5d1d968fc1665909b34f9f16010_img.jpg\) Download PDF](#) [Article preview](#) 

Research article *Open access*

Design, Material Properties and Structural Performance of Sustainable Concrete

Harald S. Mueller, Michael Haist, Jack S. Moffatt, Michael Vogel

Pages 22-32

[!\[\]\(e3275251d0893157c3584e20c81dc3ba_img.jpg\) Download PDF](#) [Article preview](#) 

Research article *Open access*

Sustainable Seismic Design

Stephen Pessiki

Pages 33-39

[!\[\]\(83bbbd261710c59db0214aa27b2edc0d_img.jpg\) Download PDF](#) [Article preview](#) 

Research article *Open access*

Importance of Soft Processing (Low-energy Production) of Advanced Materials for Sustainable Society

Masahiro Yoshimura

Pages 40-52


[!\[\]\(a8ff699ced33317c53c86f9bf3171905_img.jpg\) Download PDF](#) [Article preview](#) 

Research article *Open access*

Societal Burden and Engineering Challenges of Ageing Infrastructure

Klaas van Breugel

Pages 53-63

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Smart Graphene Oxide Based Composite Materials and their Electric and Magnetic Stimuli-response

Shang Hao Piao, Hyoung Jin Choi

Pages 64-70

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Effects of Temperature and Moisture on Concrete-PCM Interface Performance

Ueda Tamon, Khuram Rashid, Qian Ye, Zhang Dawei

Pages 71-79

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Shear Behavior of High-volume Fly Ash Concrete as Replacement of Portland Cement in RC Beam

Ade Lisantono, Haryanto Yoso Wigroho, Roy Arnol Purba

Pages 80-87


 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Composite Engineering – Direct Bonding of plastic PET Films by Plasma Irradiation

Tamio Endo, Lakshmi Reddy, Hiroaki Nishikawa, Satoru Kaneko, ... Kazuhiro Endo

Pages 88-103

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Europe Goes Green

Adrian J.M. Leijten

Pages 104-112

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Wood Frame Floor Model of LVL *Paraserianthes Falcataria*

Ali Awaludin, Anita Firmanti, Muslikh, Hendra Theodarmo, Dani Astuti

Pages 113-120

 [Download PDF](#) Article preview 

Research article *Open access*

On the Confined High-strength Concrete and Need of Future Research

Antonius, Iswandi Imran, Prabowo Setiyawan

Pages 121-130

 [Download PDF](#) Article preview 

Research article *Open access*

Role of Organizational Factors Affecting Worker Safety Behavior: A Bayesian Belief Network Approach

Bonaventura H.W. Hadikusumo, Bhanupong Jitwasinkul, Abdul Qayoom Memon

Pages 131-139

 [Download PDF](#) Article preview 

Research article *Open access*

Numerical Study on Lateral-torsional Buckling of Honeycomb Beam

Danny Gunawan, Bambang Suryoatmono

Pages 140-146


 [Download PDF](#) Article preview 

Research article *Open access*

Post-buckling Behaviour of Axially FGM Planar Beams and Frames

Buntara Sthenly Gan, Trinh Thanh Huong, Nguyen Dinh Kien

Pages 147-158

 [Download PDF](#) Article preview 

Research article *Open access*

Local Wisdom to a Sustainable Non-engineered Brick Building

B. Lumantarna, P. Pudjisuryadi, R.M. Soetanto, G.G. Hindrajaya

FEEDBACK 

Pages 159-167

[Download PDF](#) Article preview 

Research article Open access

Toward Bio-based geo- & Civil Engineering for a Sustainable Society

Henk M. Jonkers

Pages 168-175


[Download PDF](#) Article preview 

Research article Open access

Full Height Rectangular Opening Castellated Steel Beam Partially Encased in Reinforced Mortar

Iman Satyarno, Djoko Sulisty, Dina Heldita, A. Talodaci Corte Real De Oliviera

Pages 176-184

[Download PDF](#) Article preview 

Research article Open access

Supply Chain Management Strategy for Recycled Materials to Support Sustainable Construction

Mochamad Agung Wibowo, Elizar, Moh Nur Sholeh, Hadjar Seti Adji

Pages 185-190

[Download PDF](#) Article preview 

Research article Open access

Experimental Evaluation of Masonry Infill Walls of RC Frame Buildings Subjected to Cyclic Loads

Mochamad Teguh

Pages 191-200

[Download PDF](#) Article preview 

Research article Open access

Nanostructured Oxide Thin Films for Sustainable Development

Paolo Mele, Shiv J. Singh, Shrikant Saini, Alok K. Jha, Malik I. Adam

Pages 201-206

FEEDBACK 

[Download PDF](#) [Article preview](#) 

Research article *Open access*

Concrete Structures for Sustainability in a Changing World

Petr Hajek

Pages 207-214

[Download PDF](#) [Article preview](#) 

Research article *Open access*

Role of Visualization Technologies in Safety Planning and Management at Construction Jobsites

Salman Azhar

Pages 215-226

[Download PDF](#) [Article preview](#) 

Research article *Open access*

EN 206 Conformity Testing for Concrete Strength in Compression

C.T. Tam, Daneti S. Babu, W. Li

Pages 227-237

[Download PDF](#) [Article preview](#) 

Research article *Open access*

Can Self-healing Mechanism Helps Concrete Structures Sustainable?

Senot Sangadji

Pages 238-249

[Download PDF](#) [Article preview](#) 

Research article *Open access*

Optimization of Sustainable House in Urban Area

Irma N. Nasution, Syahreza Alvan

Pages 250-257

[Download PDF](#) [Article preview](#) 

Research article *Open access*

Urban Farming Construction Model on the Vertical Building Envelope to Support the Green Buildings Development in Sleman, Indonesia

Suparwoko, Betri Taufani

Pages 258-264

 [Download PDF](#) Article preview 

Research article *Open access*

Producing Alternative Concept for the Trans-sumatera Toll Road Project Development using Location Quotient Method

Mohammed Ali Berawi, Teuku Yuri Zagloel, Perdana Miraj, Hadi Mulyanto

Pages 265-273


 [Download PDF](#) Article preview 

Research article *Open access*

Developing a Self-assessment Model of Risk Management Maturity for Client Organizations of Public Construction Projects: Indonesian Context

Andreas Wibowo, Januar Taufik

Pages 274-281

 [Download PDF](#) Article preview 

Research article *Open access*

Neural Network for the Standard Unit Price of the Building Area

Fachrurrazi, Saiful Husin, Tripoli, Mubarak

Pages 282-293

 [Download PDF](#) Article preview 

Research article *Open access*

Impact Factors on the Cost Calculation for Building Services within the Built Environment

Bernhard Bauer, Jörg Koppelhuber, Johannes Wall, Detlef Heck

Pages 294-301

 [Download PDF](#) Article preview 

Research article *Open access*

FEEDBACK 

Use of Life Cycle Assessments in the Construction Sector: Critical Review

Charlotte Dossche, Veerle Boel, Wouter De Corte

Pages 302-311

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

The Sustainable Infrastructure through the Construction Supply Chain Carbon Footprint Approach

Hermawan, Puti F. Marzuki, Muhamad Abduh, R. Driejana

Pages 312-322

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Retrofitting in the Middle of Project Execution: Case Study of a Public Hospital Building

Ferry Hermawan, Himawan Indarto, Robby Soetanto

Pages 323-332


 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Industrialized Timber Building Systems for an Increased Market Share – a Holistic Approach Targeting Construction Management and Building Economics

Joerg Koppelhuber, Bernhard Bauer, Johannes Wall, Detlef Heck

Pages 333-340

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Dynamic Modelling of the Relation between Bidding Strategy and Construction Project Performance

Mochamad Agung Wibowo, I. Nyoman Yudha Astana, H.A. Rusdi

Pages 341-347

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Building Information Modeling in the Architecture-engineering Construction Project in Surabaya

Herry Pintardi Chandra, Paulus Nugraha, Evan Sutanto Putra

Pages 348-353

 [Download PDF](#) Article preview 

Research article *Open access*

Significant Factors to Motivate Small and Medium Enterprise (SME) Construction Firms in the Philippines to Implement ISO9001:2008

Joseph Berlin P. Juanzon, Manuel M. Muhi

Pages 354-361

 [Download PDF](#) Article preview 

Research article *Open access*

The Critical Point in the Certification System for Project Manager in Indonesia

Putri Anggi Permata Suwandi, M. Agung Wibowo, H.A. Rusdi

Pages 362-369

 [Download PDF](#) Article preview 

Research article *Open access*

Innovation Performance of Large Contractor in Indonesia: Influencing Factors and its Impact on Firm's Performance

B. Julison, S.P.R. Wardani, M.A. Wibowo

Pages 370-378

 [Download PDF](#) Article preview 

Research article *Open access*

Innovativeness: A Key Factor to Support Contractors' Business Success

Harijanto Setiawan, Bilge Erdogan, Stephen O. Ogunlana

Pages 379-386

 [Download PDF](#) Article preview 

Research article *Open access*

Strategy for Small-medium Scale Contractor Performance Improvement in ASEAN Competitive Market

Fajar Sri Handayani

Pages 387-395

 [Download PDF](#) Article preview 

Research article *Open access*

A Model of Integrated Multilevel Safety Intervention Practices in Malaysian Construction Industry

Mazlina Zaira Mohammad, Bonaventura H.W. Hadikusumo

Pages 396-404

 [Download PDF](#) Article preview 

Research article *Open access*

Identification of Safety Culture Dimensions Based on the Implementation of OSH Management System in Construction Company

Rossy A. Machfudiyanto, Yusuf Latief, Rosmariyani Arifuddin, Yoko Yogiswara

Pages 405-412

 [Download PDF](#) Article preview 

Research article *Open access*

Model of the Maturity of Pre-construction Safety Planning

Bambang Endroyo, Akhmad Suraji, Muhammad Sahari Besari

Pages 413-418

 [Download PDF](#) Article preview 

Research article *Open access*

Implementation, Management, and Cost of the Clean Water Act and Storm Water Pollution Prevention Plan

Scott Kelting, Dylan Eads

Pages 419-424

 [Download PDF](#) Article preview 

Research article *Open access*

FEEDBACK 

Nitrogen Removal from Landfill Leachate via ex-situ Nitrification and in-situ Denitrification in Laboratory Scale Bioreactor

Gabriel Andari Kristanto, Harry Rialdi, Irma Gusniani

Pages 425-433

 [Download PDF](#) Article preview 

Research article *Open access*

Forensic Assessment on Near Surface Landslide Using Electrical Resistivity Imaging (ERI) at Kenyir Lake Area in Terengganu, Malaysia

Mohd Hazreek Zainal Abidin, Aziman Madun, Saiful Azhar Ahmad Tajudin, Mohd Fakhrurrazi Ishak

Pages 434-444

 [Download PDF](#) Article preview 

Research article *Open access*

The Effect of Drainage Channel Type on Seepage Percentage

Sri Amini Yuni Astuti, Munadhir, Dwi Astuti Wahyu Wulan Pratiwi

Pages 445-453

 [Download PDF](#) Article preview 

Research article *Open access*

Settlement of Residential Houses Supported by Piled Foundation Embedded in Expansive Soil

Gogot Setyo Budi

Pages 454-460

 [Download PDF](#) Article preview 

Research article *Open access*

Evaluation of Frost Heave Pressure Characteristics in Transverse Direction to Heat Flow

Chikako Amanuma, Takashi Kanauchi, Satoshi Akagawa, Zheng Hao, Shunji Kanie

Pages 461-468

 [Download PDF](#) Article preview 

Research article *Open access*

Analysis of the Seepage Due to the Thawing of Permafrost, Considering the Gradient of the Impermeable Layer

Masaya Ogawa, Shunji Kanie

Pages 469-475


 [Download PDF](#) Article preview 

Research article *Open access*

Shear Behavior of Calcium Carbide Residue - Bagasse Ash Stabilized Expansive Soil

John Tri Hatmoko, Hendra Suryadharma

Pages 476-483

 [Download PDF](#) Article preview 

Research article *Open access*

A Study of the Effectiveness of the Use of Cement and Bottom ash Towards the Stability of Clay in Terms of UCT Value

Ika Puji Hastuty, Roesyanto, B.S. Jeriko

Pages 484-491

 [Download PDF](#) Article preview 

Research article *Open access*

Effect of Clay Core Configuration of the Rock Fill Dams Against Hydraulic Fracturing

Didiek Djarwadi, Kabul Basah Suryolelono, Bambang Suhendro, Hari Christady Hardiyatmo

Pages 492-501


 [Download PDF](#) Article preview 

Research article *Open access*

Back Calculation of Excessive Deformation on Deep Excavation

M.F. Ma'ruf, H. Darjanto

Pages 502-510

 [Download PDF](#) Article preview 

Research article *Open access*

Resistance of Concrete with Calcium Stearate Due to Chloride Attack Tested by Accelerated Corrosion

FEEDBACK 

Agus Maryoto

Pages 511-516

 [Download PDF](#) Article preview 

Research article *Open access*

Study of Pitting Resistance of Rebar Steels in Jakarta Coastal Using Simulated Concrete Pore Solution

Moch. Syaiful Anwar, Bobby Fadillah, Arini Nikitasari, Soesaptri Oediyani, Efendi Mabururi

Pages 517-525

 [Download PDF](#) Article preview 

Research article *Open access*

Effect of Pit Distance on Failure Probability of a Corroded RC Beam

Mahdi Kioumars, Gro Markeset, Sheida Hooshmandi

Pages 526-533

 [Download PDF](#) Article preview 

Research article *Open access*

Influence of Vacuum Mixing on the Carbonation Resistance and Microstructure of Reactive Powder Concrete Containing Secondary Copper Slag as Supplementary Cementitious Material (SCM)

Romy Suryaningrat Edwin, Elke Gruyaert, Jeroen Dils, Nele De Belie

Pages 534-542

 [Download PDF](#) Article preview 

Research article *Open access*

Compressive Strength and Chloride Penetration Tests of Modified Type IP Cement Concrete with Rice Ash

Anna Rose A. Javier, Neslyn E. Lopez, Joseph Berlin P. Juanzon

Pages 543-548

 [Download PDF](#) Article preview 

Research article *Open access*

Need for Further Development in Service Life Modelling of Concrete Structures in Chloride Environment

Gro Marqueset, Mahdi Kioumars

Pages 549-556



 [Download PDF](#) Article preview 

Research article *Open access*

Properties of Plain and Blended Cement Concrete Immersed in Acidic Peat Water Canal

Monita Olivia, Tomy Pradana, Iskandar Romey Sitompul

Pages 557-563

 [Download PDF](#) Article preview 

Research article *Open access*

Mechanical and Durability Performance of Novel Self-activating Geopolymer Mortars

Cheah Chee Ban, Part Wei Ken, Mahyuddin Ramli

Pages 564-571



 [Download PDF](#) Article preview 

Research article *Open access*

Effect of Curing Temperature and Fiber on Metakaolin-based Geopolymer

Januarti Jaya Ekaputri, Subaer Junaedi, Wijaya

Pages 572-583

 [Download PDF](#) Article preview 

Research article *Open access*

An Alternative Method for Determining Tensile Properties of Engineered Cementitious Composites

Benny Suryanto, Blair Cockburn, Han Ay Lie, W. John McCarter

Pages 584-591

 [Download PDF](#) Article preview 

Research article *Open access*

Mechanical Properties of Concrete with *Enterococcus Faecalis* and Calcium Lactate

J.M. Irwan, L.H. Anneza, N. Othman, A. Faisal Alshalif, ... T. Teddy

FEEDBACK 

Pages 592-597

[Download PDF](#) [Article preview](#) ✓

Research article [Open access](#)

Bacillus Subtilis HU58 Immobilized in Micropores of Diatomite for Using in Self-healing Concrete

Nguyen Ngoc Tri Huynh, Nghi Mai Phuong, Nguyen Phung Anh Toan, Nguyen Khanh Son

Pages 598-605

[Download PDF](#) [Article preview](#) ✓

Research article [Open access](#)

The Use of Alkaliphilic Bacteria-based Repair Solution for Porous Network Concrete Healing Mechanism

Senot Sangadji, Virginie Wiktor, Henk Jonkers, Erik Schlangen

Pages 606-613

[Download PDF](#) [Article preview](#) ✓

Research article [Open access](#)

The Influence of Pet Plastic Waste Gradations as Coarse Aggregate Towards Compressive Strength of Light Concrete

Nursyamsi, Winner Syukur Berkat Zebua

Pages 614-619

[Download PDF](#) [Article preview](#) ✓

Research article [Open access](#)

Experimental Study of Fly Ash Density Effect to the Mortar Compressive Strength with Recycled Fine Aggregate

Altho Sagara, Johannes Adhijoso Tjondro, Dinda Karina Putri

Pages 620-626

[Download PDF](#) [Article preview](#) ✓

Research article [Open access](#)

Mechanical Properties of Concretes with Recycled Aggregates and Waste Brick Powder as Cement Replacement

Viviana Letelier, Ester Tarela, Giacomo Moriconi

Pages 627-632

 [Download PDF](#) Article preview 

Research article *Open access*

Potential of Substituting Waste Glass in Aerated Light Weight Concrete

Lim Sheau Hooi, Phang Jia Min

Pages 633-639

 [Download PDF](#) Article preview 

Research article *Open access*

Improving of Recycled Aggregate Quality by Thermal-mechanical-chemical Process

Ni Nyoman Kencanawati, Akmaluddin, I. Nyoman Merdana, Nonik Nuraida, ... Mitsuhiro Shigeishi

Pages 640-644

 [Download PDF](#) Article preview 

Research article *Open access*

Proportioning, Microstructure and Fresh Properties of Self-compacting Concrete with Recycled Sand

Diego Carro-López, Belén González-Fonteboa, Fernando Martínez-Abella, Iris González-Taboada, ...

Fernando Varela-Puga

Pages 645-657

 [Download PDF](#) Article preview 

Research article *Open access*

Properties of Concrete Containing Ground Waste Cockle and Clam Seashells

Monita Olivia, Revina Oktaviani, Ismeddiyanto

Pages 658-663

 [Download PDF](#) Article preview 



Research article *Open access*

Utilization of Polystyrene Waste for Wall Panel to Produce Green Construct

FEEDBACK 

Suprpto Siswosukarto, Ashar Saputra, I. Gede Yohan Kafrain

Pages 664-671



 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Valorization of the Crushed Dune Sand in the Formulation of Self-compacting-concrete

Farid Benmerioul, Abdelkadir Makani, Ahmed Taфраoui, Said Zaouai

Pages 672-678

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Calcium Silicate Board as Wall-facade

Luciana Kristanto, Handoko Sugiharto, S.W. Dwi Agus, S. Aditya Pratama

Pages 679-688

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Compressive Strength of Mortar Containing Ferronickel Slag as Replacement of Natural Sand

Ashish Kumer Saha, Prabir Kumar Sarker

Pages 689-694

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Physical and Mechanical Properties of WPC Board from Sengon Sawdust and Recycled HDPE Plastic

Yudhi Arnandha, Iman Satyarno, Ali Awaludin, Inggar Septia Irawati, ... Astri Amalia

Pages 695-704

 [Download PDF](#) [Article preview](#) 

Research article *Open access*

Characterization of Fly-ash using Electrochemical Impedance Spectroscopy

Benny Suryanto, W. John McCarter, Gerry Starrs, T. Malcolm Chrisp

Pages 705-714

FEEDBACK 

[Download PDF](#) [Article preview](#) ✓

Research article *Open access*

Creep Behaviour of Self-compacting Concrete Incorporating High Volume Fly Ash and its Effect on the Long-term Deflection of Reinforced Concrete Beam

Stefanus A. Kristiawan, Agung P. Nugroho

Pages 715-724

[Download PDF](#) [Article preview](#) ✓

Research article *Open access*

Investigation of Agro-concrete using by-products of Rice Husk in Mekong Delta of Vietnam

Nguyen Khanh Son, Nguyen Phung Anh Toan, Tran Thi Thuy Dung, Nguyen Ngoc Tri Huynh

Pages 725-733

[Download PDF](#) [Article preview](#) ✓

Research article *Open access*

Delamination Tendency of Repair Mortar Incorporating Crumb Rubber

Stefanus A. Kristiawan, Amanah N.D. Hapsari

Pages 734-743

[Download PDF](#) [Article preview](#) ✓

Research article *Open access*

Effect of Phosphogypsum on the Properties of Portland Cement

G.M. Sadiqul Islam, Fazlul Habib Chowdhury, Muhammad Tanveer Raihan, Shishir Kumar Sikder Amit, Mohammad Rafiqul Islam

Pages 744-751

[Download PDF](#) [Article preview](#) ✓

Research article *Open access*

Optimizing Polycarboxylate Based Superplasticizer Dosage with Different Cement Type

Antoni, James Gabriel Halim, Owen Chandra Kusuma, Djwantoro Hardjito

Pages 752-759

[Download PDF](#) [Article preview](#) ✓



FEEDBACK 

Research article *Open access*

Influence of the Stiffness Modulus and Volume Fraction of Inclusions on Compressive Strength of Concrete

Han Ay Lie, Buntara Shently Gan, Benny Suryanto, Yulita Arni Priastiwi

Pages 760-767

 [Download PDF](#) Article preview 

Research article *Open access*

Thermal Conductivity and Compressive Strength of Lightweight Mortar Utilizing Pumice Breccia as Fine Aggregate

Slamet Widodo, Faqih Ma'arif, Buntara Sthenly Gan

Pages 768-773

 [Download PDF](#) Article preview 

Research article *Open access*

The Effect of Seawater Curing on the Correlation between Split Tensile Strength and Modulus of Rupture in High-strength Concrete Incorporating Rice Husk Ash

Galuh Chrismaningwang, Achmad Basuki, Kusno Adi Sambowo

Pages 774-780

 [Download PDF](#) Article preview 

Research article *Open access*

Numerical Modelling of Hexagonal Castellated Beam under Monotonic Loading

Richard Frans, Herman Parung, Desi Sandy, Surianti Tonapa

Pages 781-788


 [Download PDF](#) Article preview 

Research article *Open access*

Numerical Analysis of R/C Cylindrical Shell with Hoop Edge Beams

Takashi Hara

Pages 789-796

 [Download PDF](#) Article preview 

Research article *Open access*

FEEDBACK 

Structural Characteristics of Hagia Sophia under Consideration of the Ribs Inside the Dome

Akito Oto, Takashi Hara

Pages 797-804

[Download PDF](#) Article preview 

Research article Open access

Development of the DKMQ Element for Buckling Analysis of Shear-deformable Plate Bending

Foek Tjong Wong, Erwin, Alexander Richard, Irwan Katili

Pages 805-812

[Download PDF](#) Article preview 

Research article Open access

Lateral Torsional Buckling of Castellated Beams Analyzed using the Collapse Analysis

Sandhi Kwani, Paulus Karta Wijaya

Pages 813-820

[Download PDF](#) Article preview 

Research article Open access

Numerical Analysis of RC Columns Accompanied with Friction Damping Mechanism under Cyclic Loading

Angga Fajar Setiawan, Yoshikazu Takahashi, Junji Kiyono, Sumio Sawada

Pages 821-835

[Download PDF](#) Article preview 

Research article Open access

Numerical Approximation of Acoustic Equation using Radial Basis Function-discontinuous Galerkin Method

W.S. Kresno, S.P.R. Wardani, Endra Susila, Pranowo

Pages 836-846

[Download PDF](#) Article preview 

Research article Open access





FEEDBACK 

Three-dimensional Finite Element Analysis of Circular Reinforced Concrete Column Confined with FRP using Plasticity Model

Bambang Pисcesa, Mario M. Attard, Ali K. Samani

Pages 847-856

[Download PDF](#) Article preview 

  page 1 of 2  

[Previous vol/issue](#)

[Next vol/issue](#) 

ISSN: 1877-7058

Copyright © 2021 Elsevier Ltd. All rights reserved



Copyright © 2021 Elsevier B.V. or its licensors or contributors.
ScienceDirect® is a registered trademark of Elsevier B.V.

FEEDBACK 



Source details

Procedia Engineering

Scopus coverage years: from 2009 to 2019

ISSN: 1877-7058

Subject area: Engineering: General Engineering

Source type: Conference Proceeding

[View all documents >](#)

[Set document alert](#)

[📁 Save to source list](#) [Source Homepage](#)

CiteScore 2020

4.0



SJR 2020

0.320



SNIP 2020

1.437



[CiteScore](#) [CiteScore rank & trend](#) [Scopus content coverage](#)

Improved CiteScore methodology

CiteScore 2020 counts the citations received in 2017-2020 to articles, reviews, conference papers, book chapters and data papers published in 2017-2020, and divides this by the number of publications published in 2017-2020. [Learn more >](#)

CiteScore

2020

▼

4.0

=

23,216 Citations 2017 - 2020

5,804 Documents 2017 - 2020

Calculated on 05 May, 2021

CiteScoreTracker 2021

ⓘ

4.7

=

1,867 Citations to date

395 Documents to date

Last updated on 05 October, 2021 • Updated monthly

CiteScore rank 2020 ⓘ

Category	Rank	Percentile
Engineering		
General Engineering	#57/297	80th

[View CiteScore methodology >](#) [CiteScore FAQ >](#) [Add CiteScore to your site 🔗](#)

About Scopus

- What is Scopus
- Content coverage
- Scopus blog
- Scopus API
- Privacy matters

Language

- 日本語に切り替える
- 切换到简体中文
- 切换到繁體中文
- Русский язык

Customer Service

- Help
- Contact us



Ads by Google

Stop seeing this ad

Why this ad? ⓘ

Procedia Engineering


COUNTRY	SUBJECT AREA AND CATEGORY	PUBLISHER	H-INDEX
Netherlands	Engineering Engineering (miscellaneous)	Elsevier BV	74



Universities and
research
institutions in
Netherlands

Download the
Secure
Browser

Secure your netv
and endpoints with
in malware & phis
protection.



PUBLICATION TYPE

Conferences and
Proceedings

ISSN

18777058

COVERAGE


2009-2019

INFORMATION

[Homepage](#)

SCOPE

Information not localized

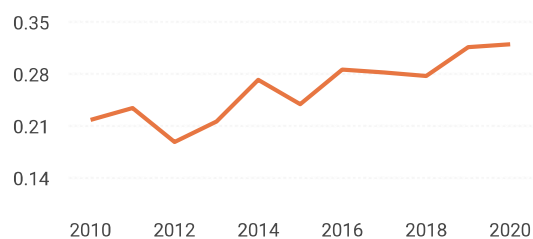
 Join the conversation about this journal

Download the Secure Browser

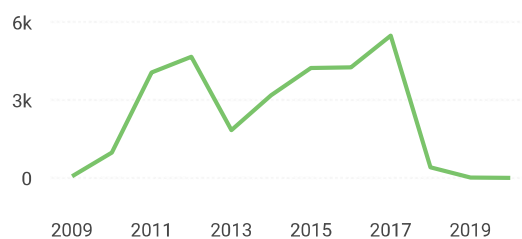
Secure your network and endpoints with built-in malware & phishing protection. Google



SJR

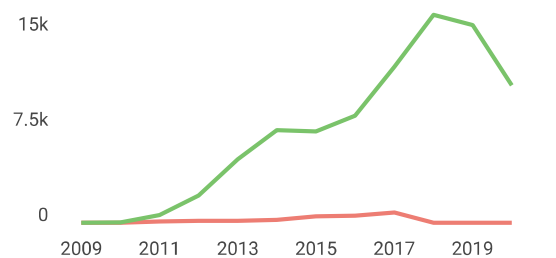


Total Documents

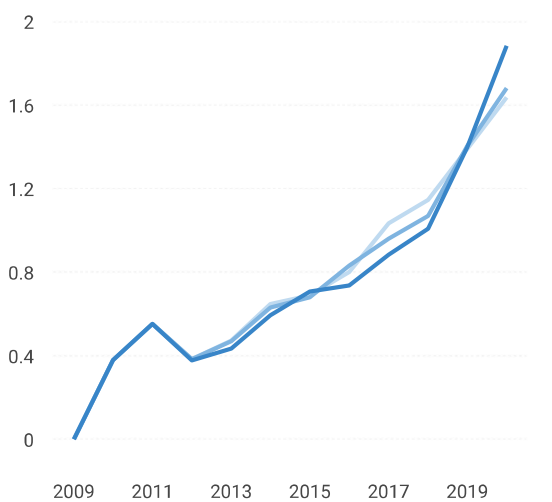


Total Cites

Self-Cites

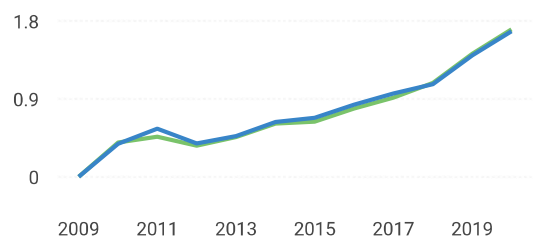


Citations per document



External Cites per Doc

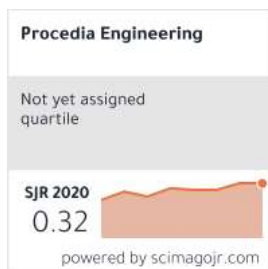
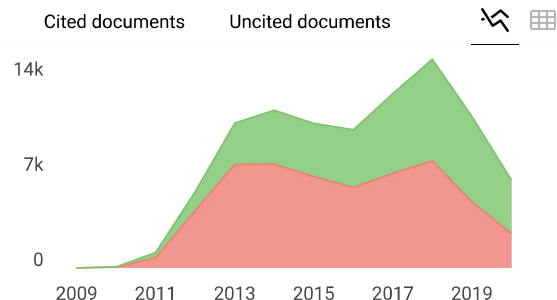
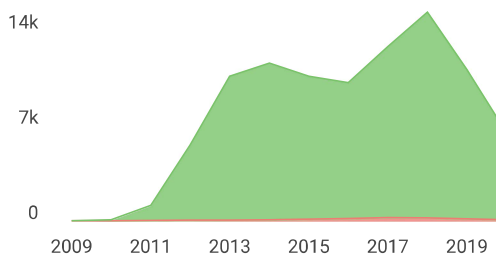
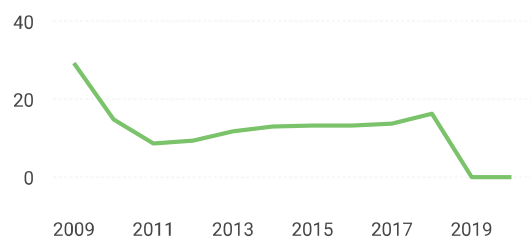
Cites per Doc



% International Collaboration

Citable documents

Non-citable documents



← Show this widget in your own website

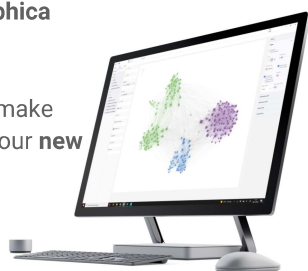
Just copy the code below and paste within your html code:

`<a href="https://www.scimag`

SCImago Graphica

Explore, visually communicate and make sense of data with our **new free tool**.

Get it



Download the Secure Browser

Secure your network and endpoints with built-in malware & phishing protection. Google

Metrics based on Scopus® data as of April 2021

B Bambang Sabariman 10 months ago

Indexed Procedia Engineering?

reply



Melanie Ortiz 10 months ago

SCImago Team

Dear Bambang,

Thank you for contacting us.

SJR is a portal with scientometric indicators of journals indexed in Elsevier/Scopus.

Unfortunately, we cannot help you with your request referring to the index status. We

suggest you consult Scopus database (see the current status of the journal) or other databases for further information. You can also check that information in the journal's website or contact directly with the editorial staff.
Best Regards, SCImago Team

M **M. Gamal** 12 months ago

how can submit paper at the procedia engineering journal

reply



Melanie Ortiz 12 months ago

SCImago Team

Dear M. Gamal, thank you very much for your comment, we suggest you look for author's instructions/submission guidelines in the website. Best Regards, SCImago Team

O **Oleg Tkachenko** 1 year ago

Dear Colleagues,
Is this magazine coming out now? The journal page is not available.
Regards, Oleg.

reply



Melanie Ortiz 1 year ago

SCImago Team

Dear Oleg,

Thank you for contacting us. Apparently, this title has ceased publication but we can not confirm it.

We suggest you contact Scopus support for further details here:

https://service.elsevier.com/app/answers/detail/a_id/14883/kw/scimago/supporthub/scopus/

Best Regards, SCImago Team

D **Davide** 1 year ago

Didn't Procedia Engineering have any ISBN code?

reply



SCImago Team

Melanie Ortiz 1 year ago

Dear Davide, thank you very much for your comment. Unfortunately, we cannot help you with your request, we suggest you contact the editorial staff so they could inform you more deeply. Best Regards, SCImago Team

S

Sergey 1 year ago

Good afternoon!

In continuation of the last question.

Why does Procedia manufacturing have a quartile, but Procedia Engineering does not?

Best regards.

reply



SCImago Team

Melanie Ortiz 1 year ago

Dear Sergey,

As said previously, the quartile is only assigned to Journal type's publications. Best regards, SCImago Team

S

Sergey 1 year ago

Good afternoon!

Please tell me how the Procedia engineering journal was not assigned a quartile, and the Materials Science Forum was assigned Q3, although both editions publish exclusively conference proceedings? According to CITESCORE, the citation of Procedia engineering and its percentile is significantly higher.

Best regards, Sergey

reply



SCImago Team

Melanie Ortiz 1 year ago

Dear Sergey,

Thank you for contacting us. We calculate the SJR data for all the publication types, but the Quartile data are only calculated for Journal type's publications. Best regards, SCImago Team

A

Ahmad 2 years ago

Is procedia engineering can be counted as peer reviewed journal

reply

F **fatima** 3 years ago

Please what the price of Publishing?

reply



Elena Corera 3 years ago

SCImago Team

Dear Fatima,

thank you very much for your comment, unfortunately we cannot help you with your request. We suggest you check author's instructions in journal website. You can find that information in SJR website <https://www.scimagojr.com>

Best Regards,
SCImago Team

Leave a comment

Name

Email

(will not be published)



I'm not a robot

reCAPTCHA
[Privacy](#) - [Terms](#)

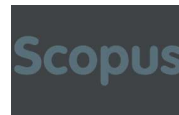
Submit

The users of Scimago Journal & Country Rank have the possibility to dialogue through comments linked to a specific journal. The purpose is to have a forum in which general doubts about the processes of publication in the journal, experiences and other issues derived from the publication of papers are resolved. For topics on particular articles, maintain the dialogue through the usual channels with your editor.

Developed by:



Powered by:



Follow us on @ScimagoJR

Scimago Lab, Copyright 2007-2020. Data Source: Scopus®

EST MODUS IN REBUS

Horatio (Satire 1,1,106)

Sustainable Civil Engineering Structures and Construction Materials, SCESCM 2016

Local wisdom to a sustainable non-engineered brick building

B. Lumantarna^{a,*}, P. Pudjisuryadi^a, R.M. Soetanto^a, G.G. Hindrajaya^a

^a*Civil Engineering Department, Petra Christian University, Siwalankerto 121-131, Surabaya 60236, Indonesia*

Abstract

With the increase of wealth, people tend to modernize their houses by replacing the traditional wooden houses to brick buildings. Unfortunately most of these “modern non-engineered buildings” collapsed during earthquake, while the traditional wooden houses remain undamaged. In previous studies, the authors have shown that the strength of the traditional building was in the construction of the columns which were not fixed to the ground but rested on top of flat stones, hence simulating friction base dampers.

In this study a typical non-engineered brick building is used as a prototype, it is also assumed that this building is built properly. Two types of building are considered, the first one has its tie beams anchored to the foundation. While in the second one, the tie beams are not anchored to the foundation, allowing the building to slide thus simulating friction damper. Both non-engineered brick buildings are subjected to spectrum consistent earthquake excitations with several return periods. The prototype building with anchors is treated as pinned on the anchor locations, while the one without anchor is treated as friction base isolation. A third building assuming no infilling brick wall is also analyzed as a comparison. The result shows that the two buildings can stand to earthquake with a return period of 500 and 2500 year, however the one with pinned base suffers some small damages. However the bare frame already showed extensive damages due to 500 year earthquake. It is worth to note that the building with friction base attracts only 66% of the total base shear of the one with pinned base.

© 2017 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the organizing committee of SCESCM 2016.

Keywords: Friction base isolation; non-engineered brick building; seismic performance

1. Introduction

Although the first Indonesian earthquake code was introduced in 1971 [1], after more than forty years, despite all effort to disseminate the principle of good earthquake engineering design and construction, in recent earthquake events, such as Padang, October 2009, Bengkulu, September 2007, Yogya, Mei 2006, Nias, March 2005, a lot of

* Corresponding author. Tel.: +62-31-2983394
E-mail address: bluman@petra.ac.id

modern buildings collapsed (Figure 1a), while traditional building such as Northern Nias, *Omo Hada* (Figure 1b) survived without any damage [2].



Fig. 1. (a) Nias 2005: Modern Building; (b) *Omo Hada* (Lase, 2005).



Fig. 2. (a) A three story shop house (Bengkulu September 17th 2007, private documentation); (b) Wooden house (Bengkulu September 17th 2007, private documentation).



Fig. 3. (a) *Uma Lengge*; (b) Base of *Uma Lengge*.

On the other hand with the increase of wealth people tend to renovate their wooden houses to modern brick houses, apparently brick house is a pride to the owner. Unfortunately the quality of work of the building is very inferior, hence during earthquake these “modern buildings” collapse (Figure 2a) while the wooden building (Figure 2b) next to the modern building in Figure 2a survived. In the previous paper, Lumantarna and Pudjisuryadi [3] reported that besides due to the light mass of the wooden house which attracts less inertia force, the traditional building survived due to the details of the columns connections to the foundation. In traditional buildings the columns are not fixed to the ground, thus simulating a friction base isolation system (Figures 3a and 3b).

2. Building Considered and Method

In this study, a typical non-engineered building suggested by Boen [4] is used as a prototype (Figure 4a). To enable slip between the upper structure and the lower structure, the anchors between the tie beams and the foundation are omitted (Figure 4b). This building (without anchor), the original building (with anchor), and a bare frame (without infilling wall) are subjected to earthquake with various return periods. SAP2000 v11 is used to perform the nonlinear time history analysis. The ground acceleration used for the excitation is a spectrum consistent ground acceleration which is modified from El Centro 18 May 1940 NS to the acceleration design spectrum [5] specific to the area where the buildings are. The modification of the earthquake record is performed using RESMAT, a software developed at Petra Christian University, Surabaya, Indonesia [6]. The original El Centro, the modified El Centro, and their response spectra compared to the design spectrum are shown in Figures 5a, 5b, and 5c respectively.

The building considered is modeled as a three dimensional frame (Figure 6). Three-strut model [7] is used to model the infilling brick wall with the width of strut is one-quarter of the diagonal length. The plastic hinge properties and the shear capacity of the beams are obtained using Cumbia [8]. A typical input to SAP2000 Nonlinear is shown in Figure 7 and 8. The building is arbitrarily assumed to be built on soft ground, in Palu, Sulawesi, Indonesia.

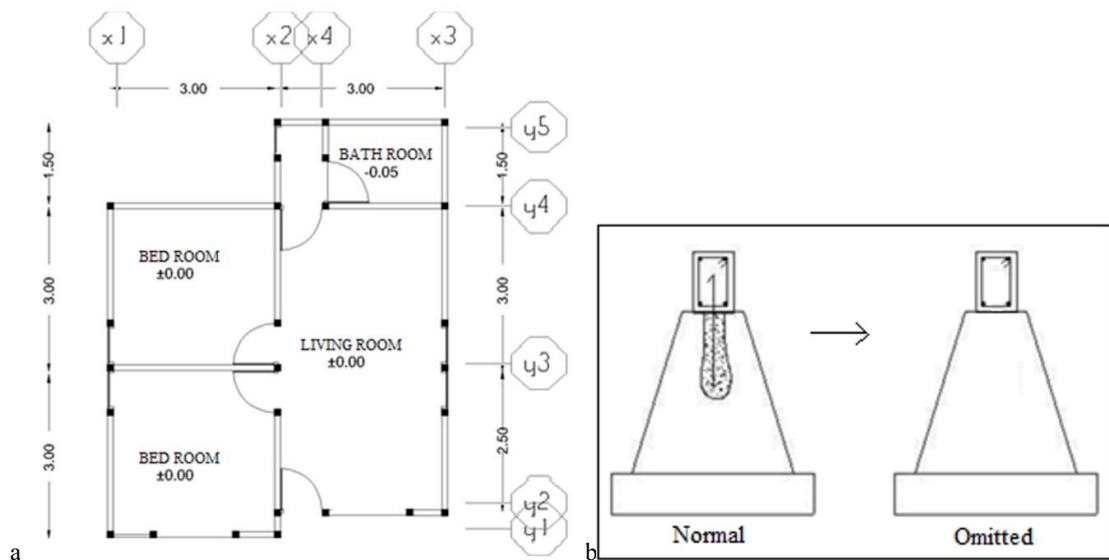


Fig. 4. Typical non-engineered brick building: (a) Plan of the building; (b) Anchors between tie beams to foundation (spaced every meter).

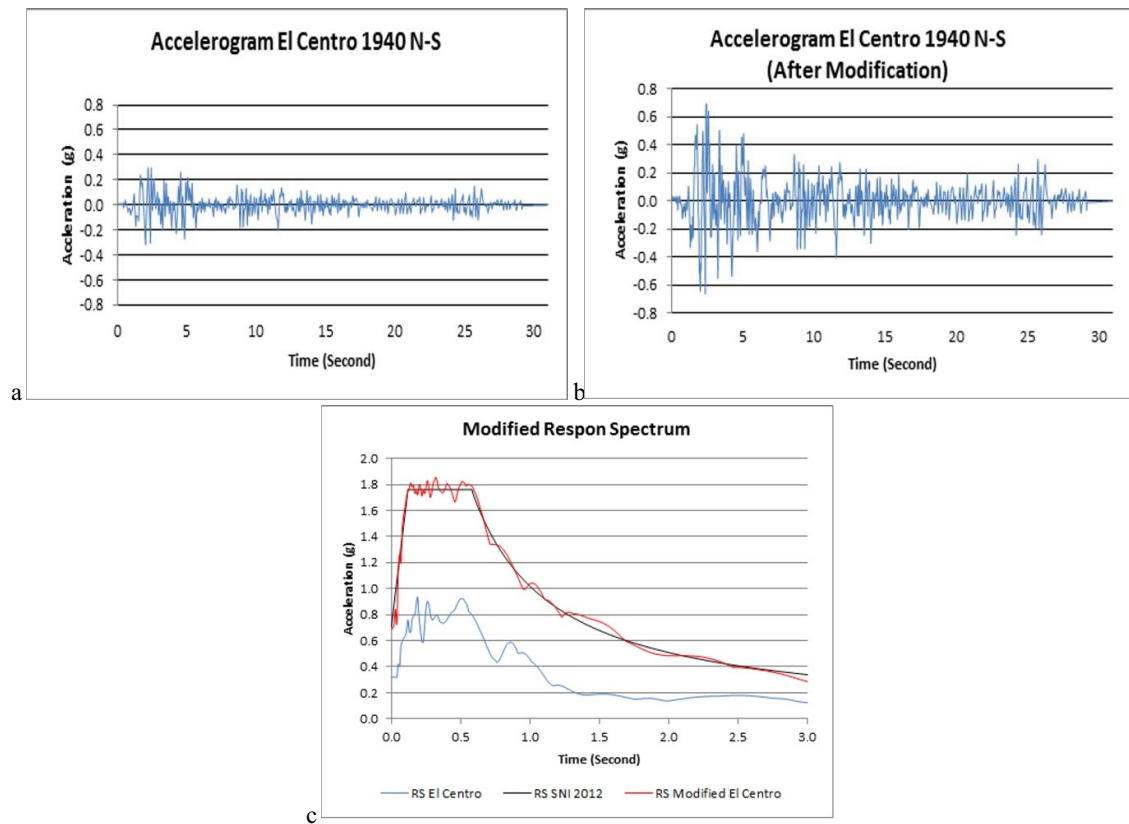


Fig. 5. El Centro 1940 N-S Component: (a) Original acceleration; (b) Modified acceleration (2500 years return period, Palu, Sulawesi, Indonesia); (c) Response Spectra

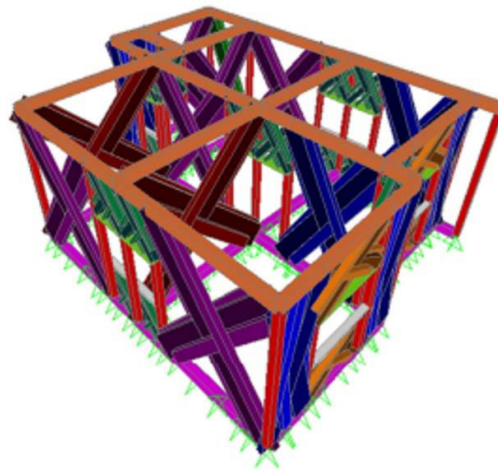


Fig. 6. Three dimensional structural model of the building (extrude view).

Edit

Displacement Control Parameters

Point	Moment/SF	Curvature/SF
E	-8.65	-0.778
D	-8.65	-0.777
C	-8.65	-0.776
B	-7.04	0
A	0	0
B	7.04	0
C	8.65	0.776
D	8.65	0.777
E	8.65	0.778

☒ Symmetric

Type

☐ Moment - Rotation

☒ Moment - Curvature

Hinge Length

☐ Relative Length

Load Carrying Capacity Beyond Point E

☒ Drops To Zero

☐ Is Extrapolated

Scaling for Moment and Curvature

☐ Use Yield Moment

Moment SF

Positive

Negative

☐ Use Yield Curvature

Curvature

Positive

Negative

Acceptance Criteria (Plastic Curvature/SF)

☒ Immediate Occupancy

0.079

Positive

Negative

☒ Life Safety

0.198

Positive

Negative

☒ Collapse Prevention

0.316

Positive

Negative

☐ Show Acceptance Criteria on Plot

OK Cancel

Fig. 7. Typical plastic hinge properties (bending capacity).

Edit

Displacement Control Parameters

Point	Force/SF	Disp/SF
E	-46.64	-1.136
D	-46.64	-0.544
C	-60.64	-0.119
B	-60.24	0
A	0	0
B	60.24	0
C	60.64	0.119
D	46.64	0.544
E	46.64	1.136

☒ Symmetric

Type

☒ Force - Displacement

☐ Stress - Strain

Hinge Length

☐ Relative Length

Load Carrying Capacity Beyond Point E

☒ Drops To Zero

☐ Is Extrapolated

Scaling for Force and Disp

☐ Use Yield Force

Force SF

Positive

Negative

☐ Use Yield Disp

Disp SF

Positive

Negative

Acceptance Criteria (Plastic Disp/SF)

☒ Immediate Occupancy

0.119

Positive

Negative

☒ Life Safety

0.544

Positive

Negative

☒ Collapse Prevention

1.136

Positive

Negative

☐ Show Acceptance Criteria on Plot

OK Cancel

Fig. 8. Typical plastic hinge properties (shear capacity).

Friction base isolation relies on friction between the upper structure (in this case the tie beam) with the foundation. Friction is defined as (Figure 9):

$$f_s = \mu_s N \quad (1)$$

$$f_k = \mu_k N \quad (2)$$

In which, f_s , f_k , μ_s , μ_k , and N are the static friction force, kinetic friction force, static friction coefficient, kinetic friction coefficient, and normal force, respectively. To model the friction base damper, Friction Pendulum Isolators with radius is equal to zero (flat base) in SAP2000 v11 [9] are used, while for building with anchors, the anchors are assumed as hinges (pinned). The coefficients of static friction and kinetic friction for this research are set as much as 0.4.

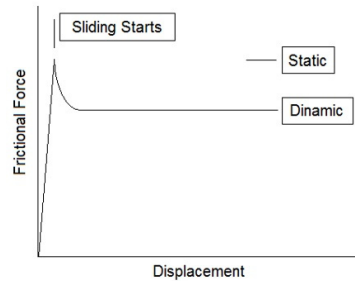


Fig. 9. Frictional force.

3. Analysis Results

3.1. Base Shear

Figures 10 and 11 show the total base shear of the two buildings due to earthquakes with 500, and 2500 years return period in X direction. While Table 1 shows comparison of maximum total base-shear in the two buildings due to earthquakes with 500 and 2500 years return period in the X direction.

It can be seen from Table 1, Figures 10, and 11 that the total base shear in the building with friction base is always smaller than the one with anchor. Comparison between the 500 and 2500 years shows that while the maximum base shear of the anchored base increases by 1.5, the friction base only increases 1.19 time. This indicates that the base of the friction base building already slips.

Table 1. Comparison of maximum Base-Shear in X direction for 500 and 2500 years.

Base Shear (N)	Earthquake in X direction					
	500 years			2500 years		
	Friction	Anchored	Anchored/ Friction	Friction	Anchored	Anchored/ Friction
Min (-)	-78,559	-84,210	1.07	-92,020	-129,833	1.41
Max (+)	99,727	132,455	1.32	118,254	199,801	1.67

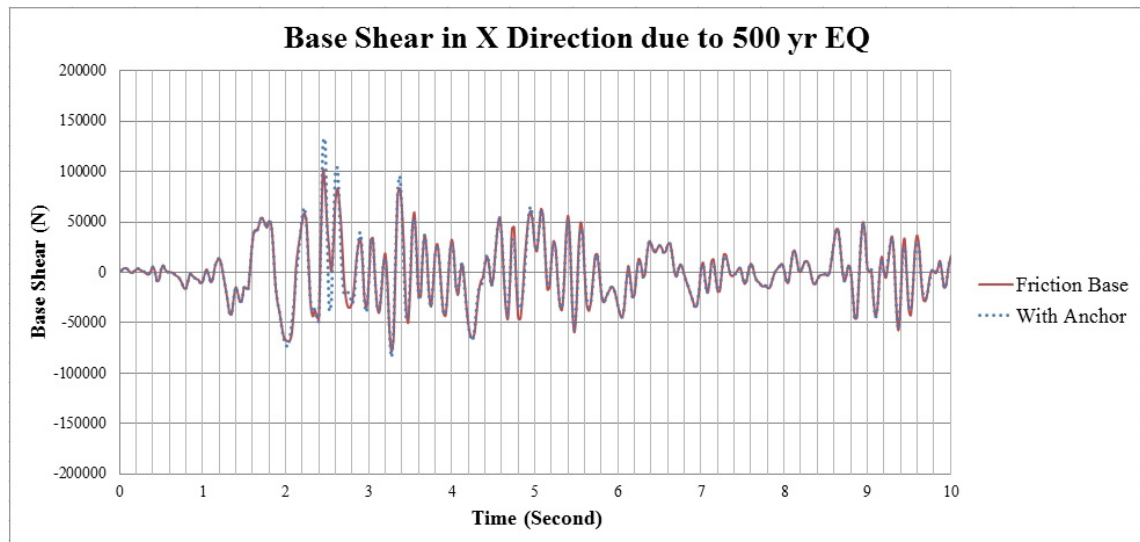


Fig. 10. Total Base Shear in X direction due to 500 years earthquake.

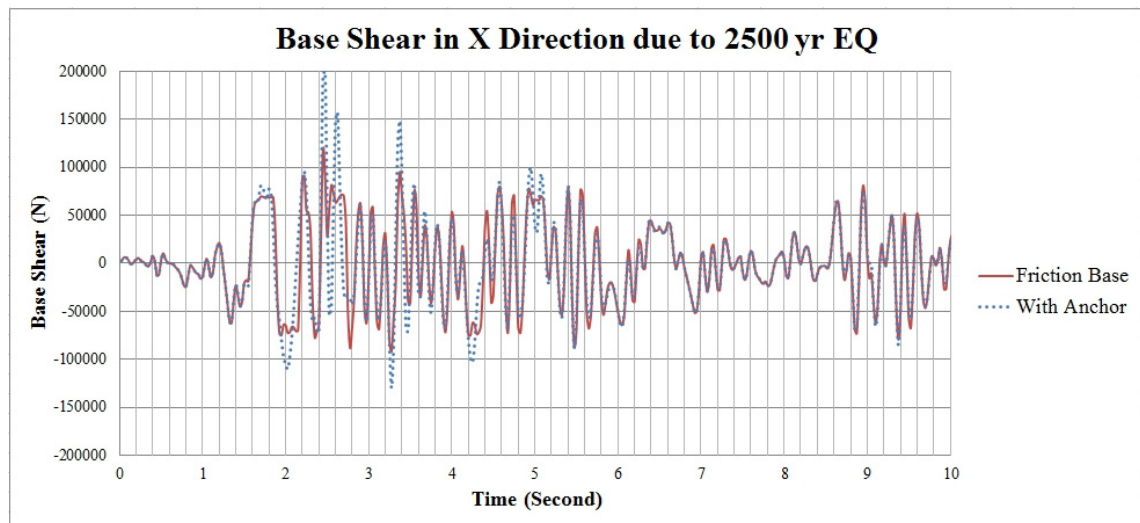


Fig. 11. Total Base Shear of building with friction base in X direction due to 2500 years earthquake.

3.2. Drift

Table 2 compares drift due to 500 and 2500 year earthquakes in the X direction between building with base isolation and with anchor. It can be seen that applying base isolation reduces the drift significantly.

Table 2. Comparison of drift due to earthquake in X direction.

Column IDs	Drift (%) due to Earthquake in the X direction					
	500 year			2500 year		
	Friction	Hinge	Friction/ Hinge	Friction	Hinge	Friction/ Hinge
K1	0.151	0.168	0.899	0.19	0.257	0.739
K2	0.151	0.167	0.904	0.189	0.257	0.735
K3	0.148	0.162	0.914	0.181	0.249	0.727
K4	0.148	0.162	0.914	0.181	0.249	0.727
K5	0.103	0.134	0.769	0.124	0.205	0.605
K6	0.104	0.134	0.776	0.125	0.205	0.610
K7	0.105	0.134	0.784	0.126	0.205	0.615
K8	0.081	0.103	0.786	0.104	0.158	0.658
K9	0.081	0.103	0.786	0.104	0.158	0.658
K10	0.082	0.103	0.796	0.105	0.158	0.665
K11	0.083	0.096	0.865	0.102	0.147	0.694
K12	0.082	0.095	0.863	0.102	0.147	0.694
K13	0.081	0.103	0.786	0.104	0.158	0.658
K14	0.082	0.096	0.854	0.102	0.147	0.694

3.3. Damages

The Analysis only showed slight damages in the anchored building due to 2500 year earthquake as shown in Figure 12. However the bare frame already showed extensive damages due to 500 year earthquake (Figure 13).

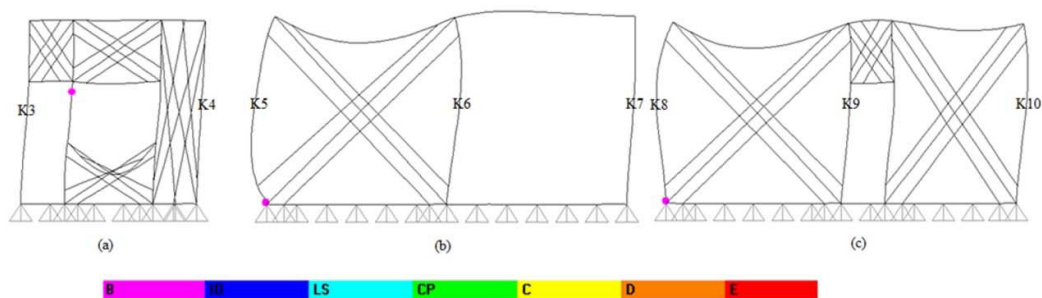


Fig. 12. Damages in (a) Frame Y2 (b) Frame Y3 (c) Frame Y4 due to 2500 year earthquake in the X direction Base Shear of building with anchor in X direction.

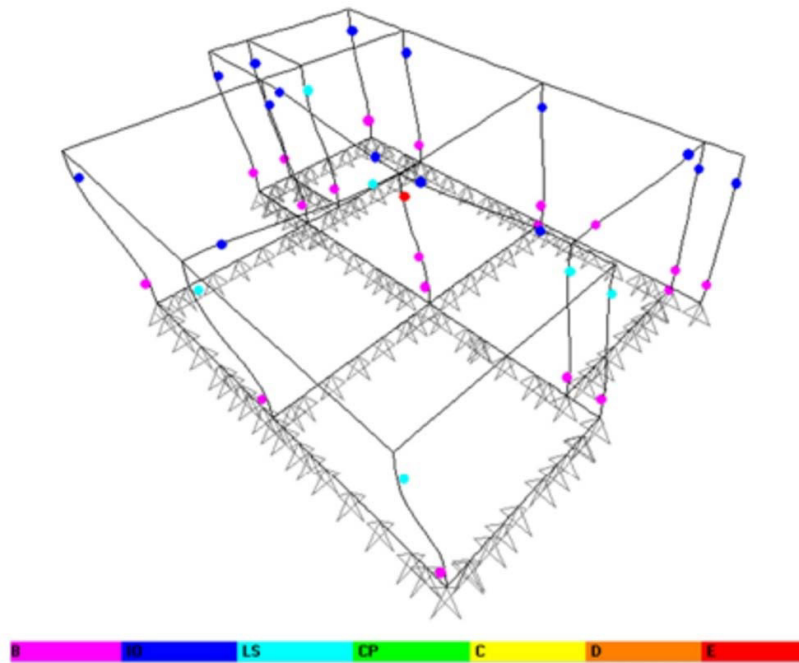


Fig. 13. Damages in bare frame due to 500 year earthquake in the X direction (at $t=6.6$ sec).

4. Conclusions

This study did not consider earthquake going in two directions, thus eliminating the possibility of walls already damage due to load perpendicular to the wall (face load). If the infilling wall was damaged due to the face load, there is a possibility that the structure behave as bare frame and will possibly collapse.

It can be concluded that the non-engineered building suggested by Boen [4] will survive with very minimal damage to 2500 year earthquake if the structure is constructed soundly. However the friction base building behaves better by attracting only 66% of the total base shear and 68% of the average drift due to 2500 year earthquake of the traditional fixed base (anchored) building.

References

- [1] B. Lumantarna, Perkembangan peraturan pembebanan dan perencanaan bangunan tahan gempa, A paper presented in earthquake engineering seminar, Makasar, November 15th, 2007.
- [2] Y. Lase, Kontrol seismik pada rumah adat Nias, Proc. HAKI conference, Jakarta, Indonesia, 2005, pp. 1-10.
- [3] B. Lumantarna, and P. Pudjisuryadi, Key note lecture presented in the Thirteenth East Asia-Pacific Conference on Structural Engineering and Construction, Sapporo, Japan, September 11th-13th, 2013.
- [4] Boen, T., Membangun Rumah Tembok Tahan Gempa. Jakarta, Indonesia, 2005.
- [5] Badan Standarisasi Nasional, Tata Cara Perencanaan Ketahanan Gempa untuk Struktur Bangunan Gedung dan Non Gedung, SNI 03-1726-2012, Indonesia, 2012.
- [6] B. Lumantarna, and M. Lukito, RESMAT Sebuah Program Interaktif untuk Menghasilkan Riwayat Waktu Gempa dengan Spektrum Tertentu, Proceedings of HAKI Conference, Jakarta, Indonesia, 1997.
- [7] H. B. Kaushik, D. C. Rai, and S. K. Jain, A Rational Approach to Analytical Modeling of Masonry Infills in Reinforced Concrete Frame Buildings, The 14th World Conference on Earthquake Engineering, Beijing, China, 2008.
- [8] L.M. Montejo, and M. J. Kowalsky, CUMBIA Set of Codes for the Analysis of Reinforced Concrete Members, California, United States, 2007.
- [9] Computer and Structures Inc., CSI Analysis Reference Manual, California, USA, 2007.