



Waste Engineering  
and Management

Proceeding

SIBE-2009

The 1<sup>st</sup> International Conference  
on Sustainable Infrastructure  
and Built Environment  
in Developing Countries

SABUGA ITB, Bandung - Indonesia  
2<sup>nd</sup> - 3<sup>rd</sup> November 2009

Published by  
Faculty of Civil and Environmental Engineering  
Institut Teknologi Bandung - Indonesia



AUN/SEED-Net



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*SIBE 2009 published eight (8) volumes of proceeding as following :*

*Volume A : Structure and Material*

*Volume B : Transportation System and Engineering*

*Volume C : Water Engineering and Management*

*Volume D : Waste Engineering and Management*

*Volume E : Ocean Engineering*

*Volume F : Construction Management*

*Volume G : Geotechnical Engineering*

*Volume H : Environmental Protection and Management*



## PREFACE

The 1st International Conference on Sustainable Infrastructure and Built Environment in Developing Countries (SIBE) 2009 is aimed to provide a forum to discuss and disseminate recent advance in scientific research, technology, and management approach to obtain better environment quality.

Infrastructure that provides the basic need of a society and sustainable infrastructure system are essential for the survival, health and well-being of a society. In developing countries, civil and environmental engineers are at the epicenter in seeking means to enhance the quality of human life through modernization of infrastructure as evidenced by provision of shelters, water, and transport, amongst others. The current rate of urbanization and industrialization raises a number of environmental issues, often resulting in environmental mismanagement, especially in developing countries. The problems are further aggravated by environmental degradation such as soil erosion, depletion of water resources, etc. In order to meet these multifaceted challenges, proper planning followed by implementation and verification must be exercised, via an integrated, multi disciplinary and holistic approach.

The conference will provide an opportunity for professionals and researchers to learn, share and exchange about the latest development and research in civil and environmental engineering. The scope of the conference covers all aspect of civil and environmental engineering practices.

Participants of the conference include researchers, academic staffs, students, industries, public and local governments. The keynote presentations during the conference are as follows:

Keynote speakers:

- **Indonesian Government Representative**  
*Minister of Public Works, Indonesia*
- **Dr. Puti Farida Marzuki**  
*Dean of the Faculty of Civil and Environmental Engineering, Institut Teknologi Bandung, Indonesia*
- **Dr. Tony Liu**  
*National Taiwan University, Taiwan*
- **Prof. Shunji Kanie**  
*Hokkaido University, Japan*
- **Prof. Syunsuke Ikeda**  
*Tokyo Institute of Technology (AUN/SEED-Net), Japan.*

Invited speakers:

- **Dr. Setiawan Wangsaatmaja**  
*Environmental Protection Agency of West Java Province, Indonesia*
- **Dr. Edwan Kardena**  
*Faculty of Civil and Environmental Engineering, Institut Teknologi Bandung, Indonesia*
- **Prof. Harianto Rahardjo, Ph.D.**  
*School of Civil and Environmental Engineering, Nanyang Technological University, Singapore*
- **Prof. Ikuo Towhata**  
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- **Prof. Nakasaki Kiyohiko**  
*Tokyo Institute of Technology, Japan.*

The objectives of this conference are:

1. To provide a platform for exchange of ideas, information and experiences among academics, researchers, consultants, engineers, manufacturers and post graduate scholars in civil and environmental engineering.
2. To discuss and evaluate the latest approaches, innovative technologies, policies and new directions in infrastructure development, pollution prevention and eco-friendly technologies adapted to developing countries.
3. To promote cooperation and networking amongst practitioners and researchers involved in addressing infrastructure and built environment issues.

The oral and poster presentations are subdivided into 8 major sections, as following:

- A. Structure and material
- B. Transportation system and engineering
- C. Water engineering and management
- D. Waste engineering and management
- E. Ocean engineering
- F. Construction management
- G. Geotechnical engineering
- H. Environmental protection and management.

There are 174 contributors in oral presentation and 36 contributors for poster presentation.

Finally, the Organizing Committee wishes that this conference is able to provide beneficial scientific information to the participants and other concerned readers.

Bandung, November 2009  
Organizing Committee



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