

LIVING BRIDGES ON THE RIVER NILE: A VISION TO ENHANCE URBAN SPACE INFORMALITY AND USAGE

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Abstract

Bridges are prominent features of many landscapes; they are justifiably called on to meet public objectives beyond their transportation purpose (Gottemoeller, 2004). Some bridges' sidewalks are subject to unplanned uses as well. The areas underneath some bridges have become makeshift shelters to homeless people or unplanned urban spaces. The undersides of bridges all around the world are areas of graffiti art, other bridges attract people attempting suicide, and become known as suicide bridges.

Most cities have begun to pay attention to the landscape design of urban rivers and tried not only to protect the ecological environment but also provide a place of recreation for the public (Qiao, 2008).

Over the past few decades in Egypt, many of the Nile's riverfronts have been systematically occupied by an assortment of private projects; this unplanned privatization of the riverfront has physically, visually and symbolically separated the Nile from the general public. The best alternative for people who want to enjoy the riverfront was to informally use bridges sidewalk as an unplanned urban spaces and sitting areas.

This study will explore the term "Living Bridges", and examine the various forms of formality and informality in using the urban spaces created adjacent to or on or underneath the riverfront bridges. Paper assumes that, adapting creative solutions in using bridges sidewalk and underneath can solve many urban spaces informality problems, add visual value, and create more enjoyable spaces and functions on the riverfronts.

To examine that, some important goals must be achieved through the research process:

- Evaluate some successful international examples of riverfront bridges in the world, and explore the most important lessons learned.
- Address the various informal types of uses on Cairo Nile river bridges and its position.
- The conceptualization of possible solutions to re-use existing Bridges urban spaces to change them into vibrant and pleasant areas and not only as a way of connection.

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1. Introduction

From the ancient days, people have had a physical, social and even emotional connection and reliance on the bridge as the built form. Bridges have played a part in the city's defense, established a city or civilization's boundary, exercised a civic role and been the location of many historical happenings. As a small scale of architectural design, a bridge, like the building has been an example of an evolutionary body due to a refocus and exploration of new technologies and materials. Specifically, the living or inhabitable bridge has undergone more conceptualization than any other bridge type (Young, 2007).

This paper provides a brief overview of different types and classification of bridges, exploring the term "Living Bridges" especially on riverfronts' bridges, also assesses the need of new urban spaces on riverfronts' bridges due to the increasing uses of city's locals (lay public) of riverfronts' bridges as livable places then mention Bridge-scape & aesthetics which justifiably called on to meet public objectives beyond bridges' transportation purpose.

Some successful international examples of riverfront's bridges will be analyzed, to investigate bridge-scape valuable ideas and sidewalk's landscape elements, then the paper will focus on Informality of Using river Nile bridges sidewalks as an unplanned urban spaces and sitting areas. The study will end up with some concepts of possible solutions to re-use existing Bridges' urban spaces on river Nile to change them into vibrant and pleasant areas.

2. Bridges & riverfronts' spaces

2.1. Bridge architecture: design and types

A bridge is a structure providing passage over an obstacle without cutting the way beneath. This passage may be for a road, a railway, pedestrians, a canal or a pipeline. The obstacle to be crossed may be a river, a road, railway or a valley (Vasani, 2008). There are several ways to classify bridges due to their construction material, type of movement, construction type, etc.

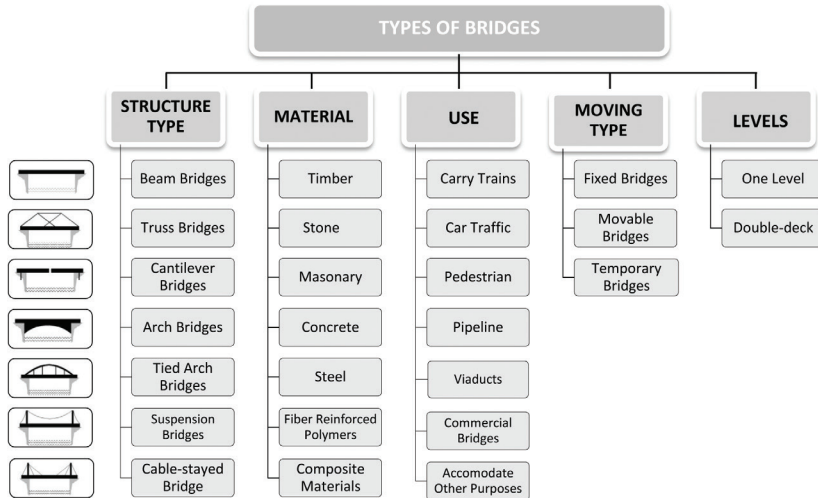


Fig. (1): Different types of bridges
 (Adapted from Vasani, 2008 & www.historyofbridges.com)

Bridges traverse environmentally and ecologically sensitive sites, culturally or visually significant areas, or are visually prominent features in communities and other developed settings. They also function socially and symbolically as vital factors in their communities and environments (Gottemoeller, 2010). Although bridges can have negative impacts on these environments, they can also be created in such a way that they are pleasing or welcome additions to the landscape. In addition bridges now became places where the lay public gather to fish, eat, drink, smoke and shop, so bridge design has to be more than how to get to the other side. Hence, bridge architecture is necessary because people need it to improve and develop social lifestyle. It makes us build communities, spaces to interact and to experience a new world within the confines of a construction (Niroumand, 2011).

2.2. living bridges from the past, to the future

The term "Living Bridges" start to take place to confirm the hidden role of bridges to human activities and social life within its area and around (Mimram, 2008). Living bridges are multi-functional bridges that People can live, can Work, and enjoy quality landscape in one place. Occupation of a bridge makes it both a building and a bridge, which becomes another type of architecture.

A precise English word for this type of bridge is called ‘inhabited bridge’, which can be broadly defined as a bridge that not only provides a link between two points

for pedestrian and vehicular traffic but also supports a superstructure that can serve residential, commercial, industrial, religious or defensive purposes, thereby creating a continuity of the built-up area from one bank to another (Murray, 1996).

Living on bridges is nothing new. In medieval times, the inhabited bridge sometimes could be described as a result of urban fabric extension. As a result, over time, the limited space in the city area became crowded. The river space, where the most central activities are found, enabled an inhabited bridge (Lai, 2011). Bridges of Amsterdam III - Living Bridges were residential structure designed and built as social housing to accommodate 600 dwellings, also Ponte Vecchio in Florence, Italy was A bridge that connects Florence over the Arno river containing Shops and stalls cover the bridge. Now, it's a tourist trap where one can purchase jewels, art, and souvenirs (Alter, 2009)



Fig. (2): Medieval living bridges (Wikipedia)

The Hamburg Bridge represents a new dimension in bridge-building. This will be the first time that a truly urban, bustling pedestrian-friendly bridge of these dimensions including green areas has been established across water. (www.livingbridge-hamburg.de)



Fig. (3): Hamburg Living Bridge (www.livingbridge-hamburg.de)

The scale of recent inhabited bridges has been increased many fold by comparison with the historical ones, as many of the projects have not been found. However, they share the same features: the utilization of technology and the integration of construction and building space (Lai 2011), such as Modern Living Bridge in Singapore-Malaysia (Fig.4), and architect “Ronald Rael” proposal for the Bay Bridge that connects San Francisco to Oakland to create a linear park with bike and pedestrian access, housing and social activities, such as theaters, commerce and museums, plus sporting facilities, in addition to orchards, gardens and meadows. (Alter, 2009) (Fig. 5).

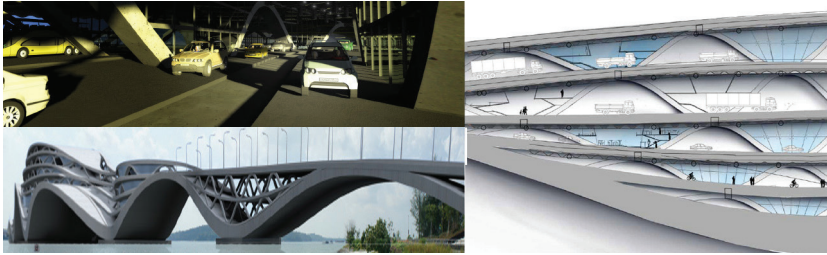


Fig. (4): Modern Living Bridge in Singapore- Malaysia(Lai, 2011)



Fig. (5): The Bay Bridge new idea of Architect Ronald Rael (Alter, 2009)

Some bridges now are subject to unplanned uses as well. The areas underneath some bridges have become makeshift shelters to homeless people, and the undersides of bridges all around the world are spots of prevalent graffiti. Living Bridges now in many developing countries which suffer from crowded and lack of open spaces can be named romance Bridge, family bridge, poor bridge, protesting bridge, and even suicide.

Today's urban bridges do not contribute to urban life apart from traffic needs. Therefore, rethinking the role of urban bridges appears necessary. To achieve that kind of space features such as setting, spatial interaction between the bridge and the city and routes need more attention (Stephan, 2000).

2.3. Bridge-scape & aesthetics

Gottemoeller, 2004 in "Bridgescape" said "The public want their bridges to be a positive feature of their cities. In short they want their bridges to be attractive". Bridge aesthetics are born out of design efficiency and sensitivity to visually pleasing details. The bridge leaves an impression, and that impression continues for as long as the bridge remains, for that bridge designers owe it to the community to create something beautiful, and any bridge design has to consider Aesthetics elements of bridges. (Fig. 6)

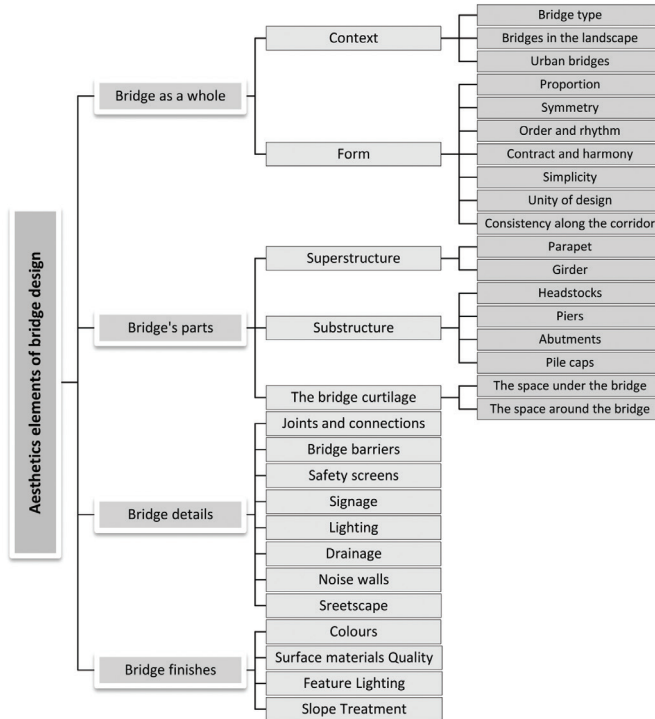


Fig. (6) Aesthetics elements of bridge design. (By researchers adapted from Gottemoeller, 2010)

We can't only worry about the structure and ignore the aesthetics to someone else. Every structural decision is an aesthetic decision. If a decision affects the size, shape, color or surface texture of a visible part of the bridge, it affects how people will feel about the bridge. For the same reason we would not build a bridge that is unsafe, we should not build one that is ugly. To ignore aesthetics is irresponsible (TRB, 2010).

2.4. Urban Riverfronts from neglecting to attention

Many of the new world riverfronts try to make public access the overall goal of any regeneration process, to give the public the opportunity to return back and access their riverfronts. They provide extensive new areas of high-quality public open space, they also establish new linkages between existing inner-city areas, intensifying the interconnectedness of urban functions, making design guidelines address the treatment of existing functional barriers and create immediate physical, visual, and auditory access to the riverfront (Stevens, 2003, Gabr, 2004, Andrew, 2006).

2.5. Urban bridges & public spaces (international examples)

Some international examples will be reviewed to learn some lessons of how to create an memorable riverfront's spaces on bridges.

Galata Bridge, Istanbul (lower deck idea as restaurant and shops) with 3 vehicular lanes, tram line and a sidewalk in each direction, the bridge is a place for fishing and socializing, for eating and drinking. The lower deck of the bridge has a lot of restaurants, while the top deck is a popular spot for fishing from. Galata Bridge manages to play both roles as connector and destination.



Fig.(7) Galata Bridge, Istanbul (Wikipedia) (www.urbanwaterfront.blogspot.com/2011/05/thickened-bridges.html)

Galata Bridge succeeds as a habitable bridge. It combines diverse and active programs in a thoughtful layering double deck that brings out the best in each. It synthesizes the complex needs and desires of the city in a coherent form.

The Banpo Bridge (idea of double deck bridge, lower as pedestrian and fountain show on the upper) is a significant bridge in downtown Seoul over the Han River, South Korea, the concept of this bridge is a “double deck bridge”, the lower deck located close to the waterline.

This deck incorporates pedestrian and bike paths that provide easy access to the Banpo Hangang Park. The fountain is programmed to play several shows during the day and night.



Fig. (8): The Banpo Bridge (www.en.wikipedia.org/wiki/Banpo_Bridge)

Helix-bridge (idea of parallel pedestrian bridge) The world's first double helix curved bridge in Marina Bay pedestrian bridge, it is set to transform Singapore's city landscape form, lighting feature is an important of this bridge. programmed to play several shows during the day and night.



Fig. (9): Helix-bridge (www.livingpod.com/lifestyle/architecture/double-helix-curved)

High Main Street Bridge (viewers terraces idea) over Miami River Hamilton, Ohio maintained traditional structure & added concrete curved terraces.



Fig. (10): Bridge over Miami River Hamilton, Ohio (Gottemoeller, 2004)

From the previous examples and many others we can suggest evaluation criteria of riverfront's bridge-scape, also suggest Bridge-scape elements to help when creating or redesigning riverfront's bridge-scape (Fig. 11 &12).

Access-ability & linkage		comfort & image		uses & activities		sociability											
Enhancement of visual access	Enhancement of physical access	Close/direct contact with water	Strengthen pedestrian access through walkable sidewalk	Play both the role of connector and destination	Attractiveness & charming	Improve the continuity and safety of movement	Create river views	Reflect context criteria & events	Quality of landscape elements	Synthesize the complex needs in a coherent fashion	Enough space for activities	Functional flexibility of landscape	Create various moods for different celebrations	Liveness	Interactivity between visitors	Encourage alternative seating arrangement	Succeed as habitable bridges

Fig.(11): proposed evaluation criteria of riverfront's bridge-scape

Landscape Elements Of Bridge Sidewalk														
sidewalk/pavement	Belvederes/terraces	seating	parapets/railings	barriers	lighting	Trees & plantation	Bridge gates & other structures	sheds	Kiosks & stalls	signage	Abutment and wall shape & placement	Stairs & ramps to riverbanks	Landmarks & sculptures	trash receptacles

Fig.(12): Bridge-scape elements of riverfront's bridge-scape

3. Field Study : A Vision of Living Bridges on River Nile

3.1. Riverfront's informality in Cairo

Cairo is one of the densest cities in the world, the urban population is underserved by parks and other public open space. The need for open space and the compelling attraction of the river is placed in sharp focus by a common sight on Cairo's traffic disruption along bridges. Families set up chairs and picnic on the sidewalks, overlooking the river and enjoying the open space, oblivious to the honking traffic that crawls besides them, because most of the river banks are fenced off from public approach, but those that are open to the public are heavily used by Cairo residents of all ages and all walks of life. The potential for human use of the river banks as open-space is enormous (Kondolf, 2011).

Over the past few decades, many of the Nile's riverfront has been systematically occupied by an assortment of private projects. Co-operatives or syndicates of many kinds, private owners and some governmental companies have occupied parts of the riverbank and built private clubs, cafeterias, restaurants or the like, where only members of the co-operatives or companies, or people who can afford private locations are allowed inside. This unplanned privatization of the riverfront has physically, visually and symbolically separated the Nile from the general public (Gabr, 2004a).

However, in recent years the Nile riverfront in the city of Cairo has experienced numerous changes in the form of designed projects to take advantage of the river's potential for attracting visitors and users by accommodating their various leisure and recreational, to reconnect its people with the river and to freely access the riverbanks. (Gabr, 2004b), still physical & visual blockage made by insensitive design of structures blocking the view of the Nile from the main street and sidewalk.



Fig.(13) Current situation of Nile riverfront (By researchers)

3.2. bridges on River Nile –places of public attraction

The number of Cairo bridges is Sixty Seven, mostly connects between the two shores of the Nile (Cairo and Giza) along about 50 km, also connecting the two banks, for example : Kasr Elnil (1875) ,October(1980), Zamalek Bridge (1907) and Abbas bridge (1908), July 26 (Aboul-Ela Bridge formerly 1909) and Galaa bridge (1911) and University Bridge (1957).

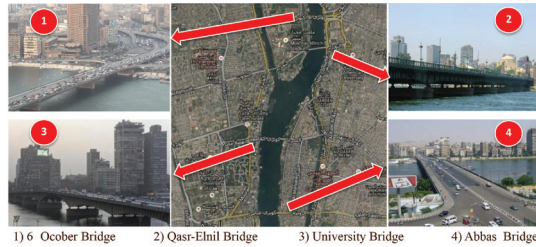


Fig. (14): Four bridges along River Nile in Cairo (Google earth & researchers)

Many Cairo bridges overlooking the Nile became attractive areas as open parks for the lay public, and became the most significant sites in the evenings, especially in, to search of a breeze, to escape from fatigue, stress, long working hours, as a place for some street vendors, grilled corn, such as Kasr al-Nil bridge, which is a very touch of beauty on the Nightlife, and is one of the favorite places for fishing, but the crowds it precludes the possibility of staying long. The 6th of October Bridge is characterized by relative calm, but the wedding processions gives him a very unique joy, as well as the University Bridge, also Abbas bridge has a familiar sights to see an open car doors overlooking of their owners who parked beside sidewalk and stand on to enjoy river night view.

3.3. Activities and events on bridges

The crowd on sidewalks became uncomfortable and to raise concern for public safety. Activities on Nile bridges varies from walking - exercise - View River - sitting in front of the river - having popularity lower-class Food & Drink - fishing - cycling - celebrations like weddings (Fig. 15).



Fig. (15): Different uses on riverfront's bridges (By researchers)

3.4. Informality of uses along Nile river bridges

After 25 January revolution, government is unable to enforce laws and regulations governing informality uses along river Nile's bridges completely. So when lay public escape from prepaid places along Nile riverfronts they find bridges along Nile also became engaged with Hawkers and street vendors who set plastic chairs as a usual scene on all bridges The unexpected pedestrian-excited vibration

when carrying a crowd of people has since come to light on a majority of bridges on River Nile. (Fig. 16)



Fig. (16): Informality uses on Nile riverfront's bridges (By researchers)

Asking the lay public using these bridges about the reasons made them use these bridges, some of them said "The bridge is the place to be for courting couples", an elder couple answered "We come for the breeze, the view, and to be far from the pollution", a bridal couple said that the wedding celebration on the bridge does not cost money but will be an excellent memory. Others said they enjoy the Nile view from bridges sidewalks because they can't afford prepaid parks on riverfronts. The majority decided that they are prevented from using riverfronts because the private uses or high fences, so they escaped to enjoy Nile view from the bridges but they also found the informal occupation by vendors which prevented them also from viewing the Nile. Some people complained of sidewalk pavement, and insufficient lighting, the sidewalk is not wide enough and lack security because of motor bikes, while random vendors use sidewalk as a sitting area and prevent people from Nile view.

3.5. Case study (Kasr El-Nil bridge)

Kasr Al Nil bridge is an icon of Cairo with its four lions on its east and west approaches, another Symbol of the revolution and one of its old bridges since the time of Khedive Ismail , it has got many tales about the city called Cairo yet I think its most important tale is how millions of Egyptians used it to cross from fear to freedom in 2011 in a historical scene. The Bridge is mainly for vehicles, with its architectural type construction, built with steel of 3360 ton, on large concrete piers. With total length 382m and 20m width, it connects downtown's Tahrir Square with Gezirah's Opera Square in Cairo; it offers a great view of the river, as well as landmark buildings, hotels, and other structures on the island.

After analyzing the user's needs and from site observation, the public use of the bridge was random; they adapt the space to enhance their needs. Considering that, we have some proposed solutions to change this informality into a new plan by adding terraces to the bridge for the pedestrian, such as a lower deck, and developing another parallel bridge to hold all kind of activities and festivals for public users. Fig. (17) Shows the proposed solutions to re-use Bridges urban spaces and change it into lively and pleasant areas, not only a way of connection.

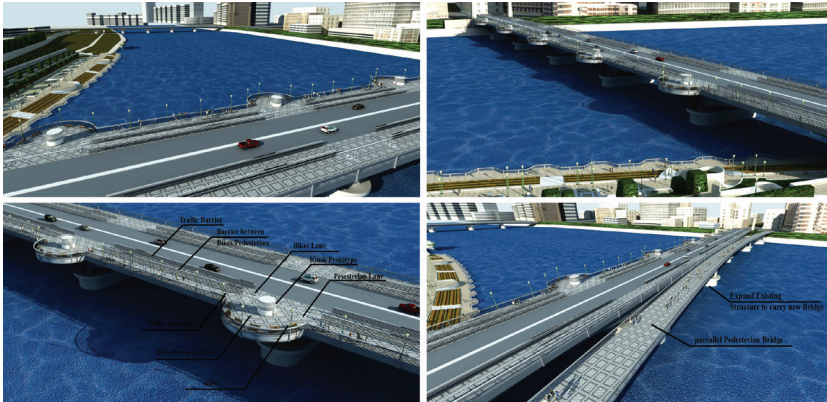


Fig. (17): Conceptualization of potential solutions to re-use Kasr El-Nil Bridge sidewalk's landscape (by researchers)

4. Conclusion

Bridge has to be considered as an architectural and urban form not only as civil work; a landscape-approach bridge design must be included. The role of Architects to adapt social aspects and aesthetics of bridges in the design process - beside the structural design- must be more consistent and in harmony with the surrounding urban environment. Meanwhile, public users have the right to access riverfronts from bridges, which not only a way of connection from one place to another, it should have a different aspect of transition which is livable, living or inhabited bridges.

The bridge-scape design has to be paid more attention in Egypt to meet public needs for urban spaces on river Nile. Making the bridges' sidewalk Safe, wide, walkable, comfortable, diverse and connected, expanding sidewalk and adding islands to sidewalk. Enhance pedestrian and bike paths or add ramps & stairs to underneath bridge, redesign lighting poles (heights, spacing, and shape), adding seats, build a prototype kiosks for vendors, considering safety barriers, considering signs, all of these can develop a lot of informality uses of bridges and change people's understanding of its use.

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