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

Judul Karya Ilmiah (paper) : Displacement analysis of dam based on material parameters using numerical simulation and monitoring instrumentation

Jumlah Penulis : 3 orang (Undayani Cita Sari, Windu Partono, Sri Prabandiyani Retno Wardani)

Status Pengusul : ~~penulis pertama~~/penulis ke 2 ~~/penulis korespodensi~~

Identitas Jurnal Ilmiah :
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- f. Terindeks di (jika ada) : Google Scholar

Kategori Publikasi Jurnal Ilmiah (beri ✓pada kategori yang tepat) :
- ☑ Prosiding forum ilmiah Internasional
- ☐ Prosiding forum ilmiah Nasional

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Komponen Yang Dinilai	Nilai Reviewer		Nilai Rata-rata /Nilai Akhir yang diperoleh
	Reviewer I	Reviewer II	
a. Kelengkapan unsur isi prosiding (10%)	1.35	1.50	1.425
b. Ruang lingkup dan kedalaman pembahasan (30%)	3.75	4.00	3.875
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	3.75	4.00	3.875
d. Kelengkapan unsur dan kualitas penerbit (30%)	3.75	4.50	4.125
Total = (100%)	**12.60**	**14.00**	**13.30**

Penulis ke 2 dari 3 = (13.30 x 40%)/2 = 2.66

Reviewer I

Prof. Dr. Ir. Nan Ay Lie, M.Eng
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Kategori Publikasi Karya Ilmiah (beri ✓pada kategori yang tepat) :
☑ Prosiding forum ilmiah Internasional
☐ Prosiding forum ilmiah Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Prosiding		Nilai Yang Diperoleh
	Internasional ☑	Nasional ☐	
a. Kelengkapan unsur isi prosiding (10%)	1,5		1,35
b. Ruang lingkup dan kedalaman pembahasan (30%)	4,5		3,75
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	4,5		3,75
d. Kelengkapan unsur dan kualitas penerbit (30%)	4,5		3,75
Total = (100%)	15		12,6

Catatan Penilaian artikel oleh Reviewer:
a) daftar reviewer tdk tampak, daftar isi, peer Review dan info conference lengkap
b) Bahasa Inggris kurang baik, tapi data yg ada cukup memadai. Analisa dilakukan dg bantuan Software
c) Kesimpulan masih terbatas bukti validitas model dan blm ada pengembangan kearah validasi model tsb
d) matec mulai 2019 terdistribusi di Scopus. Selanjutnya mulai max utk karya ini tdk sama dg tahun² sebelumnya

Penulis II dari 2 = 0,4/2 x 12,6 = 2,52

Semarang, 8-2-2019
Reviewer

Prof. Dr. Ir. Han Ay Lie, M.Eng.
NIP.195611091985032002
Unit kerja : Departemen Teknik Sipil FT UNDIP

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☑ Prosiding forum ilmiah Internasional
☐ Prosiding forum ilmiah Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Prosiding		Nilai Yang Diperoleh
	Internasional [15]	Nasional [ ]	
a. Kelengkapan unsur isi prosiding (10%)	1.5		1.5
b. Ruang lingkup dan kedalaman pembahasan (30%)	4.5		4
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	4.5		4
d. Kelengkapan unsur dan kualitas penerbit (30%)	4.5		4.5
Total = (100%)	15		14

Catatan Penilaian artikel oleh Reviewer:
a. Unsur isi prosiding lengkap
b. 3 pustaka yang disitasi dalam pembahasan.
c. 7 pustaka dari 12 pustaka 10 tahun terakhir
d. Pada 2019 Penerbit tidak terindeks scopus.

Penulis II dari 2 = 0,4/2 x 14 = 2,8

Semarang,
Reviewer

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The 4th

SCESCM

International Conference on
Sustainable Civil Engineering
Structures and Construction Materials

"Sustainable Structures for Future Generation"

ABSTRACT

September 5-7, 2018
Yogyakarta, Indonesia

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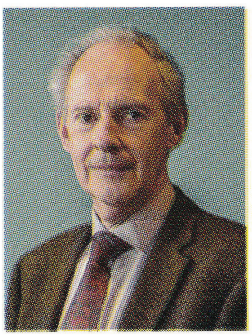

Klaas van Breugel

The Netherlands

Editorial Board

Wednesday, September 5, 2018

07.30 - 08.00	**REGISTRATION**				
08.00 - 08.30	**OPENING SPEECHES**				
	1. Assoc. Prof. Ali Awaludin, Conference Chair				
	2. Prof. Tamon UEDA, Chief Advisor and Acting Executive Director AUN/SEED-Net				
	3. Prof. Panut Mulyono, Rector of Universitas Gadjah Mada				
08.30 - 8.40	**PHOTO SESSION**				
08.40 - 10.10	**PLENARY SESSION I**				
Room	Karaton Ballroom				
Session Chair	Prof. Han Aylie, Universitas Diponegoro, Indonesia				
Keynote Speakers	1. Prof. Henricus Priyosulistyo, Universitas Gadjah Mada, Indonesia *The Use of Vibration Analysis for Identification of Structural Reliability and Comfort*				
	2. Prof. Chikako Fujiyama, Hosei University, Japan *Degradation of Submerged/Wet Concrete Under Cyclic Compression and Cyclic Shear*				
	3. Kazuo Takase, OMRON Social Solutions, Japan *Social Infrastructure Monitoring using ICT Technology in Japan and Application Case by OMRON*				
10.10 - 10.40	**COFFEE BREAK**				
10.40 - 12.10	**TECHNICAL SESSION I**				
Room	Pamandengan I Room	Pamandengan 2 Room	Pamandengan 3 Room	Pamandengan 4 Room	Karaton Ballroom
Session Chair	Prof. Tamon Ueda	Prof. Barry Jones	Prof. Takashi Matsumoto	Assoc. Prof. Norhazilan Md Noor	Prof. Jiro Takemura
	Paper 1	Paper 29	Paper 58	Paper 95	RCCE 2
	Paper 2	Paper 30	Paper 59	Paper 96	RCCE 3
	Paper 3	Paper 31	Paper 60	Paper 97	RCCE 20
	Paper 4	Paper 49	Paper 61	Paper 93	RCCE 7
	Paper 5	Paper 33	Paper 62	Paper 99	RCCE 8
	Paper 126	Paper 34	Paper 63	Paper 111	RCCE 16
12.10 - 13.10	**LUNCH**				

13.10 - 14.25	TECHNICAL SESSION II				
Room	Pamandengan I Room	Pamandengan 2 Room	Pamandengan 3 Room	Pamandengan 4 Room	Karaton Ballroom
Session Chair	Dr. Angga Fajar Setiawan	Dr. Muhamad Abduh	Prof. Johannes Tarigan	Prof. Shunji Kanie	Andi Arham Adam, Ph.D
	Paper 7	Paper 36	Paper 64	Paper 86	RCCE 9
	Paper 10	Paper 37	Paper 65	Paper 88	RCCE 17
	Paper 21	Paper 38	Paper 66	Paper 89	RCCE 18
	Paper 22	Paper 39	Paper 67	Paper 90	RCCE 19
	RCCE 15	Paper 50	Paper 68	Paper 91	RCCE 6
14.25 - 14.55	**COFFEE BREAK**				
14.55 - 16.10	**TECHNICAL SESSION III**				
Room	Pamandengan I Room	Pamandengan 2 Room	Pamandengan 3 Room	Pamandengan 4 Room	Karaton Ballroom (14.25 - 15.55)
Session Chair	Dr. Yazmin Sahol Hamid	Dr. Eng. Mahmud Kori Efendi	Prof. Benjamin Lumantarna		Assoc. Prof. Taweep Chaisomphob
	Paper 11	Paper 40	Paper 70		RCCE 4
	Paper 12	Paper 42	Paper 71		RCCE 11
	Paper 13	Paper 51	Paper 72		RCCE 12
	Paper 14	Paper 52	Paper 73		RCCE 13
	Paper 127	Paper 57	Paper 80		RCCE 14
16.10 - 17.00	**FREE SESSION**				
17.00 - 22.00	**WELCOME DINNER**				

***FMM AUN/SEED-Net Meeting will be held on September 5, 2018 at 13.00 - 16.00 at Meeting Room (9th Floor)**

Thursday, September 6, 2018

07.30 - 08.00	**REGISTRATION**				
08.00 - 09.30	**PLENARY SESSION II**				
Room	Karaton Ballroom				
Session Chair	Bambang Suryo Atmono, Universitas Parahyangan, Indonesia				
Keynote Speakers	1. Prof. Shunji Kanie, Hokkaido University, Japan *Freezing Technology: Challenges and Prospects for Sustainable Development in Urban Infrastructure*				
	2. Prof. Teerapong Senjuntichai, Chulalongkorn University, Thailand *Influence of Surface Energy Effects on Various Contact Problems*				
	3. Ir. Tugur Wibisono, PT. Cigading Habeam Centre, Indonesia *Contribution of Steel Fabrication for Future Generation*				
09.30 - 10.00	**COFFEE BREAK**				
10.00 - 11.30	**TECHNICAL SESSION IV**				
Room	Pamandengan I Room	Pamandengan 2 Room	Pamandengan 3 Room	Pamandengan 4 Room	Karaton Ballrom (10.00 - 11.50)
Session Chair	Dr. Hazrina Mansoor	Prof. Buntara S Gan	Dr. Riza Yosia Sunindijo	Dr. Ing. Dian Rubiana Widarda	Assoc. Prof. Mongkut Piantanakulchai
	Paper 15	Paper 45	Paper 41	Paper 94	RCCE 1
	Paper 16	Paper 46	Paper 43	Paper 100	RCCE 5
	Paper 17	Paper 47	Paper 53	Paper 101	RCCE 10
	Paper 18	Paper 48	Paper 54	Paper 102	RCCE 21
	Paper 19	Paper 32	Paper 55	Paper 103	**11.05 - 11.35 PRESENTATION FROM AUN/SEED-Net (All RCCE Participants Must Attend)**
	Paper 20	Paper 35	Paper 56	Paper 104	**11.35 - 11.50 CLOSING RCCE by Head of Department of Civil and Environmental Engineering UGM**
11.30 - 13.00	**LUNCH**				
13.00 - 16.45	**TECHNICAL TOUR**				

Friday, September 7, 2018

08.15 - 10.30	TECHNICAL SESSION V				
Room	Pamandengan I Room	Pamandengan 2 Room	Pamandengan 3 Room	Pamandengan 4 Room	Karaton Ballroom
Session Chair	Prof. Iman Satyarno	Prof. Bambang Suhendro	Dr. Lim Pang Jen	Dr. Inggar Septhia Irawati	Dr. Benny Suryanto
	Paper 8	Paper 74	Paper 69	Paper 98	Paper 114
	Paper 9	Paper 75	Paper 79	Paper 106	Paper 115
	Paper 23	Paper 76	Paper 81	Paper 107	Paper 116
	Paper 24	Paper 77	Paper 82	Paper 108	Paper 117
	Paper 25	Paper 78	Paper 83	Paper 109	Paper 118
	Paper 26	Paper 123	Paper 84	Paper 110	Paper 119
	Paper 27	Paper 124	Paper 85	Paper 112	Paper 120
	Paper 28	Paper 125	Paper 87	Paper 113	Paper 121
	Paper 44	Paper 6	Paper 92		Paper 122
10.40 - 11.00	CLOSING				
	SCESCM 2020 by Prof. Bambang Suhendro, SCESCM Advisory Board				

***The registration also opens on September 4, 2018 at 16.00 – 20.00 at Secretariat Room (9th Floor). To prevent too many registration on the day, participants are advised to register on September 4, 2018.**

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Takashi Matsumoto
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Adaptive Robotic Systems Design in University of Applied Sciences

Jos Gunsing, Fons Gijselhart, Nyke Hagemans, Hans Jonkers, Eric Kivits. Peter Klijn, Bart Kapteijns, Diederich Kroeske, Hans Langen, Bart Oerlemans, Jan Oostindieand Joost van Stuijvenberg

Avans University of Applied Sciences, Centre of Expertise for Sustainable Innovation, Research Group for Robotics & Mechatronics, Breda/'s-Hertogenbosch, The Netherlands

Abstract. In the industry for highly specialized machine building (small series with high variety and high complexity) and in healthcare a demand for adaptive robotics is rapidly coming up. Technically skilled people are not always available in sufficient numbers. A lot of know how with respect to the required technologies is available but successful adaptive robotic system designs are still rare. In our research at the university of applied sciences we incorporate new available technologies in our education courses by way of research projects; in these projects students will investigate the application possibilities of new technologies together with companies and teachers. Thus we are able to transfer knowledge to the students including an innovation oriented attitude and skills. Last years we developed several industrial binpicking applications for logistics and machining-factories with different types of 3D vision. Also force feedback gripping has been developed including slip sensing. Especially for healthcare robotics we developed a so-called twisted wire actuator, which is very compact in combination with an underactuated gripper, manufactured in one piece in polyurethane. We work both on modeling and testing the functions of these designs but we work also on complete demonstrator systems. Since the amount of disciplines involved in complex product and machine design increases rapidly we pay a lot of attention with respect to systems engineering methods. Apart from the classical engineering disciplines like mechanical, electrical, software and mechatronics engineering, especially for adaptive robotics more and more disciplines like industrial product design, communication &multimedia design and of course physics and even art are to be involved depending on the specific application to be designed. Design tools like V-model, agile/scrum and design-approaches to obtain the best set of requirements are being implemented in the engineering studies from the early beginning.

1 Introduction

Avans University of Applied Sciences is situated in an industrialized part of the Netherlands.

In the technical field a shortage of highly skilled people is present. Thus production automation and robotics is an important theme. Many small and mediumsized companies are active in this industry notwith mass production but with building highly complex machines in small series. Also logistics/transport and material handling is important. Increasing logistic flexibility and a huge variety of products to be handled are typical trends. Apart from this in many types of industry a shortage of highly skilled technical people is present. Thus automation and robotics are important themes in

Sustainable cementitious materials: The effect of fly ash percentage as a part replacement of portland cement composite (PCC) and curing temperature on the early age strength of fly ash concrete

Gidion Turuallo[1,*], *Harun* Mallisa[1]

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Abstract. This research aims to determine the effect of fly ash percentage as a part replacement of Portland cement and curing temperatures to the early age strength of concrete. The percentages of fly ash used were 0, 10 and 15% by cement weight. The cured temperatures were 25, 30 dan 50ºC. The concrete specimens were cubes of 150 x 150 x 150 mm^3. The cubes, which were cured at 25ºC, placed in water tank, while those cured at 30 and 50ºC cured in oven until 7 days and then continued in water. The testing was conducted at ages 3, 7, 14 dan 28 days. The results showed that at early ages, the strength of concrete without fly ash cured at 25ºC were higher than that of fly ash concrete. The higher level replacement of cement with fly ash, the lower strength of concrete obtained. The higher the curing temperature at earlier age resulted the higher the strength of concrete. The strength of concretes with 10% of fly ash cured at 25, 30 and 50ºC at age three days were 15.111, 15.481 and 16.296 MPa respectively. Conversely, the strength of concrete that of cured at higher temperatures at ages 28 days, were lower than that of concretes cured at lower temperature. The results of this research also showed that fly ash could improve the workability of concrete.

1 Introduction

Concrete is the most used construction material worldwide due to its availability of the raw materials over the world. For many arguments, the production of cement as a construction material is not sustainable, as it consumes large quantities of natural materials. It is about 1.5 tons of raw materials is needed in producing each tone of cement. Another reason is the cement, which is the main material in producing concrete, has a large contribution to the CO_2 emission that leads to global warming and climate change. It is approximately one ton of CO_2, is released to the atmosphere in producing each ton of cement [1-5].

The cement manufacturing is discovered to need large amounts of energy. Embodied energy is the total energy required to produce a new material. Those are needed to extract the raw material, process and manufacture material, and transportation for all stages of production. For this reason, it is needed to develop cementitious materials, which are waste by product of industry and consume a smaller amount of energy in producing them and can reduce the cement content to be used in concrete. Furthermore, the use such materials may give additional benefits and improve certain properties such as strength, workability and durability of concrete. The use of cementitious materials can have impact on the environment and contribution to reduce the need of landfill for disposal [3, 4, 6]. The use of fly ash as cementitious material in concrete can play an important role in sustainable development. It has been introduced for using as supplementary cementitious material in concrete in the beginning of last century, although it was started to be familiar used in concrete in the last 50 years [7].

2 Using fly ash in concrete

Fly ash is a by-product of burning pulverized of a coal-fired electrical generation station. The mineral impurities in the coal (clay, feldspar, quartz and shale) are separated out of combustion chamber along with exhaust gases. It then cools and solidifies into spherical glassy particles called fly ash [8, 9]. Generally, fly ash is used to replace original Portland cement in concrete up to 30% by mass of the total binder or cementitious material [10, 11]. The use of fly ash as addition in concrete

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Flood-induced Bridge Failures in Papua New Guinea

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[1]Master Student, Division of Engineering and Policy for Sustainable Environment, Hokkaido University, Sapporo, Japan.
[2]Professor, Division of Engineering and Policy for Sustainable Environment, Hokkaido University, Sapporo, Japan.

Abstract. Papua New Guinea has been experiencing frequent bridge failures and collapses due to flooding rivers in the recent past. According to the records from Papua New Guinea Department of Works, it is estimated that over Two Hundred and Eighty (285) bridges, fords (causeways) and major culverts were damaged by flood action alone in the last five years between 2013-2017. That is approximately at an average rate of 57 bridges in a year. This result is very disturbing and as such this study was undertaken to assess and analyze the flood-induced bridge failure causes and offer applicable solutions. This study will report on the field investigation works and results derived from the twenty-one flood affected bridges in six different major road networks in three provinces of Papua New Guinea. Hence, it was observed in this study that substructure damages due to flooding account for seventy percent (70%) of the bridge damages while superstructure damages account for the thirty percent (30%). The common causes of flood-induced bridge failures were identified as local scour around bridge piers and abutments, contraction scours, sedimentation, debris, and log impact.

1. Introduction

The climatic effects of flood against the road infrastructure such as a bridge are so prevalent that it requires deeper engineering and technological intervention to address this ever-present phenomenon. Papua New Guinea has been experiencing frequent bridge failures and collapses due to flooding rivers in the recent past. According to the records from Papua New Guinea Department of Works, it has shown that over Two Hundred and Eighty (285) bridges, fords (causeways) and major culverts were damaged by flood action alone in the last five years. That is at an average rate of 57 bridges in a year.

Bridge damages have been observed to be mainly at the bridge foundations. More specifically, the flooding waters erode the bridge abutments, scour the bridge piers and weaken the bridge's resistance against the flood load and eventually destroy the bridge. In addition, it is also attested that riverbank and road approach embankment erosion by flooding rivers have been one of the leading causes of bridge failures in Papua New Guinea, according to this study.

The bridge inspections were carried out in three provinces of Papua New Guinea, namely; Morobe Province, Madang Province and New Ireland Province. In Morobe Province, five (5) number of bridges were investigated, three (3) bridges along Wau Highway, one (1) bridge along Highlands Highway and one (1) bridge along Ramu Highway. In Madang Province, eight (8) bridges were inspected and all were along the Ramu Highway section of Madang Province between Pompaquato Bridge and Usino Junction. Moreover, in New Ireland Province, eight bridges were inspected, three (3) bridge along Boluminski Highway, two (2) bridges along Lanzarote Road and three (3) bridges along West Coast Road. All in all, twenty-one (21) bridges were inspected in three different provinces along five major socio-economic roads that support the livelihood of people in Papua New Guinea.

Richard Davies, a News Reporter for Floodlist Asia, published on 16th October 2016, that Papua New Guinea is vulnerable to both inland and coastal flooding. The country has suffered from severe coastal flooding in 2008 as many as 75,000 people were displaced from eight (8) different provinces. In 2016, around 10,000 people were affected by flooding in West New Britain Province with thirty-five (35) houses, bridges, roads and agricultural farms were damaged across both provinces of Gulf and Southern Highlands such as sampled in Figures 1 and 2 respectively.

Figure 1. Flood-damaged Himutu Bridge, Boluminski Highway, New Ireland Province, Papua New Guinea. Photo Credit: Gibson Holemba (2016).

Rain and its effect of flooding are a natural phenomenon and are here to stay whether we like it or not. Flooding will continue to affect the livelihood of the people as long as the natural law of Water Cycle exists. The only way out to reduce or control and provide a sustainable solution is an innovative way of engineering and technology and better flood mitigation planning and control works.

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Phytoremediation of heavy metal from leachate using *imperata cylindrica*

Khairul Anam Moktar[1,*], and *Ramlah* Mohd Tajuddin[2]

[1]Faculty of Civil Engineering, Universiti Teknologi MARA, Shah Alam, Malaysia
[2]Associate Professor, Faculty of Civil Engineering, Universiti Teknologi MARA, Shah Alam, Malaysia

Abstract. Landfill leachate has many toxic substances, which may adversely affect the environmental health. The high concentration of heavy metal in landfill leachate creates complication to its removal and management. Hence this research was conducted to explore the ability of phytoremediation using *Imperata cylindrica* to remove Lead, Zinc and Cadmium; which is deemed to be nature friendly and sustainable. Raw landfill leachates were taken from the collection ponds at Jeram Sanitary Landfill and placed in fabricated phytoremediation system at UiTM laboratory. Heavy metal concentration of leachate from this system was monitored for 30 days. It was found that *Imperata cylindrica* is able to remove lead, Zinc and Cadmium from the leachate.

1 Introduction

Landfill leachate is highly concentrated and a complex effluent; which contains organic and inorganic compound. The unselective treatment can lead to a major health problem globally as the inorganic compound such as heavy metal cannot be degraded or changed to non-toxic form easily [1].

The exposure of heavy metals can cause disorder to human and other living organisms. Additionally, this type of pollutants has the potential to contribute in mortality and increase the serious irreversible illness. Acute poisoning in human can cause severe failure in the kidneys, reproductive system, liver, brain and nervous system.

As leachate vary so much even within landfills, at present a universal solution to the problem had not been found. Numerous methods have been introduced for removing heavy metals from leachate mainly, chemical precipitation, chemical oxidation or reduction, ultrafiltration, electrochemical treatment, reverse osmosis, electro-dialysis, application of membrane technology, evaporation recovery, solvent extraction and ion exchange process.

Although, above-mentioned methods had proven to remove the pollutants but those are very expensive and may produce large volume of wastes and not economically feasible for small and medium size landfill. However, methods are continuously reviewed and developed to meet this environmental issue [14].

Treatments within the recycling, filtering, filtering, biological and chemical areas are the most common [14], but phytoremediation-the use of plant in the purifying process- has gained attention as a viable option for landfills.

Phytoremediation is a treatment that uses plants to remediate heavy metals from contaminated water and wastewater; it is reported that that the pollutants are confined within the root zone of the plant [2] [3]. Hence phytoremediation has become an operational and affordable technological solution used to extract or remove metal pollutants from wastewater and soil.

Many plants have successfully absorbed contaminants such as lead, cadmium, chromium, arsenic and various radionuclides from wastewater. One of the phytoremediation categories is phytoextraction, which can be used to remove heavy metals from leachate using its ability to uptake metals which is essential for plant growth (Fe, Mn, Zn, Cu, Mo and Ni). These studies proved that phytoremediation is a potential or an alternative approach to treat heavy metals such as Cadmium (Cd), Lead (Pb), and Zinc (Zn) contaminated site.

Table 1 shows the options of phytoremediation process available and their specific contaminants removal. This table presented several types of phytoremediation process and types which can be used as potential technique for phytoremediation to remove treat heavy metals such as (Cd), Lead (Pb), and Zinc (Zn) from contaminated site [2] [3].

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Concrete using sawdust as partial replacement of sand : Is it strong and does not endanger health ?

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Abstract. This study was conducted to investigate the effectiveness of concrete using sawdust to partially replace the river sand which could reduce both environmental problems and construction cost. In this study, sawdust concrete has been produced where the river sand is replaced with sawdust by 5%, 10% and 15% of the total sand volume. Both wet concrete and hardened concrete (cubes specimens) were tested through material testing and cube testing to obtain the most optimum sawdust concrete design. In addition, specimens have also been tested in environmental laboratory to identify the extent of hazardous use of sawdust to consumer health. This is because the dust used is the waste taken from the unknown root of the level of cleanliness. The result shows that the most optimum design for producing sawdust concrete is that with 10% replacement of river sand. The result is based on the compressive strength obtained. The results of environmental study also show that this sawdust concrete is free from any harmful to health contaminants.

1 Introduction

Sustainable development is a very important agenda in this century. This is where the world needs balance in maintaining resources, energy and resolving environmental problems. For example, the use of sand in the production of glass, electronics and concretes causing scarcity of sand is growing. In addition to causing eco-system disturbance, the shortage of sand has turned sand from local product into expensive commodity [1][2][3]. Therefore, in this study, sawdust was used partially replacement for sand in concrete production. The application of sawdust will reduce the usage of sand which bring the fact that it also eco-friendly and economical than conventional concrete.

The study on replacement of sand with sawdust in concrete perhaps can give positive outcomes. The significance of sawdust concrete production is to reduce the sawdust waste that could save the environment for a long term run. This is because almost all sawmill dumped the sawdust at landfill which causing the landfill to pile up and increased its volume day by day.

Another significance of this study is reducing the sand usage in concrete mix which eventually reduce the construction cost. Besides, when the usage of sand is reduced, the overall cost of construction also can be deducted as sawdust can be obtained cheaply at sawmill or sometimes with cost-free.

The use of sawdust in concrete production is doubtful because of its easy to decompose properties. However, there have been many studies conducted to test the properties and abilities of this sawdust for use in concrete production. The results of the study have shown that sawdust has unique characteristics and is competitive with other building materials [4].

1.1 Sawdust Production

Sawdust is a waste composed of fine particles of wood from different species and sources. In 2016, RM678.2 million has been invested in this wood-based industry, which become one of major revenue contributors to the Malaysia economy [5]. As the 8th largest exporter of tropical timber for sawn timber, panel product, builders' joinery and carpentry, mouldings and furniture/furniture parts, Muar Furniture Park has been stablished by the government to enhance the wood industry. It is comprising houses companies, innovation and training centres. Therefore, the total export of RM53 billion and RM16 billion for wood products and furniture, respectively can be achieved by 2020 which one of the national aim under National Timber Industry Policy (NATIP) [6].

With the increment of export revenue in wood industry, wood waste has also been generated largely. In 2010, it was estimated that 4.09×10^6 m^3 of wood waste was produced which 3.4×10^6 m^3 of them have been used for other purposes. The rest 1.5×10^6 m^3 of wood waste has been dumped at the landfill [7]. In order to face the increase in volume in timber waste from the timber industry, the use of sawdust waste as a building material has been created as a continuation to ensure the balance of industrial growth with the well-being of the people and the environment as shown in Figure 1 [6].

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Evaluatıon of Pervıous Concrete Utılızıng Recycled HDPE as Partıal Replacement of Coarse Aggregate wıth Acrylıc as Addıtıve

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Abstract. Pervious concrete is an eco-friendly alternative and is beneficial to providing good rainwater drainage in order to prevent flooding. But the application is limited to lower trafficked roadways and often times disregarded due to its low strength capabilities. This study investigates on the effect of High-denstiy Polyethylene as partial replacement of coarse aggregates on the physical and mechanical properties of Acrylic Polymer Pervious Concrete (AcPPC). Two different coarse aggregate sizes were evaluated which are ½" and ¾" with varying ratios of 10%, 20%, and 30%. It was determined that the partial replacement of recycled HDPE caused an increase in the porosity and permeability of the AcPPC. However, it decreased the AcPPC's compressive and flexural strength. Only the ½" 10% HDPE modified Pervious Concrete with 15% Acrylic Additive (PCHA) achieved a compressive strength that is within the range of the acceptable compressive strength for pervious concrete. While for the flexural strength, both the ½" 10% PCHA and ¾" 10% PCHA was within the standard values for flexural strength of pervious concrete. Thus, making the ½" 10% PCHA as the optimum mix in this study. The application of PCHA is limited to typical application of a pervious concrete.

1 Introduction

Over the decades, human population continues to grow and expand. And as the said population increases, advances in technology continuously happen. Breakthroughs in technology happen at a frequent rate. One product of today's innovation in technology is the paving of roads. These said roads are made of impermeable surfaces such as asphalt, concrete, traditional stone, and brick, among other possible pavers. These impermeable or impervious concrete surfaces do not allow water to pass or penetrate through. Today, it is very common to see our roads as paved surfaces, even in rural regions.

Unfortunately, society's development has its consequent drawbacks. Aside from the obvious waste produced by human activities, modernization sometimes poses a threat to our environment and its natural cycles. Among the various downsides of the negligence to our environment is the common event of flooding and drainage failure.

According to [1], the effect of impervious pavement is not only limited to flooding. Some effects of these surfaces on the environment are (1) Pollution of surface water; when runoff occurs, it gathers pollutants and flows directly into bodies of water such as rivers, lakes, etc.; (2) Water table is not adequately recharged; on a natural condition or in permeable surfaces, water can penetrate with ease, therefore, before reaching the groundwater, it is recharged or simply filtered. However, on impermeable surfaces, water is hindered to penetrate, groundwater is consequently used faster than it is recharged; (3) Formation of stagnate water puddles, and; (4) Heat island effect, as stated by EPA— United States Environmental Protection Agency [2] the interpretation of the heat island effect is simply making an "island" with temperatures much higher than that of its environment. This is due to the heat-absorbing property of asphalt, concrete or any other paving material. It simply gathers heat during the day and releases it at night [1].

Fortunately, the construction industry has adapted to the idea of creating and using Pervious Concrete (hereby referred to as PC), also known as permeable concrete, to address the various potential impermeable surface complications especially on paved roads. Pervious concrete is the no-fines, porous, gap-graded, and enhanced porosity concrete [3]. Interconnected void spaces are very evident in typical pervious concrete. These voids act as an opening for air and water to easily pass through, allowing it to seep into the ground, thus resulting to a fast drainage of other large volumes of water, preventing runoffs from occurring [4].

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Simple innovative comparison of costs between tied-arch bridge and cable-stayed bridge

Järvenpää Esko[1,*], *Quach Thanh* Tung[2]

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Abstract. The proposed paper compares tied-arch bridge alternatives and cable-stayed bridge alternatives based on needed load-bearing construction material amounts in the superstructure. The comparisons are prepared between four tied arch bridge solutions and four cable-stayed bridge solutions of the same span lengths. The sum of the span lengths is 300 m. The rise of arch as well as the height of pylon and cable arrangements follow optimal dimensions. The theoretic optimum rise of tied-arch for minimum material amount is higher than traditionally used for aesthetic reason. The optimum rise for minimum material amount parabolic arch is shown in the paper. The mathematical solution uses axial force index method presented in the paper. For the tied-arches the span-rise-ration of 3 is used. The hangers of the tied-arches are vertical-The tied-arches are calculated by numeric iteration method in order to get moment-less arch. The arches are designed as constant stress arch. The area and the weight of the cross section follow the compression force in the arch. In addition the self-weight of the suspender cables are included in the calculation. The influence of traffic loads are calculated by using a separate FEM program. It is concluded that tied-arch is a competitive alternative to cable-stayed bridge especially when asymmetric bridge spans are considered.

1 Introduction

Arch bridge is perhaps the best known bridge type. It came to use 2000 years ago [1]. Arches can be classified in many ways like deck arch bridge, tied-arch bridge, through arch bridge, truss arch and most recently network arch. The span range of arch bridge has today reached 552 m and longer spans are designed. The modern construction material is steel, often used as composite structure with concrete. Many studies have been published lately about arches. Only little has been written about theoretic and practical limits of arch bridges. Already in forties an article was published where the limit of 1000 m of concrete was found. The allowable stress of the concrete was 15 MPa [2].

Cable-stayed bridge has been a competitive bridge type during recent years. The authors have an opinion that it will be a good time to start to think how competitive arches could be, especially tied-arch bridges.

In this article tied-arch bridge and cable-stayed bridge have been compared to each other using axial force index method. Four tied-arch bridge alternatives and four cable-stayed bridge alternatives are studied using the same total length of the bridge and the same span lengths with the same effective width of the deck. Only load bearing material in the longitudinal direction of the superstructure is the basis of comparison.

All bridges have steel and concrete composite deck The bridges have six vehicle lanes. The traffic load follows AASTHO design codes. Multiple presence load factor of 0.65 is used.

2 Span ranges of tied-arch and cable-stayed bridges

Tied-arch bridge span range used have been from 50 m to 550 m. Typical span length for highway bridges is from 75 m to 250 m. The competitive span range of cable-stayed bridge has been from100 m to 1200 m. Typical spans lengths have been from 150 m to 500 m. The development of cable-stayed bridges during last three decades has been powerful, especially in construction and cable technology [3]. The development of arch bridges has been waiting. In China truss-type arch ribs and steel box arches have broken records [4], [5]. Many resent articles handle about network arches and especially their optimal suspender arrangements. Anyhow, the rise of arch is the first priority of the optimal solution, because the arch itself represents half of structural steel amount of the longitudinal load-bearing structures.

3 Cost comparison method

3.1 Design basis of the alternatives

This study was prepared in order to get general understanding about the reasons and differences of costs between tied-arch bridge and cable–stayed bridge. The basis for the study is that all the bridge alternatives are balanced structures for permanent load. The shape of arch

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Evaluation of various GIS-based methods for the analysis of road traffic accident hotspot

El-Said M. M. Zahran[1,*], *Soon Jiann* Tan[1], *Nurul Amirah 'Atiqah Binti* Mohamad *'Asri* Putra[2], *Eng Hie Angel* Tan[2], *Yok Hoe* Yap[1] and *Ena Kartina Abdul* Rahman[1]

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Abstract. In order to establish objective criteria for road traffic accident (RTA) hotspots, this paper examines the application of three different hotspot analysis methods to both identify and rank the RTA hotspots. The three methods selected are the network Kernel Density Estimation (KDE+) method, the Getis-Ord GI* method, and a recently proposed risk-based method that accounts for RTA frequency, severity and socioeconomic costs – STAA method. The study road, Jalan Tutong, is a major dual-carriageway connecting major residential and commercial areas from the west of Brunei-Muara district and beyond to the capital, Bandar Seri Begawan. The RTA data consists of cases reported to the police during a 5-year period from 2012 to 2016. The RTA data were digitised and prepared, before being imported into ESRI ArcGIS 10.2 software for analysis using each of these methods. The outcomes, particularly the location, extent and priority of the RTA hotspots, are subsequently compared to results from road safety audits, in order to determine the relative merits and drawbacks of each method. The findings from the comparative study would be useful to recommend the most suitable method to identify and rank the RTA hotspots for the study road.

1 Introduction

1.1 Background

According to the World Health Organisation, 1.25 million die from road traffic accidents (RTAs) every year and in most countries, RTAs cost approximately 3% of the gross domestic product [1], with generally higher RTA deaths in low- and medium-income countries and lesser in high-income countries. Brunei Darussalam is a country of land area 5,765 km² is located on the north Shore of Borneo Island in South East Asia and shares land territorial borders with Malaysia and Indonesia and maritime borders with Malaysia and China. As of 2016, Brunei has as a total population of 422,678 and a road network totalling 3,404.8 km [2], mostly concentrated in the Brunei-Muara district. It was previously reported that Brunei's vehicle fleet comprise of 92% cars, 5% heavy goods vehicles and 3% motorcycles with relatively few vulnerable road users such as motorcyclists, pedal cyclists and pedestrians [3]. A survey conducted in 2014 revealed that 98% of the surveyed trips primarily involved of private cars, and there is a growing concern that RTA in Brunei is related to the high dependency on private cars[3].

Hence, in order to establish objective criteria to reduce RTA and improve road in the face of limited budgets, it is important to recognise how, where and when RTA occurs [4]. Understanding the spatial patterns of RTA allows road authority engineers, design consultants and maintenance teams to implement appropriate RTA reduction measures [4] and prioritise them through a ranking scheme [5]. Identifying RTA hotspots or blackspots along the road has been made easier in recent years with the integrated application of Geographic Information System (GIS) software and Global Positioning System (GPS) devices.

RTAs seldom happen randomly but rather in clusters [4] which become more evident with a high number of accidents per kilometre on a given road. The fundamental concept is that the greater the cluster strength, the greater the urgency to undertake countermeasures. Although there are a good number of RTA hotspot identification approaches, it is better to have at least 2 systematic approaches for relative comparisons.

1.2 Brunei Historical Road Traffic Accident Data

Ref. [3] reported the characteristics of RTA cases in Brunei between 2010 and 2015 and found that the number of RTA cases and slightly injury casualties decreased while the number of seriously injured and killed

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