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HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH : PROSIDING**

Judul Jurnal Ilmiah (Artikel) : Development of surface ground motion and spectral acceleration based on modified shear wave propagation analysis

Jumlah Penulis : 6 Orang (Windu Partono, Frida Kistiani, Undayani Cita Sari, Haryadi, E Putro, dan W R Ramadhan)

Status Pengusul : penulis pertama/ penulis ke / penulis korespondensi**

Identitas Jurnal Ilmiah : a. Nama Prosiding : IOP Conference Series: Materials Science and Engineering (Volume 669)
 b. ISBN/ISSN : ISSN 1757-899X
 c. Tahun Terbit, Tempat Pelaksanaan : Malang, Indonesia, 4-6 September 2019
 d. Penerbit/ Organizer : IOP
 e. Alamat repository PT/web prosiding : <https://iopscience.iop.org/article/10.1088/1757-899X/669/1/012035>
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Total = (100%)	26,4	24	25,2
Nilai Pengusul = 25,2 x 60% = 15,12			

Reviewer I

Prof. Dr. Ir. Han Ay Lie, M.Eng
NIP. 195611091985032002

Unit kerja : Departemen Teknik Sipil FT UNDIP

Reviewer II

Ilham Nurhuda, ST., MT., Ph.D
NIP. 197602252000121001

Unit kerja : Departemen Teknik Sipil FT UNDIP

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d. Kelengkapan unsur dan kualitas penerbit (30%)	9		8,1
Total = (100%)	30		26,4

Catatan Penilaian artikel oleh Reviewer:

1. Tulisan ini menyajikan hasil analisis rambatan gelombang gempa pada kampus Undip Tembalang Semarang dengan menggunakan dua model lapisan tanah yaitu 50 meter dan 30 meter. Kedua model lapisan tanah ditentukan berdasarkan hasil pengujian microtremor dan pengeboran tanah. Tujuan dari penelitian ini adalah untuk mendapatkan spektra percepatan gerakan tanah dipermukaan. Hasil analisis dengan kedua pendekatan tersebut kemudian dibandingkan. Gelombang gempa yang digunakan berasal dari scenario gempa dengan kekuatan 6.5 Mw.
2. Metodology penelitian telah disampaikan secara jelas pada tulisan ini. Hasil analisis dan pembahasan juga disampaikan secara jelas dan kemudian di tutup dengan kesimpulan yang membandingkan hasil analisis dari kedua model lapisan tanah tersebut.
3. Referensi yang digunakan pada tulisan ini sebagian masih diperoleh dari hasil penelitian yang cukup lama yaitu tahun 1972 sampai 1982. Sebagian yang lain diperoleh dari hasil penelitian tahun 2010 sampai tahun 2017.
4. Kualitas penerbit cukup baik dengan jumlah halaman 6. Hasil penelusuran artikel yang diterbitkan terlihat jumlah penulis berasal dari lebih empat negara.

Semarang,
Reviewer



Prof. Dr. Iry Han Ay Lie, M.Eng.
NIP.195611091985032002

Unit kerja: Departemen Teknik Sipil FT UNDIP

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c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	9		6,5
d. Kelengkapan unsur dan kualitas penerbit (30%)	9		7,5
Total = (100%)			24

Catatan Penilaian artikel oleh Reviewer:

- unsur isi prosiding lengkap terdiri dari abstrak, introduction, methodology, results & discussion, conclusion, references. semua bagian dibahas sesuai dgn lingkungannya.
- kedalaman pembahasan: paper ini membandingkan hasil perhitungan respon spektra dan pergerakan tanah (ground motion) dari 2 tipe kedalaman batuan, yaitu 30 m & 50m. Pergerakan kelambatan lapisan batuan (bedrock) di peroleh dari 2 metode yaitu: mikroremmer dan nilai $N=SPF$. Sumber gempa berasal dari sejar lepasan & sejar Semarang dgn magnitude maksimum = 6,5 Mw dgn jarak 10 Km. Analisis menunjukkan perbedaan PSA 0,15 antara 2 kedalaman bedrock.
- methodology yang digunakan kurang detail dijelaskan. Referensi standar terdapat 4/9
- berikan di prosiding meliputi issn, terindeks, unsur lengkap.

Semarang,
Reviewer



Ilham Nurhuda, ST., MT., Ph.D
 NIP.197602252000121001
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2nd International Conference on Green Civil and Environmental Engineering, GCEE 2019; Atria
Hotel and ConventionMalang, East Java; Indonesia; 4 September 2019 through 6 September
2019; Code 155574

Development of surface ground motion and spectral acceleration based on modified shear wave propagation analysis (Conference Paper)

[\(Open Access\)](#)

Partono, W. ✉, Kistiani, F., Sari, U.C., Haryadi, Putro, E., Ramadhan, W.R.

Civil Engineering Department, Engineering Faculty, Diponegoro University, Semarang, 50275, Indonesia

Abstract

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The shear wave propagation analysis (SPA) is a method for developing surface ground motion and spectral acceleration by conducting seismic wave propagation from bedrock to surface elevation. The bedrock elevation and soil profile from bedrock through surface elevation are important information needed for SPA. The shear wave velocity, damping ratio, soil density and shear modulus are the four parameters that are needed for developing SPA. This paper describes a modified SPA for developing surface ground motion and spectral acceleration by conducting two different soil deposit model, actual and modified bedrock elevation models. The difference in the two models depends on the bedrock elevation used for SPA. The actual bedrock elevation model is conducted based on the real bedrock elevation observed using microtremor test. However, the second model is performed based on the final depth of soil boring investigation. The study was conducted at the Engineering Faculty of Diponegoro University. Based on the microtremor observation, the bedrock elevation was predicted at 50 metres below the surface level. However, two soil boring investigations conducted in this study area were stopped at 30 metres below the surface level. The surface ground motion and spectral acceleration developed from both models are almost equal. © Published under licence by IOP Publishing Ltd.

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Announcement of call for paper	: 21 January 2019
Full paper submission deadline	: 8 July 2019
Announcement of accepted paper	: 22 July 2019
Early bird registration deadline	: 1 August 2019
Normal registration	: 23 August 2019
Conference Day	: 4-6 September 2019

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1. **Prof. Buntara Sthenly Gan**
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2. **Prof. dr. ir. Diederik Rousseau**
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3. **Prof. Hsieh-Lung Hsu**
National Central University, Taiwan
4. **Assoc. Prof. Januarti Jaya Ekaputri**
Institut Teknologi Sepuluh Nopember, Indonesia
5. **Apif Miftahul Hajji, Ph.D**
Universitas Negeri Malang, Indonesia

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Economic prospects of Steel Reinforced Functionally Graded Concrete (SRFGC) beam structures

B S Gan¹, S Kiryu², A Han³ and M M A Pratama⁴

¹Department of Architecture, College of Engineering, Nihon University, Koriyama, Japan

²Department of Architecture, Graduate School of Engineering, Nihon University, Koriyama, Japan

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Abstract. Engineering materials, for instance, ceramics and concrete, are manufactured with uniform properties purposefully. Because the uniformity is a convenient measurement to ensure the safety design calculation of a structure to be built. The non-uniform material property of concrete can be resulted from mixing, placing, consolidation, and curing processes during the manufacturing of structural members. Therefore, using concrete as a material could lead to an uneconomical use of natural resources because of non-uniformity problems that occur in the structural members. Ideally, in the Functionally Graded Concrete (FGC) material, the properties (elasticity, density, rigidity) of concrete material have to be smoothly graded in the projected directions (longitudinally, transversally, diagonally) by following a governing equation. Hence, FGC has significant advantages over the existing concrete materials in the prominence of cement optimization. In recent progress, many researchers have been studied the mechanical behaviors and production methodologies of FGC enthusiastically. In the state-of-the-art of the FGC developments, two objectives need to be achieved: 1. The manufacturing procedure of FGC material, and 2. The method of analysis to design FGC material. In current developments, the technologies for manufacturing FGC material are still not available for the practitioners. The objective of this paper is to present a method of analysis to design a Steel Reinforced Functionally Concrete Graded (SRFGC) beam element based on the SNI (Indonesian National Standard) of Structural Concrete Requirements for Buildings code 2847:2013. The effects of the non-uniformity of concrete strengths are incorporated into the analysis. Because of the crack-opening assumption in the tensile region of the concrete, the neutral axis position is no longer at the mid-height of the beam cross-section. Hence, an iterative technique has to be employed in the design. An iterative technique is necessary because the internal forces of the beam have to be calculated at the cross-section being designed. The application of the method of analysis is highlighted by designing various type of beam cross-sections, which show the economic benefits of SRFGC beam compared to both the normal and high strength concrete's material.



Cyclic behavior of moment-resisting frames strengthened with steel curved dampers

H L Hsu¹ and H Halim¹

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hhsu@ncu.edu.tw

Abstract. Steel moment frames have been widely used for earthquake-resistant purposes. These systems possess significant ductility, however, excessive deformation due to the lower structural stiffness. In order to improve the behavior of moment-resisting frames when subjected to cyclic loads, a new design that combined steel curved damper and brace member was proposed in this study. The curved damper was cut from steel plate and was placed in the center portion of the brace member. The new device was attached to the frame and was used to dissipate energy throughout the load application. A series of loading tests on steel frames strengthened with the proposed design were carried out. The strength and energy dissipation capabilities of frames with and without the strengthening device were compared. It was found from the comparisons that the behavior of framed structures was significantly improved, thus justified the effectiveness of the proposed design.

1. Introduction

Steel moment frames have been widely used for earthquake-resistant purposes [1-3]. These systems possess significant ductility, however, excessive deformation due to the lower structural stiffness. Application of brace members to the steel moment frames has been considered effective approach to reduce the excessive deformation, as structural stiffness can be significantly enhanced. This approach subsequently raises concerns in loss of structural deformability due to excessive structural stiffness and buckling of brace member at large deformation [4-5]. Therefore, a remedy, i.e. development of a brace with adequate stiffness and deformability simultaneously, to further improve the structural behavior is essential.

It has been investigated in the authors' previous study [6] that when steel plate was fabricated in curved shape and loaded by in-plane bending, the device would exhibit sufficient strength, sustained stability at large deformation and dissipated significant energy through inelastic deformation. This device was named steel curved damper, as shown in Figure 1. To further improve the behavior of moment-resisting frames when subjected to cyclic loads, a new design that combined steel curved damper and brace member, forming A-Brace as shown in Figure 2, was proposed in this study. The curved damper was placed in the center portion of the brace member and mobilized by the lever mechanism of the A-Brace. The new device was attached to the frame and was used to dissipate energy throughout the load application.

A series of loading tests on the steel curved dampers and steel frames strengthened with the proposed design were carried out. The strength and energy dissipation capabilities of frames with and without the strengthening device were compared to evaluate the effectiveness of the proposed method.



Emission factors of NO_x and PM of heavy construction equipment used in toll road project in Indonesia – Case study: Rembang-Pasuruan Toll Section II

A M Hajji¹, A Yulistyorini¹, Huang Yue² and D C Patulak¹

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Abstract. Heavy duty diesel (HDD) equipment play an important role in constructing Indonesian infrastructure. This paper proposes a methodology for recording an emission inventory for HDD equipment that formulates emission factors as a baseline of current emissions quantities. The sample case of the proposed emissions inventory technique is based on a small part of Indonesia's national toll road project: Rembang-Pasuruan toll road project. Rembang-Pasuruan toll road is a part of Gempol-Pasuruan toll road, a piece of national infrastructure project called Trans-Java Toll road that runs from Merak, Northwestern end of Java, to Banyuwangi, the eastern end of the island. This toll road connects almost all major cities and landmarks of the island with the total length of the road is nearly 1,167 km. The length of Gempol-Pasuruan toll road is about 34.15 km, and consists of three section: Section I, Gempol-Rembang 13.9 km, Section II, Rembang-Pasuruan 6.6 km, and Section III, Pasuruan-Grati 13.65 km. This toll road project utilizes a HDD fleet that includes 9 excavators, 2 bulldozers, 2 roller compactors, 1 motor-grader and 1 paver. This equipment consumes large quantities of diesel fuel and release air pollutants, including nitrogen oxides (NO_x) and particulate matters (PM). The proposed inventory technique in this paper addresses the key attributes of the equipment on how long it is used during its operational life and how emission rates of NO_x and PM are estimated. By using emission factors calculated from equipment's key attributes, it is revealed that all equipment in the project release approximately 452.12 gr/hr of NO_x or 3400.97 gr/day on average, and emit 31.99 gr/hr of PM or equals to 252.92 gr/day.

1. Introduction

Heavy duty diesel (HDD) equipment play an important role in constructing Indonesian infrastructure. Most of this equipment fleets are owned and operated by public entities, such as local governments and government-owned construction companies, that have limited budgets and are wondering how to acquire, maintain, and update their fleets. Not only does this equipment needs comprehensive fleet management but it also has a significant impact on national energy consumption in the form of diesel fuel, and an impact on the environment in the form of hazardous air pollutants.

This paper proposes a methodology for recording an emission inventory for HDD equipment that formulates emission factors as a baseline of current emissions quantities. The emission inventory technique proposed in this paper can help fleet managers or equipment operator to quantify emissions air pollutants for each individual item of equipment and possibly the entire fleet used in an infrastructure project. Furthermore, this technique can also help some public entities or stakeholders determine strategies to make infrastructure project more environmentally-sound. The sample case of the proposed emissions inventory technique is based on a small part of Indonesia's national toll road project: Rembang-Pasuruan toll road project. Rembang-Pasuruan toll road is a part of Gempol-Pasuruan toll road, a piece of national infrastructure project called Trans-Java Toll road that runs from Merak, Northwestern end of Java, to Banyuwangi, the eastern end of the island. This toll road connects almost all major cities and landmarks of the island with the total length of the road is nearly 1,167 km. The length of Gempol-Pasuruan toll road is about 34.15 km, and consists of three section: Section I, Gempol-



Rainfall induced residual soil slope instability: building cracked and slope failure

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Abstract. Rainfall is one of the factors of slope failures due to the intensity of rainfall that will seep and increase the moisture content of geo-materials. One of the important role in slope stability is matric suction. This study present the relationship between rainfall and suction of soil which induced the slope instability and the slope stability analysis involving a building which may cause by instability due to suction variation. The slope had separated into three parts which are top of slope, middle of slope and toe of slope. Every part has been inserted with three tensiometer with 0.3 m, 0.45 m and 0.9 m depth. Suction of soil on slope was carried out by using tensiometer. Intensity of rainfall was collected by using rain gauge which placed at open area which to compare with matric suction of soil. Several site and laboratory tests were carried out to identify the soil properties. Stability of slope was analyzed using Slope/w and Manual Calculation via input parameters collected from laboratory test and field test. Fellenius' method was used to interpret the factor of safety for slope study. This includes the analysis of the factor of safety of slices at the selected area with its matric suction value. It was found that when the rainfall increased, the suction of soil decreased and affected to decrease of factor of safety. Hence, the constructed slope was suggested to be redesign to improve its safety factor.

1. Introduction

Slope instability can cause by three different factor or categories. Some of the main factors has being categorized by geological, climate change and human activities. From the geological perspective, soil layer and profile were crucial in influencing the slope instability. Intensity of rainfall, earthquake, flooding and those related disaster are some of the crucial factors of slope instability from the perspective of climate change. During the rainfall, rain water may distribute into two medium on surface and subsurface via surface runoff and infiltration/seepage phenomenon. Shallow failure of slope will occurred due to the less rainwater infiltration volume and surface runoff. Meanwhile, deep-seated slope failure will occurred due to the influence of the river and high groundwater level supplied by the excessive rainfall water.


Rainfall induced slope instability create a common geotechnical hazard in tropical region such as Malaysia [1]. The intensity of rainfall will affect the measurement of rain gauge and the suction of soil because of the measure amount of the rain that falls over time. Rainfall was one of the major cause of slope failures or slope instability when the area or region experience heavy rainfall. Therefore, the characteristic of the rainfall should be considered in the analysis of the slope instability.

Suction plays an important role in the stability of slope especially in tropical region. Hence, the evaluation on the measurement of suction in soil of slope stability is needed [1]. Rainfall which happening at the area will cause the moisture content increased, the matric suction is reduced which



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BACKGROUND



Nowadays, the level of global awareness about the quality of environment and its impacting changes to the society has increased sharply. Various kinds of activities in anticipating intense global warming throughout the world, methods in attaining efficiency and energy use, are some efforts in minimizing environmental damage. Construction industry plays a major contribution on campaigns to anticipate global warming. Stakeholders related to the construction industry, including building owners, planner, builder, operator, and residents, as well as academia and researchers play their roles as construction service agent to minimize the negative impacts on environment. The concept known as Green Construction demands all actors in the industry to pay high attention to environment aspects. All parties should have to follow the sustainable and green principles, codes, and regulations, starting from the planning stage, use of materials, development stage, operation, to the maintenance periods.

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