

The 4<sup>th</sup>  
**SCESCM**

Sustainable Structures for Future Generation  
in conjunction with

**RCCE**

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**Regional Conference in Civil Engineering**

***PROGRAM***

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September 5-7, 2018  
Yogyakarta, Indonesia

The 4<sup>th</sup>  
SCESCM

Sustainable Structures for Future Generation  
in conjunction with

RCCE

Regional Conference in Civil Engineering

Sponsored by



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The 4<sup>th</sup>  
SCESCM

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Regional Conference in Civil Engineering



AUN/SEED-Net



# Founder Institutions



UNIVERSITAS  
GADJAH MADA



HOKKAIDO  
UNIVERSITY



Karlsruher Institut für Technologie

# The 4<sup>th</sup> SCESCM

Sustainable Structures for Future Generation  
in conjunction with

## RCCE

Regional Conference in Civil Engineering



AUN/SEED-Net



## Co-Organizing Institutions



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AUN/SEED-Net



Supporting Institutions



# Welcoming Remarks

from The 4th SCESCM and AUN/SEED-Net RCCE 2018 Chair

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Dear participants,

It is my great pleasure to welcome you in The 4th SCESCM and AUN/SEED-Net RCCE here at Royal Ambarrukmo Hotel, Yogyakarta, Indonesia.

I would like to express my appreciation to all the co-organizers institutes, universities from Indonesia and universities outside the country. Also to the all the third parties, PT. Pamapersada Nusantara, PT. Adhi Karya, PT. Inti Beton, PT. Cigading Habeam Centre, PT. Geoforce Indonesia, PT. Wika Beton, PT. Hutama Karya, PT PP, PT. Waskita Karya, PT. Tamara Overseas, PT. Fyfe Fibrwrap, PT. Jasamarga Japek Selatan, and PT. Semen Indonesia who provide financial support for us, to Indonesian Society of Civil and Structural Engineers, Asian Concrete Federation, Japan Society of Civil Engineers, International Federation for Structural Concrete, the International Association for Bridge and Structural Engineering as supporting institutions, and to all the reviewers who have worked on their best helping us to sort hundreds of papers from around the world.

To gather and to share all knowledge and research results from students, academicians and professionals, in 2012 the first SCESCM conference was organized focusing on sustainability concept implemented in design, construction and maintenance in any civil engineering structure. Since then, the conference is organized biannually and is increasingly enriched by outstanding keynotes, invited papers and selected participant's papers sharing the latest scientific findings and achievements among civil engineers across the globe.

This time, SCESCM is held in conjunction with The Regional Conference in Civil Engineering (RCCE) 2018. RCCE is the AUN/SEED-Net conference hosted by the Department of Civil Engineering and Environment, Universitas Gadjah Mada, Yogyakarta, Indonesia. We received 129 technical papers from various country and will be published in MATEC WEB Conference which is indexed by Scopus. In addition, we also received 26 papers to be presented in RCCE conference.

We really hope this 4th SCESCM in conjunction with AUN/SEED-Net RCCE 2018 under the theme "Sustainable Structures for Future Generation" will provide us a valuable opportunity to share knowledges and experiences. SCESCM has also been introducing local cultures of Indonesia at the welcome dinner and optional cultural tour on a day after the conference. Once again, welcome to The 4th SCESCM in conjunction with AUN/SEED-Net RCCE 2018! We wish you a productive conference, and hope you enjoy your time here in Yogyakarta. Thank you.

**Ali Awaludin, Ph.D.**

Chair





# General Introduction



International Conference on Sustainable Civil Engineering Structures and Construction Materials (SCESCM)

The concept of sustainability has developed in every aspect of knowledge, including civil engineering aspects. Universitas Gadjah Mada Yogyakarta Indonesia, Hokkaido University Japan and Karlsruhe Institute of Technology Germany agreed to initiate an international conference focusing on sustainability concept implemented in design, construction and maintenance in any civil engineering structure for students, academicians and professionals to share their knowledge and network about the concept. The initiation was then realized by conducting the 1st International Conference on Sustainable Civil Engineering Structures and Construction Materials (SCESCM) in 2012 in Yogyakarta, Indonesia.

The initiators continued to hold the conference again in 2014 and 2016. The 2nd SCESCM was held back in Yogyakarta and the 3rd SCESCM was held in Bali, Indonesia. Better than the previous, those two conference were enrich by outstanding keynotes, invited papers and selected participant's papers. There were more than 190 papers presented in each conferences.



# General Introduction

Gaining more universities to join the conference as the organizing institutions, this biannual conference is held back in Yogyakarta, Indonesia on September 5 - 6, 2018. The 4th SCESCM in conjunction with The AUN/SEED-Net Regional Conference in Civil Engineering (RCCE) brings up the theme "Sustainable Structures for Future Generation". This year, more Indonesian universities join the conference as the co-organizing institutions, those are Universitas Atma Jaya Yogyakarta, Universitas Diponegoro, Universitas Islam Indonesia, Universitas Sebelas Maret, Universitas Islam Sultan Agung, Universitas Kristen Petra, Universitas Katolik Parahyangan, Institut Teknologi Bandung, Institut Teknologi Sepuluh Nopember, Universitas Sumatra Utara, Universitas Tadulako, Universitas Negeri Semarang, Universitas Hasanuddin. Other universities outside Indonesia such as Nihon University, Universiti Teknologi Brunei, Chulalongkorn University, Universiti Tun Hussein Onn, and Universiti Teknologi Mara, also take part as co-organizers of the conference.

## Regional Conference in Civil Engineering (RCCE)

The Regional Conference in Civil Engineering (RCCE) is an annual conference initiated by AUN/SEED-Net where this year RCCE is hosted by the Department of Civil and Environmental Engineering of Universitas Gadjah Mada, in conjunction with The 4th International Conference on Sustainable Civil Engineering Structures and Construction Materials (SCESCM). The conference is part of the continuing series of regional conference to provide a forum to collect and disseminate the most updated technology and the research of regional issues and public interests in the field of civil and environmental engineering in order to contribute to the sustainable community and to draw support from the industrial and the governmental sectors.

# General Introduction

## Yogyakarta

The Special Region of Yogyakarta is one of Indonesia's 34 provinces. Yogyakarta, or 'Yogya', 'Jogja' for short, is one of the most popular tourist destination on Java that is located geographically extends from Mount Merapi in the north to the Indian Ocean on the south side.

Jogja offers so many Javanese cultural traditions such as classical and contemporary Javanese dances, Keraton (The Royal Palace in Yogyakarta), Gamelan (Javanese orchestra), Wayang Kulit (sort of leather puppets show), Ketoprak (Javanese teater) and handicrafts such as Batik Jawa, silver and leather that will make tourists be enthralled. Jogja is also known for its famous surroundings, as it is close to iconic sights in Java such as Borobudur and Prambanan temples. Another destination to visit in Yogyakarta is the main road, Malioboro Street, that is always crowded and famous for its night street food-culture.

By holding The 4th SCESCM in conjunction with RCCE participants and guests will be invited not only to share knowledge but also to experience the warmth of Javanese culture in Yogyakarta.

# Conference Program

Wednesday, September 5, 2018

07.30 - 08.00	REGISTRATION			
08.00 - 08.30	OPENING SPEECHES			
	<ol style="list-style-type: none"> <li>1. Assoc. Prof. Ali Awaludin, Conference Chair</li> <li>2. Prof. Tamon UEDA, Chief Advisor and Acting Executive Director AUN/SEED-Net</li> <li>3. Prof. Panut Mulyono, Rector of Universitas Gadjah Mada</li> </ol>			
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	<ol style="list-style-type: none"> <li>1. Prof. Henricus Priyosulistyo, Universitas Gadjah Mada, Indonesia The Use of Vibration Analysis for Identification of Structural Reliability and Comfort</li> <li>2. Prof. Chikako Fujiyama, Hosei University, Japan Degradation of Submerged/Wet Concrete Under Cyclic Compression and Cyclic Shear</li> <li>3. Kazuo Takase, OMRON Social Solutions, Japan Social Infrastructure Monitoring using ICT Technology in Japan and Application Case by OMRON</li> </ol>			
	10.10 - 10.40	COFFEE BREAK		
	10.40 - 12.10	TECHNICAL SESSION I		
Room	Pemandangan 1 Room	Pemandangan 2 Room	Pemandangan 3 Room	Pemandangan 4 Room
Session Chair	Prof. Tamon Ueda	Prof. Barry Jones	Prof. Takashi Matsumoto	Assoc. Prof. Norhazilan Md Noor
	Paper 1	Paper 29	Paper 58	Paper 95
	Paper 2	Paper 30	Paper 59	Paper 96
	Paper 3	Paper 31	Paper 60	Paper 97
	Paper 4	Paper 49	Paper 61	Paper 93
	Paper 5	Paper 33	Paper 62	Paper 99
	Paper 126	Paper 34	Paper 63	Paper 111
12.10 - 13.10	LUNCH			

# Conference Program

TECHNICAL SESSION II					
13.10 - 14.25	Pamandengan I Room	Pamandengan 2 Room	Pamandengan 3 Room	Pamandengan 4 Room	Karaton Ballroom
Room	Dr. Angga Fajar Setiawan	Dr. Muhamad Abduh	Prof. Johannes Tarigan	Prof. Shunji Kanie	Andi Arham Adam, Ph.D
Session Chair	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				
TECHNICAL SESSION III					
14.55 - 16.10	Pamandengan I Room	Pamandengan 2 Room	Pamandengan 3 Room	Pamandengan 4 Room	Karaton Ballroom (14.25 - 15.55)
Room	Dr. Yazmin Sahol Hamid	Dr. Eng. Mahmud Kori Efendi	Prof. Benjamin Lumantarna		Assoc. Prof. Taweeep Chaisomphob
Session Chair	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				

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

# Conference Program

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		Pamandangan 3 Room	Pamandangan 4 Room
Session Chair		Dr. Riza Yosia Sunindijo	Dr. Ing. Dian Rubiana Widarda
	Paper 15	Paper 41	Paper 94
	Paper 16	Paper 43	Paper 100
	Paper 17	Paper 53	Paper 101
	Paper 18	Paper 54	Paper 102
	Paper 19	Paper 55	Paper 103
	Paper 20	Paper 56	Paper 104
			11.05 - 11.35 PRESENTATION FROM AUN/SEED-Net (All RCCE Participants Must Attend)
			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	

# Conference Program

Friday, September 7, 2018

TECHNICAL SESSION V						
08.15 - 10.30	Room	Pemandangan 1 Room	Pemandangan 2 Room	Pemandangan 3 Room	Pemandangan 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 114
	Paper 9	Paper 75	Paper 79	Paper 106	Paper 115	Paper 115
	Paper 23	Paper 76	Paper 81	Paper 107	Paper 116	Paper 116
	Paper 24	Paper 77	Paper 82	Paper 108	Paper 117	Paper 117
	Paper 25	Paper 78	Paper 83	Paper 109	Paper 118	Paper 118
	Paper 26	Paper 123	Paper 84	Paper 110	Paper 119	Paper 119
	Paper 27	Paper 124	Paper 85	Paper 112	Paper 120	Paper 120
	Paper 28	Paper 125	Paper 87	Paper 113	Paper 121	Paper 121
	Paper 44	Paper 6	Paper 92		Paper 122	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.

# List of Paper Presentation

## List of The 4<sup>th</sup> SCESCM Paper Presentation

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A MOCKUP UNIT OF THE AN-ECO BUDGET BAMBOO CHALET: DESIGN AND COST ESTIMATION ANALYSIS <i>(Hazrina Mansor, Nursuzila Mira Adila Abdul Wahab, Yazmin Sahol Hamid, Mohd Khairul Kamarudin)</i>	Paper 1
A STUDY INTO FLEXURAL, COMPRESSIVE AND TENSILE STRENGTH OF COIR-CONCRETE AS SUSTAINABLE BUILDING MATERIAL <i>(Rilya Rumbayan, Sudarno, Adriana Ticoalu)</i>	Paper 2
A STUDY ON THE INFLUENCE OF WATER TO SOLID RATIO, ACTIVATOR TO BINDER RATIO, AND PROPORTION OF LIME IN THE BINDER ON THE COMPRESSIVE STRENGTH OF AMBIENT CURED GEOPOLYMER CONCRETE <i>(Andi Arham Adam, Bayu Rahmat Ramadhan, Shyama Maricar)</i>	Paper 3
ADHESION CHARACTERISTICS OF GEOPOLYMER MORTAR TO CONCRETE AND REBARS <i>(Sanjay Pareek, Hiroo Kashima, Ippei Maruyama, Yoshikazu Araki)</i>	Paper 4
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ASSESSMENT OF COMPRESSIVE STRENGTH OF PEAT SOIL WITH SAWDUST AND RICE HUSK ASH (RHA) WITH HYDRATED LIME AS ADDITIVE <i>(Noorfaizah Hamzah, Nur 'Ain Mat Yusof, Muhammad Ihsan Haziq Mohd Rahimi)</i>	Paper 6
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CONSTRUCTION CLEARED LAND IMPACT ON AIR QUALITY DETERIORATION: QUANTIFICATION OF SOIL BORNE DUSTFALL AND SUSPENDED PARTICULATE GENERATION <i>(Arief Sabdo Yuwono, Iskandar, Muhammad Fauzan, Elsy Gustika Buana, Agung Abdul Ra'up, Ety Herwati)</i>	Paper 8
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EVALUATION OF PERVIOUS CONCRETE UTILIZING RECYCLED HDPE AS PARTIAL REPLACEMENT OF COARSE AGGREGATE WITH ACRYLIC AS ADDITIVE <i>(Neslyn Lopez, Emilla Collado, Lois Alexandra Diacos, Harold Dave Morente)</i>	Paper 10
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# Conference Highlights

## Welcoming Dinner



The committee is organizing a welcoming dinner for conference participants on September 5, 2018. The dinner will be taking place at nDalem Ngabean Restaurant, Yogyakarta. nDalem Ngabean Restaurant named after the brother of Sri Sultan Hamengku Buwono VII, Gusti Ngabehi. Essentially it means the house of Gusti Ngabehi.

Essentially it means the house of Gusti Ngabehi. At the moment, nDalem Ngabean is functioned as restaurant and guest house for tourist visiting Kraton. As the main building, the Pendopo or the main hall holds spacious space with classic Javanese architecture which has drawn the attention one of Hollywood producer to be used as one of the main shooting location for Java Heat (2013).

During program, participants will enjoy Angklung Orchestra, theatrical dance and be entertained by the performance of electone player and singer during the dinner. Participants will feel the nuances of strong Javanese culture while enjoying dinner at this restaurant.



*Theatrical Dances*



*Angklung Orchestra*

The dinner will be held from 6 PM, so participants are requested to gather in the Royal Ambarrukmo Lobby at 5 PM.

## Welcome Dinner Itinerary

Time	Description
17.00 - 18.00	Drive to nDalem Ngabean Resto
18.00 - 18.10	Welcoming Participant at nDalem Ngabean Resto
18.10 - 18.15	Opening MC & Opening Dance
18.15 - 18.35	Pray Time
18.35 - 19.35	Dinner
19.35 - 20.05	Angklung Performance
20.05 - 20.45	Traditional Dance Performance
20.45 - 21.00	Entertainment & Closing

## Technical Tour



*Prambanan Temple*



*Malioboro*

The committee is organizing half day city tour to several interesting place, i.e. Prambanan Temple and Malioboro. The tour will be held on September 6, 2018. Joining this program, participant can see the largest Hindu temple in Indonesia at Prambanan Temple. Still in Prambanan, participants will be attending The Heritage Class, followed by a meal with a magnificent view of the Temple. Also, joining this program, participant can visit Malioboro. Malioboro is an iconic and also a major shopping street in Yogyakarta. In Malioboro, participant are not only be able to shopping but also enjoying the local food.

Conference participants who would like to join the Technical Tour can register one day before the event as long as there are still places available. Participants who join this program are requested to gather at Royal Ambarrukmo Lobby at 12.30 PM. *(100 seats available, first come first serve)*

More information about Prambanan Temple and Malioboro :

<https://whc.unesco.org/en/list/642/indicators/>

<https://tourjogja.com/read/18/malioboro-the-24-hours-street.html>

### Technical Tour Itinerary

Time	Description
12.30 - 12.45	Preparation
12.45 - 13.15	Drive to Prambanan Temple
13.15 - 14.45	Tour at Prambanan Temple
14.45 - 15.00	Preparation to visit Malioboro
15.00 - 15.30	Drive to Malioboro
15.30 - 17.00	Tour at Malioboro
17.00 - 17.15	Preparation to go back to Hotel

## Social Program

The SCESCM and RCCE 2018 offers The Social Program for participants who come with their spouse or family members. The Social Program will be held on September 5th, 2018. The spouse or family members of a SCESCM and RCCE participant can enjoy historical sites around Yogyakarta. In this program, the committee provides free transportation and drinks only. Meals and entrance fee (if any) are not accommodated by the committee. This program is limited for only 10 people.

Destination:

1. Taman Sari Water Castle

Entrance ticket : 15000 IDR (foreign tourist), 5000 IDR (domestic tourist), 3000 IDR (photo permission)

2. Sultan Palace (Keraton Yogyakarta)

Entrance ticket : 15000 IDR (foreign tourist), 7500 IDR (domestic tourist), 1000 IDR (photo permission)

3. Lunch in Bale Raos Kraton Restaurant, a place which serves very typical food of royal cuisine king of Yogyakarta.

4. Silver Jewelries and Crafts Center in Kotagede Yogyakarta.





Taman Sari Water Castle



Sultan Palace (Keraton Yogyakarta)



Kotagede, Yogyakarta



Bale Raos Kraton Restaurant