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BRIDGING THE MESSINA STRAITS

Topic: Architecture

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BRIDGING THE MESSINA STRAITS
An alternative design approach:
Habitable Bridge Avenues Combining Dwelling, Commerce and Transportation on Floating Platforms

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Abstract

'Bridge Avenue' approach is an ancient urban concept, generally applied to solve situations of urban discontinuity, mostly because of rivers and topographic raptures. The idea of 'Living Bridge Avenues' as generators of urban continuity between neighboring cities over marine straits is a modern and a novel one.

Bridging the Messina straits and integrating the urban entities of Messina and Regio di Calabria, Italy and Sicily, over a water expanse of 5÷7km's wide and 100÷200m deep, in the near proximity of the Etna, over a lane of ocean going carrier ships, is a great architectural, marine and structural engineering challenge, haunting Italian authorities for many decades.

The presently adopted solution of a hanging, ~3,3 km clear span bridge, at the most northern tip of the straits is and audacious, expensive and questionable.

The suggested conceptual bridging approach is in employing **bridge avenues, combining living and working urban environment with transportation and all the required servicing and infrastructures, supported on floating platforms, which, in themselves might sustain complementary attractive urban fabric, open public spaces and friendly pier environment.**

The proposal represents an alternative design strategy, applicable to a wide range of similar situations around the world, is especially suitable for the proposed case-study of the Messina straits because of its earth-quake resilience, although the main reasoning behind the solution is in the following: The generated bu±ilt assets of the bridge avenue and the supporting floating platforms (for rent or sale), free from real estate costs, generate enough revenues to cover all (or most) of the costs of the incorporated traffic-transportation solutions over the straits.

The paper considers architectural, structural, marine engineering and construction, logistics and management and delves into aspects of cost-effectiveness of the proposed solution and suggests its applicability to the general universal problem of the strait bridging.

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Bridging The Messina Straits, An Alternative Design Approach: Habitable Bridge Avenues Combining Dwelling, Commerce and Transportation on Floating Platforms

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Abstract

'Bridge Avenue' approach is an ancient urban concept, generally applied to solve situations of urban discontinuity, mostly because of rivers and topographic raptures. The idea of 'Living Bridge Avenues' as generators of urban continuity between neighboring cities over marine straits is a modern and a novel one.
Bridging the Messina straits and integrating the urban entities of Messina and Regio di Calabria, Italy and Sicily, over a water expanse of 5÷7km's wide and 100÷200m deep, in the near proximity of the Etna, over a lane of ocean going carrier ships, is a great architectural, marine and structural engineering challenge.
The suggested conceptual bridging approach is in employing **bridge avenues, combining living and working urban environment, with transportation and all the required servicing and infrastructures, supported on floating platforms, which, in themselves might sustain complementary attractive urban fabric, open public spaces and friendly pier environment.**
The proposal represents an alternative design strategy, applicable to a wide range of similar situations around the world, is especially suitable for the proposed case-study of the Messina straits and that for the following reasons:

1. Fof its earthquake resilience.
2. The generated built assets of the bridge avenue and the supporting floating platforms (for rent or sale), free from real estate costs, generate enough revenues to cover all (or most) of the costs of the incorporated traffic-transportation solutions over the straits.
3. The living bridge avenues may promote the union of a new metropolitan entity, combining the resources of Regio di Calabria and Messina, and benefitting both.

Introduction

'Bridge Avenue' approach is an ancient urban concept, generally applied to solve situations of urban discontinuity, mostly because of rivers and topographic raptures. Most celebrated examples are those of the Ponto Vhecio (Florence) and to a lesser degree, the Realto (Venice) and the commercial bridge of Bath (England). History knows of numerous living bridges over the Seine in Paris (the Pont du Notre Dame) and

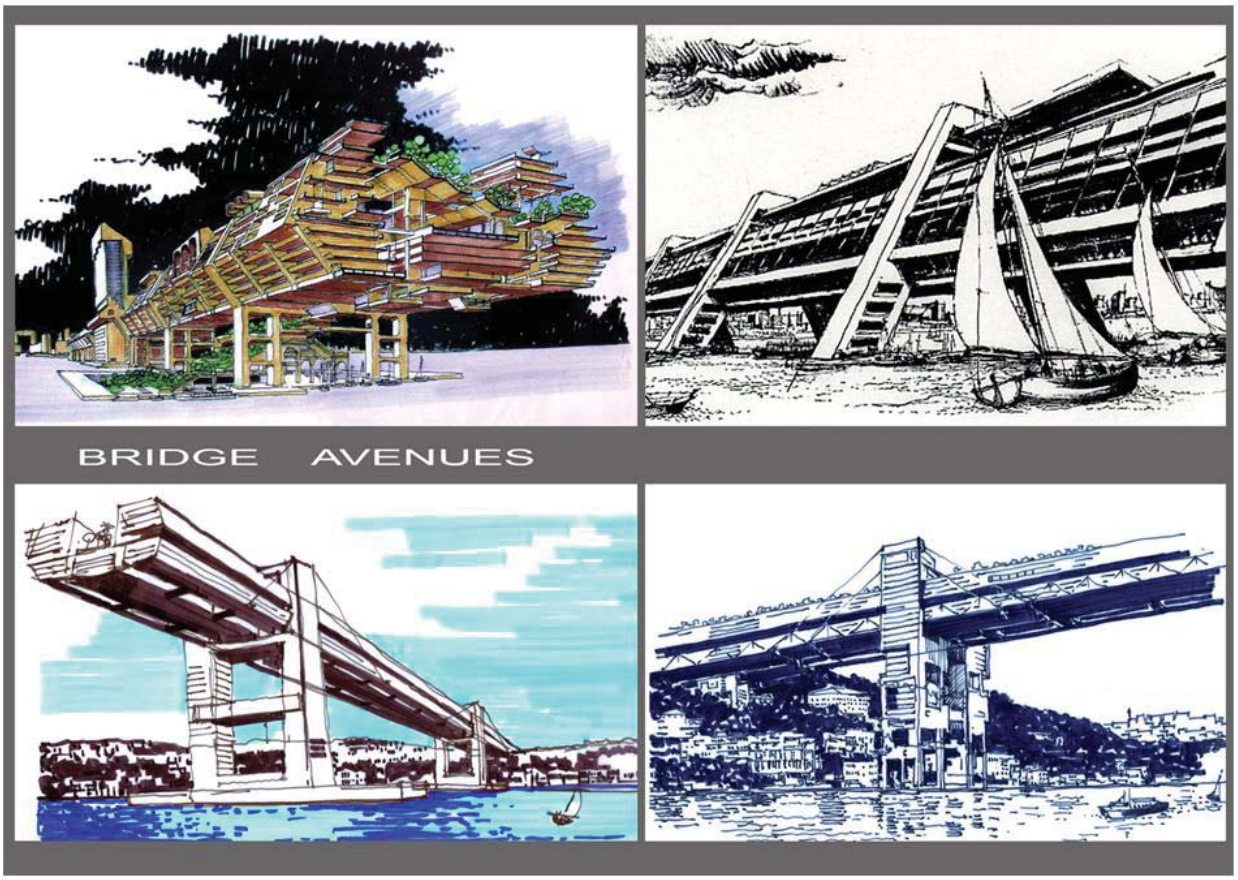
over the Thames (the London Bridge), all of them just a memory and a testimony to our blindness at the time of their demolition, because of lack of awareness to their charm and historical importance.

The idea of 'Living Bridge Avenues' as generators of urban continuity between neighboring cities over marine straits is a modern and a novel one.
It is meant to solve a universal problem of cities, on two opposite shores of water expanse straits which are glaring at each other and dreaming of a union, with the **best of motives, social-economic-political.** Growing urban densities, swelling metropolitan urban sprawls, sky-rocketing real-estate costs and prospects of sharing in infrastructures, will turn it into a profitable enterprise.
Bridging the Messina straits, joining (at long last) Italy and Sicily, with 'dry' transportation means and integrating the urban entities of Messina and Regio di Calabria, over a water expanse of 5÷7 km's wide and 100m÷200m deep, in the proximity of the Etna, over a lane of Ocean going carrier, ships is a major marine and structural engineering challenge and an audacious urban-architectural mind-provoking aspiration, haunting Italian authorities for many decades. The presently adopted solution of a hanging ~ 3,3 km clear span bridge, at the most northern tip of the straits is and audacious, expensive and questionable, at best. [1], [2].

A cable hanging bridge, with 400m high support towers and middle span water clearance of 70m high, with a clear span of 3300m, leaves a hanging bridge with **structural height to span** ratio of 1:10 only, not to mention the proximity of the Etna and its vicious historical record of high magnitude eruptions and destruction.

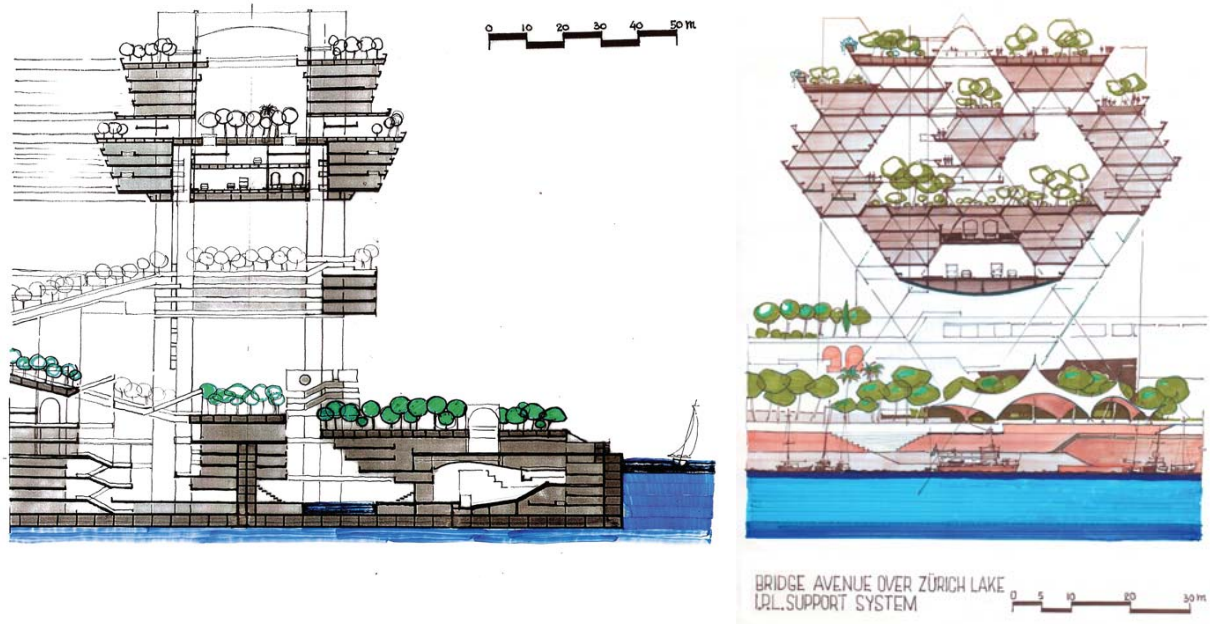
The Alternative Conceptual Approach Solution

The suggested conceptual bridging approach is in employing **bridge avenues, combining living and working urban environment with transportation and all the required servicing and infrastructures, supported on sizable floating platforms which, in themselves might sustain complementary attractive urban fabric, open public spaces with friendly pier environment** and bustling, colorful marina compounds.

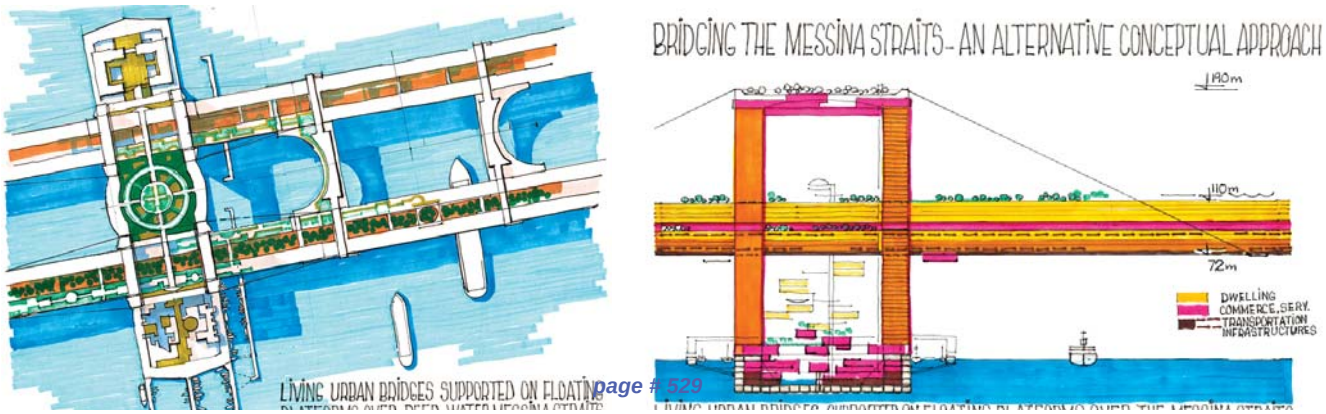


The proposal represents, an **alternative design strategy** and conceptual approach, amounting to no less than a paradigm shift and a **drastic departure from the existing axiomatic definitions of conventional urban development solutions:** No land parcelations and no familiar land ownership patterns and the resulting 'interior politics'. No historic memories and architectural heritage preservation constraints and no existing biotic mass and geographic-topographic dictates, but just a **blue 'tabula rasa'.**

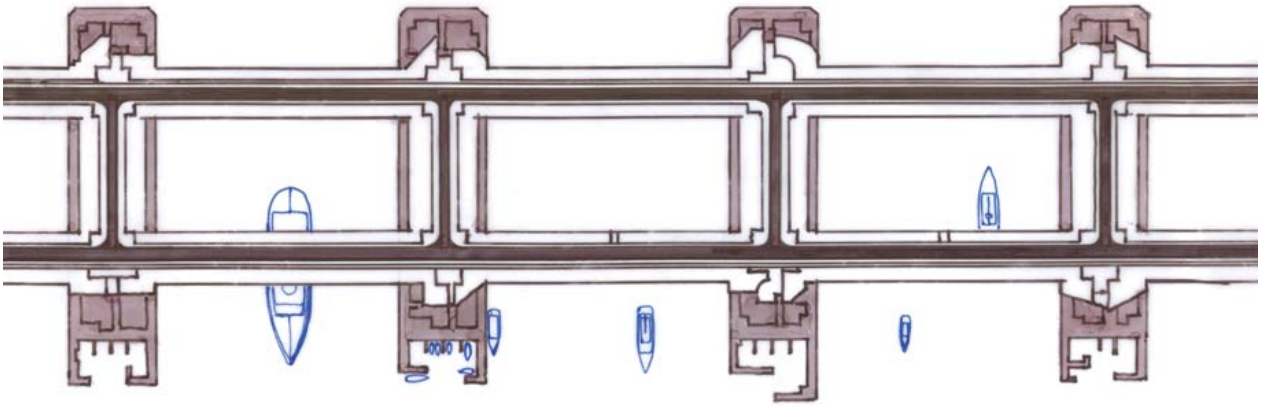
Given the contemporary technology developments in bridging and marine engineering mega-floats and mooring and anchorage solutions, what is holding back such projects is only our lack of imagination. [3], [4].
The proposal applicable to a wide range of similar situations around the world, is especially suitable for the proposed case-study of the Messina Straits, because of its earth-quake resilience, although the main reasoning behind the solution is in the following: The generated built assets of the bridge avenue and the supporting floating platforms (for rent or sale), free from real estate costs, generate enough revenues to cover all (or most) of the costs of the incorporated traffic-transportation solutions over the straits.

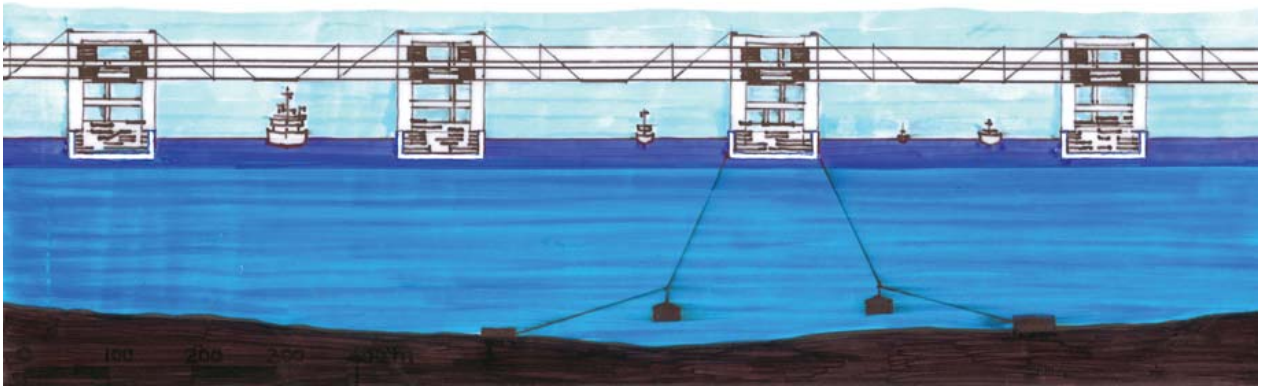


The solution envisages a living bridge with 6÷8 story dwelling mass and 2÷3 stories of commercial and working space volumes, agglomerated around a linear pedestrian-public mall, with vehicular and rail transportation (and parking) and supply-removal installation infrastructures below (see cross section) and roof-sky green promenades above. To ensure some urban articulation, a stretch of two parallel, interconnected living bridges and pedestrian malls, 150m ÷ 200m apart, simulating a horizontal ladder like structure, hovering 50m÷70m above the sea level, is suggested.



The floating platforms, about 120m wide and 500m long, with an interior depth of 15m÷25m below the pier level, are solved to carry two volumetric tower pairs, the supports of the living bridge avenues above, and in themselves housing 30÷35 stories of apartments and office space for mechanical, as well as social-recreational-educational and health related infrastructures, together with public open spaces and appropriate volume and spread of green bio-mass. [5]
The platforms will be spaced ~ 300m apart, except in places intercrossing with the major shipping lanes, where broader water stretches will be required,



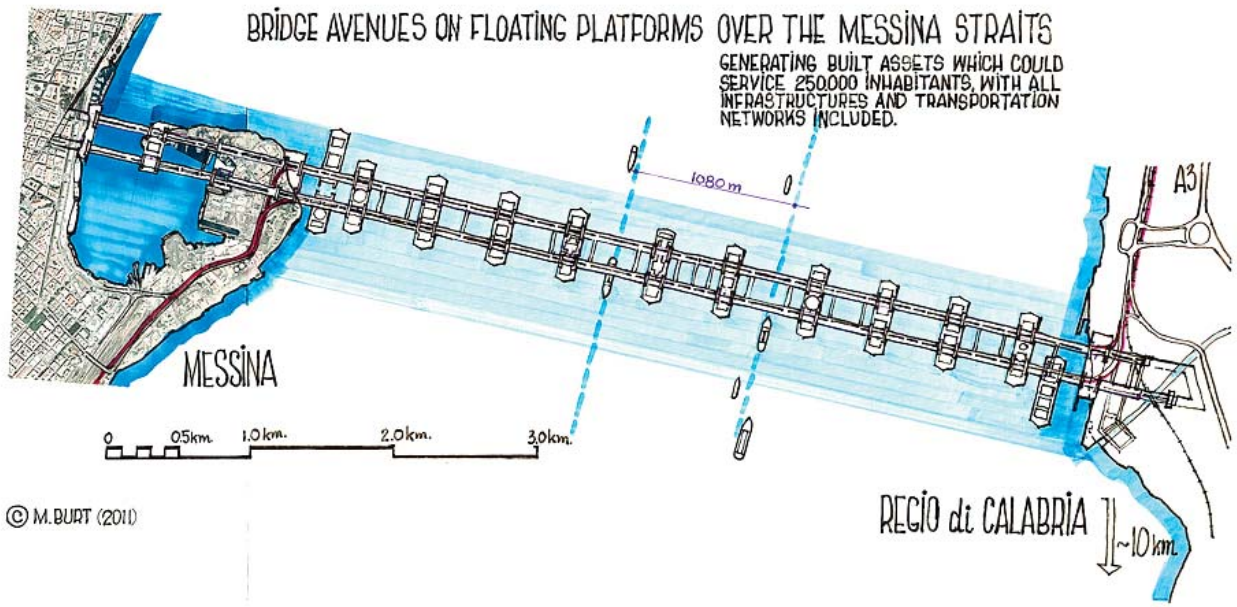


Quantitative aspects of the proposition

Programming the volume of the development may carry us into a wide range of pre-suppositions. The overall dimensions of the bridge avenues, the carrying support towers and the floating platforms, their number, their dimensions and utilization rates. But undoubtedly the predominant and the most deciding factor will be the overall length of the bridge avenues, as dictated by the specific location choices of the bridge, vis-à-vis Messina and Regio di Calabria

On the basis of very preliminary programmatic pre-suppositions and design considerations and a very scanty familiarity with the local data, a location was chosen, joining the center of Messina (Corso Garibaldi and via Vittorio Emanuel II) and south of

Catona on the Calabrian side, resulting in an overall length of about 7000m.



After deciding on rates of utilization and densities, which still preserve the urban and environmental attractiveness and well being, the following numbers emerge:
For every length-wise meter of the bridge avenue project we can generate
1200 ÷ 1400sq.m of built floor assets, for rent or sale. For 7000m of the entire project the gain is about **8.400.000sq.m ÷ 9.800.000sq.m,** transportation infrastructures not included.
When summed up and manipulated, these built assets may provide an urban habitat for approximately 250.000 inhabitants, with all the required infrastructures and servicing and public open spaces, and a sizeable floor space of business offices. [6], [7]
On top of that, the bridge avenues may provide about 850.000sq.m for transportation, about 40% of it for through-traffic of cars, automobiles and trains.
Great effort should be invested in mechanical traffic solutions (moving pavements, escalators, elevators and light electrical trams) to reduce dramatically (to a point of abolishing it) the reliance on private vehicular traffic within the bridge avenues bounds.
It is clear that the project will have to resolve many more critical problems relating to architectural-urban design and execution logistics, providing for staged completion and habitability along the process. Many marine and structural engineering and construction issues of the platforms, their contents and the bridge avenues above (complex anchorage solutions included) will have to be approached and resolved, as well as economic optimization and cost-effectiveness analyses conducted.

But, on the basis of preliminary conceptual evaluations, it is reasonable to assume that generating more than 20sq.m of commercialized built assets for every sq.m which is necessary for the through traffic, no public funding will be required.
It is also reasonable to assume that once the bridge connection over the straits will be established, it will generate a great uplift in the regions economic activity, generating in the process employment positions and opportunities and a dramatic surge in the demand for habitable space, thus fulfilling the rational and justifying the concept of the living bridge avenues project.

In conclusion

The bridging of the Messina Straits, with all the geographic-batimetric-geological-seismic uncertainties mostly, because of the proximity to the Etna), make conventional solution strategies questionable at best, and critically dangerous and costly, so as to encourage “out of the box” alternative conceptual approaches.
The Living Bridge Avenues On Floating (sizable) **Platforms** represent such an alternative design strategy and concept.
The most conspicuous aspect of this multi-disciplinary enterprise is its design and execution complexity. Many related issues remain to be researched and resolved, concerning its geography, architecture, regional planning, engineering and economics.
Deciding to live with the ‘complexity scare’ and sorting through the simple glaring facts, it is plausible to conclude that the concept is justified on engineering grounds: resilience against earth-quakes, and considerably shorter (and therefore cheaper) spans. On economic grounds: private buying power and economic resources may finance the desired transportation project, and the built habitable assets (real estates cost-free), may serve the regional surge in housing demand while contributing, in a very substantial way, to metropolitan development and expansion, based on the combined resources of Regio di Calabria and Messina.

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