

Floating Building as a New Paradigm of Architecture

Changho Moon

Professor, Department of Architecture and Building Engineering, Kunsan National University, Korea

Abstract

According to climate change, deficiency of usable land, water portion (more than 70%) of the Earth surface, and improvement of income level, floating building on water has been emerging as a strong alternative. The aim of this study is to suggest some reference ideas for new building projects around waterside through the reviewing of sample projects. New paradigm of architecture can be described as a new model and/or system of architecture with new concept and Zeitgeist like sustainability. Floating building on the water is already a new paradigm of architecture comparing with the preconception of building on the land and current building regulations. New paradigm features from the sample projects can be suggested as building on the sea, modular construction, application of various renewable energy resources, use of local material, long term usage, conservation of natural environment, and economical sustainability through global mobility.

Keywords: Floating Building, Water Friendly Building, New Paradigm, Sustainability, Climate Change

1. Introduction

Owing to climate change like global warming, the water level of sea and river has been rising. The 70% of the Earth is covered with the water. Meanwhile people want to live and enjoy leisure activities near or on the water according to the increase of economic income level. Water friendly building will be strong alternative and needed more and more in the future.

People have thought that buildings should be constructed only on the land. Usually building regulation also permits the building design on the land. But for example, the Dutch has lived on houseboat for a long time.

The aim of this study is reviewing the new paradigm features of floating building through planned and realized projects, and to suggest the reference ideas for the new building projects.

Research methods include the review of the related literatures, the navigation of floating building related homepages, and the site-visits of some floating buildings in Europe & USA.

As conclusion, the advantageous and new respects of floating building are to be suggested for architectural paradigm shift.

2. Floating building and new paradigm of architecture

According to the British Columbia Float Home Standards¹, float home means a structure incorporating a floatation system, intended for use or being used or occupied for residential purposes, containing one dwelling unit only, not primarily intended for, or usable in navigation and does not include a water craft designed or intended for navigation

Paradigm² means “one that serves as a pattern or model”, “a set or list of all the inflectional forms of a word or one of its grammatical categories”, or “a set of assumptions, concepts, values, and practices that constitutes a way of viewing reality for the community that shares them, especially in an intellectual discipline”.

New paradigm of architecture can be described as a new model and/or system of architecture with new concept and Zeitgeist like sustainability.

3. Sample floating building

3.1 IBA dock, Hamburg

- Location: Hamburg, Germany
- Year of completion: 2009

Contact Author: Changho Moon, professor,
Department of Architecture and building Engineering,
Kunsan National University, Korea.

Daehak-no 558, Kunsan, Chonbuk, 573-701 Korea

Tel: +82 63 469 4782 Fax: +82 63 469 4780

e-mail: mchangho@kunsan.ac.kr

(The publisher will insert here: received, accepted)

¹ Homepage, Office of Housing and Construction Standards, Ministry of Energy and Mines, British Columbia, Canada (<http://www.housing.gov.bc.ca/pub/htmldocs/floathome.htm>)

² Homepage, The Free Dictionary (<http://www.thefreedictionary.com/paradigm>)

- Size & scale: 3 story, 1,623 m²
- Date of visit: August 6th, 2011

This building was designed by Prof. Han Slawik, Hannover, was the headquarters of the IBA Hamburg GmbH as well as an information and event center for the IBA. It was centrally located and provided easy access for the visitors to IBA. Now the building is being used for Urban and Architecture information center in Hamburg.



Fig. 1. IBA dock

This is a steel-constructed floating building with concrete pontoon. The superstructures were made in a modular construction and assembled on the pontoon. It also used a ready-made heating and cooling ceiling elements in the entire building.

Multiple possibilities were reviewed to provide energy supply for the IBA Dock from the water temperatures of the Elbe, solar heat panel, and solar photovoltaic cells.

3.2 Floating hotel "Salt & Sill", Sweden

- Location: Island of Klädesholmen, Sweden
- Year of completion: 2008
- Size & scale: 2 story, 23 rooms(46 beds)
- Date of visit: August 8th-9th, 2011



Fig. 3. Salt and Sill

This floating hotel was designed by Mats & Arne Architects, Sweden, opened alongside the famous

seafood restaurant "Salt & Sill". The hotel consists of six two-story wooden buildings on concrete pontoon.

All the rooms have their own entrance and access to outdoor seating area. The hotel is very popular even though it is located in rural & coastal area. So there are many visitors all the year over.

The design of the hotel was done with the environment sustainability in mind as heating energy is actually generated from the warm sea water underneath the hotel in winter.

The building used local raw materials such as the wood from Swedish pine forests, and environmentally friendly paint. And they have even used the left over quarrying stone to build a new lobster reef under the pontoon. As a result the sea life was positively increased.

3.3 Oregon yacht club, Portland

- Location: Portland, Oregon, USA
- Year of completion: 2009
- Size & scale: 38 homes, 8 acres water property
- Date of visit: August 18th-19th, 2012



Fig. 2. Part of Oregon yacht club

The Oregon yacht club(OYC) is a floating home community located on the Willamette River in Portland, Oregon. It is close to downtown with a pastoral setting, so became one of the premier floating home moorage.

The OYC has more than 100 years' history. The original purpose was to foster and encourage yachting and to promote/increase the efficiency of its members in the science of navigation and the art of handling/sailing yacht. After 1910, OYC started allowing houseboat living in summer, eventually evolved to the year-round homes of today.

OYC is now a modern houseboat community, with a predominance of two-story buildings replacing the traditional one-story residences. The club is currently comprised of 38 floating homes that are permanently situated on the moorage and the walkway.

OYC members have annual inspection of houseboats to make sure they are in shipshape and

striking display when they are asked. The community has great interesting in conserving the natural environment like restoration of wild birds, clean marine program, watershed re-vegetation program, and others.

3.4 Floating cemetery, Hong Kong

- Location: Hong Kong
- Year of Design: 2010
- Size & Scale: -



Fig. 4. Floating cemetery

(Source: <http://www.fastcompany.com/1654972/dead-water-floating-cemetery-hong-kong>)

This floating cemetery was designed by Tin Shun But, gives totally new concept of burial at sea. It is really difficult to find a place in Hong Kong for cemetery. As burial grounds are very limited, private cemetery space is extremely expensive and there is a long waiting list for public burial site. So majority of dead bodies are cremated.

According to Buddhist tradition, people wants to provide good resting places for dead ancestors. There are some debates whether to build a multi-story columbarium or develop the land for cemetery.

So the architect proposed a floating cemetery near harbor. Visitors can go to the columbarium by boat and keep the ashes in a designated niche or scatter them over the sea.

There should be quite different atmosphere comparing with the existing cemetery on the land. This structure can be a sort of artificial park and provide good seascape to the prayers.

3.5 Floating pool, Prague

- Location: Vltava river, Prague
- Year of Design: 2012
- Size & Scale: 810 m²

This floating circular pool project was designed by the Czech architect team of Ondrej Lipensky and Andrea Kubna, came from the idea to clean the polluted river water and also to offer the recreational facility for the residents.

The historic Vltava was a popular swimming and

skating place before industrialization. The circular pool structure will function like a giant floating strainer to filter its contaminated water, so that the residents can swim and skate there as before.

The architects proposed to create several floating recreational islands with the purifying facility of textile membrane. Users can access by boat and/or floating pedestrian bridge.



Fig. 5. Floating pool

(Source: <http://inhabitat.com/floating-pool-could-clean-the-water-in-pragues-vltava-river/>)

The pool is located in the center of the structure and is surrounded by a bar, private cabins, changing rooms, restrooms, shower & sauna rooms, and mechanical room. A smaller and shallower pool is also provided for younger kids.

The river water can be filtered through a textile membrane on the bottom of the pool. This filter can make the water of the pool cleaner for guests and also improve the quality of the river water. In the winter, the pool can be converted into an ice rink for continued use all the year round.

3.6 Floating off-shore stadium, Qatar

- Location: Worldwide
- Year of Design: 2010/2011
- Size & Scale: 260,000sqm, 65,000seats

This stadium was developed by the German architects "Stadiumconcept" for the FIFA World Cup 2022. The floating off-shore stadium can be relocated to seaside place across the oceans. Therefore this stadium can be used by more effectively than usual on-shore stadium.

The stadium can be eco-friendly powered by renewable energy resources such as water, wind and solar power. As floating structures are located in seaside and there is no obstacles, wind and solar power is easy to obtain.

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. To compensate the economic weakness, other sports, rock concerts and public event are to be considered.

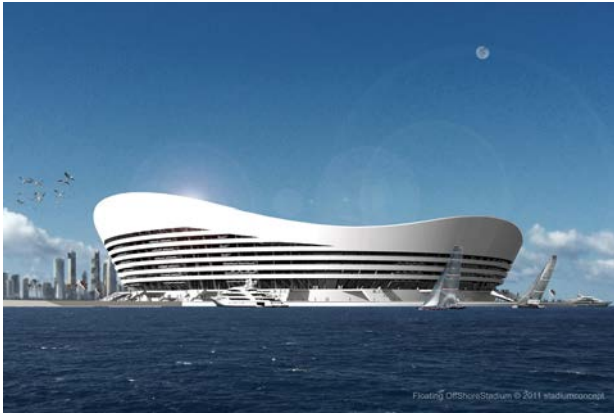


Fig. 6. Floating off-shore stadium

(Source: <http://www.archdaily.com/138162/floating-offshore-stadium-stadiumconcept/>)

Almost all the countries of the world have access to the sea. This unique floating stadium can be one of the most innovative and sustainable facility worldwide due to economic efficiency and long-term utilization.

4. New paradigm features from sample floating building

On reviewing the sample floating buildings, new paradigm features can be summarized as followings;

- IBA dock: use of modular construction, application of various renewable energy resources.
- Floating hotel “Salt and Sill”: geothermal use of sea water, use of local building material, and consideration of marine eco-system.
- Oregon yacht club: long term usage through reconstruction, high sense of community, conservation of natural environment
- Floating cemetery: suggestion of totally new concept of cemetery at sea, provision of artificial park and good seascape
- Floating pool: a building for both cleaning the polluted river and offering a recreational facility (swimming and skating)
- Floating off-shore stadium: possibility of economical sustainability from multipurpose usage and long-term utilization through global mobility

5. Conclusions

According to climate change, deficiency of

usable land & water portion (more than 70%) of the Earth surface, and improvement of income level, floating building on water has been emerging as a strong alternative. The aim of this study is to suggest some reference ideas for new building projects around waterside.

Floating building on the water is already new paradigm comparing with the preconception of building on the land and current building regulation.

New paradigm features from the sample projects can be suggested as building on the sea, modular construction, application of renewable energy resources, use of local material, long term usage, conservation of natural environment, high sense of community and economical sustainability through global mobility.

In addition, the concept of floating building needs to be changed from “building on the water” to “making the floating land and building on the land” for the easy understanding.

Acknowledgment

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

6. References

- 1) Marsh Rob et al (2010), Toward a New Paradigm: Design Strategies for Architecture, Energy and Climate Change using Danish Office Buildings as a Case Study, *Nordic Journal of Architectural Research*, 22(1/2), 32-46.
- 2) Moon Changho (2012), A Study on the Sustainable Features of Realized and Planned Floating Buildings, *Journal of Navigation and Port Research International Edition*, 36(2), 113-121.
- 3) Bridgette Meinhold (2012), Floating Pool Could Clean the Water in Prague's Vltava River, <http://inhabitat.com/floating-pool-could-clean-the-water-in-pragues-vltava-river/>
- 4) Sebastian J (2011), Floating OffShore Stadium/stadiumconcept, <http://www.archdaily.com/138162/floating-offshore-stadium-stadiumconcept/>
- 5) Suzanne LaBarre (2010), Dead in the Water: A Floating Cemetery for Hong Kong, <http://www.fastcompany.com/1654972/dead-water-floating-cemetery-hong-kong>,
- 6) Homepage, Office of Housing and Construction Standards, Ministry of Energy and Mines, British Columbia, Canada (<http://www.housing.gov.bc.ca/pub/htmldocs/floathome.htm>)
- 7) Homepage, The Free Dictionary (<http://www.thefreedictionary.com/paradigm>)