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| 제목 | Acceptance Notification of SB 13 Seoul Conference |
| 보낸사람 | "배지호"<jhbae@hensmice.com> |
| 보낸날짜 | Wed, 12 Jun 2013 01:10:23 +0900 |
| 받는사람 | mchangho@kunsan.ac.kr |


Dear Changho Moon,

**Paper Title:** Sustainability and Floating Architecture
**Paper No.: P1107**

On behalf of SB13 Seoul Conference Organizing Committee, we would like to express our sincere ap preciation for your contribution to the conference. We are also pleased to inform you that **your paper has been accepted for an Oral Presentation.**

Detailed program will be announced on our website by June 21, 2013.

We strongly recommend you to register in order for your paper to be finally accepted. For more info rmation about registration, please visit our website (www.sb13seoul.org) where you may register online.

Once again, we appreciate your contribution to SB13 Seoul Conference and strongly believe that thi s conference will be successful owing large in part to your active participation.

We look forward to meeting you in Seoul on July.

If you have any questions, please do not hesitate to contact our Conference Secretariat (secretariat@ sb13soeul.org).

**With warm regards**

**Prof. SungWoo Shin**
**Chairman of SB13 Seoul Conference**

Dr. Sungwoo Shin

President, International Sustainability Council(ISC)
Director, Sustainable Building Research Center(ERC)
Prof. School of Architecture & Architectural Engineering, Hanyang University
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■ **Important dates**

- **Submission of Abstract : 15 February, 2013**
- Acceptance Notification : 1 March, 2013
- **Submission of Final Paper : 31 May, 2013**
- Acceptance of Final Paper : 10 June, 2013

■ **Contact Person**

**Jung-Mi OH**, SB13 Seoul Conference Secretariat
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| 제목 | SB13 Oral Presentation Schedule & Guideline |
| 보낸사람 | "배지호"<jhbae@hensmice.com> |
| 보낸날짜 | Mon, 24 Jun 2013 02:34:39 +0900 |
| 받는사람 | mchangho@kunsan.ac.kr |
| 파일첨부 | 파일명 [총 파일수 1개] / 크기 |
| | [일반] Oral_Presentation_Guideline.pdf 127.25KB |


Dear Changho Moon,

On behalf of the SB13 Seoul Conference Organizing Committee, We would like to express our sincere appreciation for your contribution on the conference.
After we informed your paper has been accepted as an Oral Presentation, this time we would like to confirm your presentation schedule as below,

- **Session Topic: T4 Sustainable Economics, Liberal Arts and Social Sciences, Law, History, Aesthetics, Humanity, Philosophy, Culture, Tradition and Heritage**
- **Designation No(Session No): P1107 ( TS4-7)**
- **Title : Sustainability and Floating Architecture**
- **Presentation Date: July 10, 13:30~15:30**

Please read Oral Presentation Guideline attached carefully and prepare your presentation strictly according to it. We also would like to inform you that conference registration should be done for your presentation.
Once again, we appreciate for your contribution to the SB13 Seoul Conference and strongly believe that this conference will be successful with your active participation.
We do look forward to welcoming you in Seoul in July.

**With warm regards**

**Prof. SungWoo Shin**
**Chairman of SB13 Seoul Conference**

Dr. Sungwoo Shin

President, International Sustainability Council(ISC)
Director, Sustainable Building Research Center(ERC)
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- **Submission of Abstract : 15 February, 2013**
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# SB13 SEOUL

Sustainable Building Telegram toward Global Society

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## PROGRAM

### Technical Sessions

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## T1 TOPIC

Assessment Tools

(Environment Performance, CO2 and Amenity Evaluation, GBCC, CASBEE, GBTOOL, LEED, BREEAM, etc.)

**Chair** : Chandra Sekhar, Choul-Woong Kwon

13:30~15:30, July 9, 2013 Grand Ballroom (A)

| Session No. | Time | Paper No. | Title | Writer | Country |
|---|---|---|---|---|---|
| TS1-1 | 13:30-13:45 | P1122 | Guideline for Arranging LED Tube Lamp in Open Plan Offices to Increase Energy Efficiency | Onjira Nopporнmongkol | Thailand |
| TS1-2 | 13:45-14:00 | P1008 | GBT for BIM-based Green Building Certification System | Iksung Kim | South Korea |
| TS1-3 | 14:00-14:15 | P1147 | A Study on the Development of Energy Consumption and Greenhouse Gas Emissions of the Building Assessment Program Considering Operation | Ji Hye Min | South Korea |
| TS1-4 | 14:15-14:30 | P1095 | Performance Based Design: The Design Analysis Process | Sean Quinn | Hong Kong |
| TS1-5 | 14:30-14:45 | P1091 | The Analysis of BIM Modeling Level Considered as Building Greenhouse Gases Assessment; | Sung-woo Lee | South Korea |
| TS1-6 | 14:45-15:00 | P1101 | A development of a simplified energy assessment tool for residential buildings | Dong Ku Kim | South Korea |
| TS1-7 | 15:00-15:15 | P1084 | Time-Series Assessment of Whole Municipalities in Japan in Terms of Eco-Efficiency | Shun Kawakub | Japan |

| | | | | | |
|---|---|---|---|---|---|
| TS1-8 | 15:15-15:30 | P1049 | The Structure of the Green Certification Scheme for the Neighborhood and Application to Newtown Development : The Case of Magok, Seoul, Korea | Hong Bae Kim | South Korea |

## T2 TOPIC

Sustainable Building and Urban Policies, Systems, Codes, and Education

**Chair** : Soo Young Kim, Byung-Ho Lee

13:30~15:30, July 9, 2013 Grand Ballroom (B)

| Session No. | Time | Paper No. | Title | Writer | Country |
|---|---|---|---|---|---|
| TS2-1 | 13:30-13:45 | P1052 | Application of the CASBEE-City Assessment Tool to Disaster-Affected Cities | Masaki Takigami | Japan |
| TS2-2 | 13:45-14:00 | P1060 | Urban Policy on Historical Settlements, case study Heritage Housing in the Diponegoro Corridor Area- Surabaya Indonesia | Erika Yuni Astuti | Indonesia |
| TS2-3 | 14:00-14:15 | P1016 | Critical Review of EU Passive House Development | Feifei Sun | United Kingdom |
| TS2-4 | 14:15-14:30 | P1080 | An Experimental Study on the Thermal Comfort in Korean Style Passive House | Young Sub An | South Korea |
| TS2-5 | 14:30-14:45 | P1075 | Implementing sustainable business practices in a hotel and expanding green certification markets in the Midwestern United States | Emma Gilmore | United States |
| TS2-6 | 14:45-15:00 | P1154 | The Prospect of a Sustainable Accessible Environment in Taiwan-Reviewing from American legislation and the Latest Taiwanese Handicap Facility Regulation, Building Code, Universal Design Concept and the Handicap Policy | Chao-Chih Lin | Taiwan |
| TS2-7 | 15:00-15:15 | P1085 | Study on the optimum design tool of the building integrated geothermal system with the horizontal heat exchanger | Ho Byung Chae | South Korea |
| TS2-8 | 15:15-15:30 | P1108 | Evaluation on Sustainability and Occupants' Perceived Health in Malaysian Terraced Houses | Yaik-Wah Lim | Malaysia |

## T3 TOPIC

Sustainable Engineering (Material, Structural, Construction, Facade, Facility, etc.)

**Chair** :T. IKAGA, Hwan-yong Kim

15:45~18:00, July 9, 2013 Grand Ballroom (A)

| Session No. | Time | Paper | Title | Writer | Country |
|---|---|---|---|---|---|

| | | No. | | | |
|---|---|---|---|---|---|
| TS3-1 | 15:45-15:55 | P1099 | Challenges in Adopting Sustainable Materials in Malaysian Construction Industry | Jia Sin Tey | Malaysia |
| TS3-2 | 15:55-16:05 | P1143 | Heat Balance Analysis of Low-E Window Impacts on Thermal Load in Buildings | Kwang Ho Lee | South Korea |
| TS3-3 | 16:05-16:15 | P1042 | Promoting Sustainable Infrastructure: A Feasibility Analysis of Utility-Scale PV Covered Parking Structure | Robert Laurence Martin | United States |
| TS3-4 | 16:25-16:35 | P1040 | Developing an Impact Factor Matrix for Sustainable Construction | Ki Pyung Kim | United Kingdom |
| TS3-5 | 16:45-16:55 | P1035 | Experimental Investigation of Thermal Performance of a New Design Aerogel Window | Wei Zhang | China |
| TS3-6 | 17:05-17:15 | P1003 | A Feasibility Study of an Algae Facade System | Kyoung Hee Kim | United States |
| TS3-7 | 17:15-17:25 | P1053 | A Study on Lighting and Control Systems Remodeling Process and Guideline Development in Green Remodeling | Hyun Oh Kooe | South Korea |
| TS3-8 | 17:25-17:35 | P1097 | A System for Construction Wastes Management utilizing BOQ and Construction Schedule | Yongwoon Jeong | South Korea |
| TS3-9 | 17:35-17:45 | P1098 | Importance of Sustainability and Engineering Economics in Waste Infrastructure Projects | Kai Chen Goh | Malaysia |

## T4 TOPIC

Sustainable Economics, Liberal Arts and Social Sciences, Law, History, Aesthetics, Humanity, Philosophy, Culture, Tradition and Heritage

**Chair** : Jae-Weon Jeong, Kang Jun Lee

13:30~15:30, July 10, 2013 Grand Ballroom (A)

| Session No. | Time | Paper No. | Title | Writer | Country |
|---|---|---|---|---|---|
| TS4-1 | 13:30-13:45 | P1072 | Survey of Social & Environmental Changes for the Introduction of Sustainable Public Facility FM | Dong Ryul Cho | South Korea |
| TS4-2 | 13:45-14:00 | P1156 | Architecture Features and Restoration Design of the Imperial Tangzi(堂子) Temple building in Ch'ing dynasty China | Dongjianfei | China |

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|---|---|---|---|---|---|
| TS4-3 | 14:00-14:15 | P1145 | Seismic performance evaluation of existing moment frames having o | Chang Seok Lee | South Korea |
| TS4-4 | 14:15-14:30 | P1169 | Sustainable transportation decision-making: environmental impact valuation | Hwan yong Kim | United States |
| TS4-5 | 14:30-14:45 | P1048 | The Simulation of Wind and Thermal Environment in a Small/Medium City on the basis of Solar Radiant Heat by each Time Zone | JuHee Lee | South Korea |
| TS4-6 | 14:45-15:00 | P1029 | Preservation of Critical Modernism for Cultural Sustainability: Frank Lloyd Wright's Florida Southern College | Myengsoo Seo | United States |
| TS4-7 | 15:00-15:15 | P1107 | Sustainability and Floating Architecture | Changho Moon | South Korea |
| TS4-8 | 15:15-15:30 | P1082 | The analysis of decorative stone forms and artistic expression of wall in Chinese Eastern Railway architecture | Ruijing Wang | China |

## T5 TOPIC

Sustainable System for Super Tall Buildings

**Chair** :Moon Sung Lee, Ju-Hyung Kim

13:30~15:30, July 10, 2013 Grand Ballroom (B)

| Session No. | Time | Paper No. | Title | Writer | Country |
|---|---|---|---|---|---|
| TS5-1 | 13:30-13:45 | P1079 | Environmental Benefits of Sustainable Chiller System under Climate Change | Fu Wing Yu | Hong Kong |
| TS5-2 | 13:45-14:00 | P1027 | Modelling Guide for Space Unit-based Preliminary Estimates in Urban Renewal Mixed-Use Developments | Shin Yeop, Kang | South Korea |
| TS5-3 | 14:00-14:15 | P1088 | Fiber-optic Daylighting Systems for Large-scale Building Interiors | Seoyong Shin | South Korea |
| TS5-4 | 14:15-14:30 | P1083 | Sustainable System for Super Tall Buildings (Harmonia Skyscraper) | Liudmila Aleksandrova | Bulgaria |
| TS5-5 | 14:30-14:45 | P1047 | The study of BIM-based Energy and Environmental Performance Analysis Process for Sustainable Remodelling | Jane Ko e | South Korea |
| TS5-6 | 14:45-15:00 | P1028 | A Study on Developing Decision Support System to Aid Non-expert Clients in Selecting Renewable Energy System for Sustainable Sub-urban Housing | Min Ho Park | South Korea |

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# Sustainability and Floating Architecture

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**ABSTRACT**

This paper focuses on the sustainability of floating architecture. Comparing with the usual buildings on land, floating buildings on water have great advantages in terms of sustainability. Sustainability in architecture has been primarily dealt on physical aspects, but discussions of sustainability need to be extended to non-physical aspects because buildings are to be used by people with various purposes and meanings. Sustainability of floating architecture in three dimensions can be summarized as durability to a rise in water level, long term usage due to movability and relocation, and various application of renewable energy sources in environmental dimension, economic advantages due to prefabrication & modular construction, and economic efficiency by high utilization rate through global mobility in economic dimension, and residents' psychological comfort, strengthened security against crime, and high sense of community in social dimension.

**KEYWORDS**: Floating Architecture, Sustainability, Renewable Energy, Modular Construction

## 1. INTRODUCTION

Owing to climate change and increase of economic income level, people want to live and enjoy leisure activities near or on the water. And nowadays there have been severe and frequent natural disasters like earthquake and flooding, so proper countermeasures in terms of architecture are needed. Therefore floating architecture can be an emerging alternative.
This paper aims to discuss the sustainable features of floating architectures where the usual buildings on land are not able to have and to investigate the sustainable characteristics of floating buildings from environmental, economic and social dimensions.
Research method includes the site-visits of some floating buildings in Europe, Canada and USA, the review of related literatures, and the navigation of sustainability and floating building related homepages.

## 2. CONCEPT OF SUSTAINABILITY AND FLOATING ARCHITECTURE

### *2.1 Concept of Sustainability*

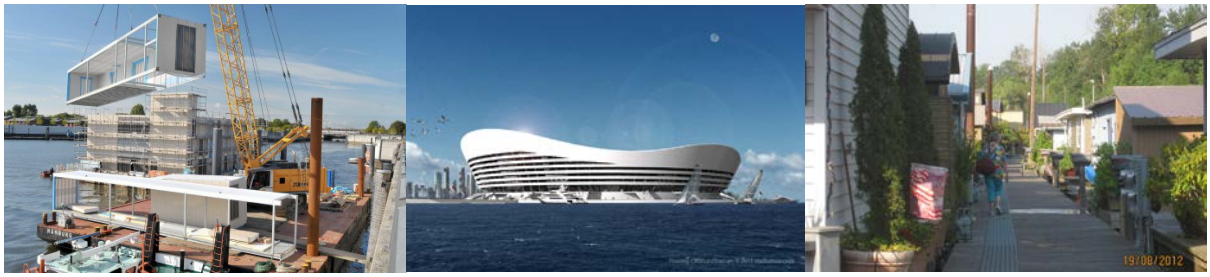
According to the Wikipedia, sustainability can be defined as the capacity to endure. Sustainability is improving the quality of human life while living within the carrying capacity of supporting eco-systems. Sustainability of architecture has been discussed mainly on the physical issues like energy and ecology, but the concept of sustainability needs to be extended to the non-physical aspects like residents' psychology and social life.
For humans, sustainability is the potential for long-term maintenance of well-being, which can have environmental, economic, and social dimensions.

In this paper, the sustainability of usual building on land would not be discussed, but only that of floating building on water would be analyzed and investigated based on environmental, economic, and social dimensions for the references(Wikipedia, 2013).

*2.2 Concept of Floating Architecture*

Floating architecture can be defined as a building for living/working space that floats on water with floatation system, is moored in a permanent location, does not include a water craft designed or intended for navigation, and has a premises service(electricity, water/sewage, gas) system served through connection by permanent supply/return system(Office of Housing and Construction Standard, Ministry of Energy and Mines, British Columbia, 2013).

(a) Four Seasons Hotel (b) IBA Dock (c) Salt & Sill Hotel



(d) IBA Dock (e) Floating Stadium (f) Oregon Yacht Club

Figure 1. Samples of floating architecture

## 3. THREE DIMENSIONS OF SUSTAINABILITY IN FLOATING BUILDING

*3.1 Environmental Dimension*

Floating building on the water is endurable to a rise in sea or river level due to climate change like global warming and natural disaster like flooding and earthquake. Floating and floatable building on the water would be available according to the site condition between bank and water. Especially floating and/or floatable architecture would be very useful in case of flooding for coastal/river and lowlands areas.

Floating building is movable and relocated to different places in need, and can be used by different people for a long time. Long term usage in different place by different people can contribute to the conservation of environment due to resources saving. For example, Four Seasons(Great Barrier Reef) Hotel was built in Singapore in 1988, moved and operated in Australia, moved in Vietnam in 1989 and operated until 1997, returned and remodeled in Singapore in 1997, bought by Hyundai Asan and moved to North Korea in 2006. This floating hotel has been moved 4 times and operated in 3 different countries for more than 20 years(see Figure 1 (a))( Moon, C., 2011).

Floating building is easy to get various renewable energy sources because there are no obstacles in the sea or river. More solar and wind energies can be obtained on the water than on the urban land. Especially hydrothermal use of sea/river water beneath the floating building might be a great advantage. In case of IBA Dock in Germany, multiple possibilities were tried to provide energy supply

from the water temperatures of the Elbe, solar heat panel, and solar photovoltaic cells(see Figure 1 (b)) (Immosolar, 2013). In Salt & Sill Hotel, in winter heating energy is actually generated from the warm sea water underneath the floating building(see Figure 1 (c))(Voyatzis, C., 2008).

*3.2 Economic Dimension*

Floating building usually employs the prefabrication and modular system in the design and construction process. Most parts are manufactured in factory, transported, assembled and installed on site. Depending on the company, completed floating building in factory is towed and moored at the site. Construction waste can be saved to the maximum and the floating building can be easy and economical to maintain. Prefabrication and modular system in floating building can contribute to the economic sustainability(see Figure 1 (d))(Archdaily, 2012).
A floating stadium was proposed for the FIFA World Cup 2022. The floating off-shore stadium can be relocated to seaside place across the oceans in the world. Therefore this kind of floating stadium can be used by more effectively than usual on-shore stadium. Its global mobility, long-term utilization and various economic efficiency show great advantages and so can be a new model for 21st century sports facility. Once a big sports event such as World Cup or Olympic Games was completed, operation and maintenance of the stadium raises economic problems due to low utilization(see Figure 1 (e)) (Sebastian, J., 2011; Anouk van den Eijnde, 2010). Therefore large scale of floating building for big events can keep the economic sustainability through global mobility.

*3.3 Social Dimension*

In floating home community, residents enjoy the peaceful and comfortable atmosphere on water within the natural setting. When the residents were asked what the first reason was to live there, they answered they liked the peaceful environment and good neighbors. There should be psychological sustainability among the residents and neighborhood.
The residents have great interesting in conserving the natural environment like wild birds and watershed vegetation, have to cooperate in managing the natural disaster like flooding and typhoon, have to cope with the fire and escape, and should negotiate the legal regulation with the city officers and get administrative/financial support from the City government. Solid social sustainability is essential and easy to be found in floating home community(see Figure 1 (f))(Oregon Yacht Club, 2013).
Floating home community is usually more secure against crime than the housing site on land. Because the residents know each other, the entrance is controlled, and the community is surrounded by water, unwanted guests are not easy to access to the floating home community. This kind of condition can enhance the social sustainability.

## 4. CONCLUSIONS

Due to climate change, people's preference to live in water space, and frequent natural disasters like flooding & earthquake, floating architecture can be a strong and attractive alternative. This paper aimed to investigate the sustainable characteristics of floating architecture in environmental, economic, and social dimensions.
Comparing with the usual buildings on land, floating buildings on water have great advantages in terms of sustainability. Sustainability in architecture has been dealt on physical aspects so far, but discussion of sustainability need to be extended to non-physical aspects because floating buildings are also to be used by people with various purposes.
Sustainability of floating architecture can be summarized as durability to a rise in water level, long term usage due to movability and relocation, and various application of renewable energy sources in environmental dimension, economic advantages due to prefabrication & modular construction, and economic efficiency by high utilization rate through global mobility in economic dimension, and

residents' psychological comfort, security against crime, and high sense of community in social dimension.
By the way, disadvantages of floating architectures should be investigated and countermeasures to overcome are to be suggested for further study. For example, wet environment may cause residents' health problem and deterioration of building exterior material. Therefore some measures of dehumidification and wet-proof building materials are to be considered.

## ACKNOWLEDGMENT

This research was supported by a grant(10 RTIP B01) from Regional Technology Innovation Program funded by Ministry of Land, infrastructure and Transport of Korean government.

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International Conference on Sustainable Building Asia

Sustainable Building Telegram toward Global Society(SUSGRAM)

SB13 SEOUL Date: July 8 ~ 10, 2013 Venue: Seoul Palace Hotel

# INVOICE

## Registration for the SB13 SEOUL

**INVOICE TO :**

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| Registration fee | 400,000 Won |
| **Total Amount** | 400,000 Won |

Please remit the due amount 400,000 Won for the Registration Fee of SB13 SEOUL Conference.

**With warm regards**

**Prof. SungWoo Shin**
**Chairman of SB13 Seoul Conference**


Dr. Sungwoo Shin

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