DISMISURA
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45th International Conference
of Representation Disciplines Teachers
Congress of Unione Italiana per il Disegno

Inhabited bridges. Connecting drawings from Ronda to Venezia

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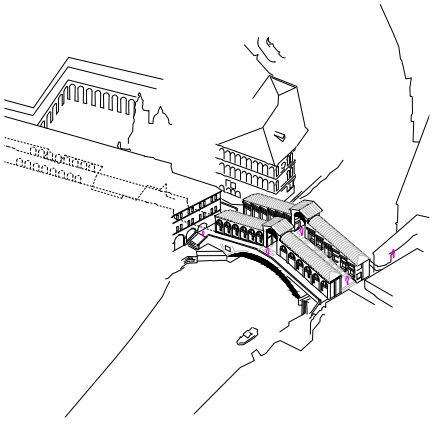
Abstract

Inhabited bridges are a constant typology in the historic centres of medieval cities, from the Spice Merchants' Bridge in Erfurt to the *Ponte Vecchio* in Florence. Including the countless bridges with their respective continuity features in Venice. An urban fabric stitched together by the infinite cities of Italo Calvino. Its graphic representations are the witness that reaches our days to build a cartography of bridges inhabited throughout history. Their timelessness has projected examples that transcend the imaginary to sew a continuous fabric in the public space of our built environments. In the last two decades, cities such as Paris and London have launched competitions for inhabited bridges, demonstrating the interest in these typologies today. The aim of the research is to select and draw, with the same system of graphic representation, some of the bridges that are part of the scenery of our cities. Dialoguing with poets who have taken up the thread with them. Understanding what are the underlying strategies in the construction of the city "*su misura*". City models that include the compactness of uses and the synergy between infrastructure and domesticity in a necessary dialogue between scales.

Keywords
habitable bridge, tailor-made infrastructure, invisible cities, axonometric



The Rialto bridge in Venice. Drawing by the author.

doi.org/10.3280/oa-1180-c610

Introduction

Italo Calvino's *Invisible Cities* (1972) has XVII bridges in its literature of cities, from Cities and Desire to Continuous Cities III. In them we find an imaginary of real and utopian bridges from literature to architecture and vice versa. We cross the drawbridge in Dorotea; we fish with a rod from the bridge in Tamara; we cross the bandstand where the bridge is located in Maurilia; we wander through corridors, staircases and bridges in Ipazia; we discover the marked bridges that arch over the canals in the conversations between Kublai and Marco Polo; we crossed the convex bridges and the suspended streets in Smeraldina; we observed the gradients of bridges and their variations from pilasters to suspension bridges, passing through the caper bridges in Phylides; we discovered the wooden bridges supported on trestles or hanging from cables in Thecla; we walked on the light and very long bridges at the Golden Gate of Jericho, Ur, Carthage...; we saw the three bridges of the three bridges of the city of Carthage... We saw the three bridges of Procopia, the one overlooking the moat, the serbo tree and the agricultural landscape, the bridge full of squatting, round-faced men, and the bridge where it is traditional to straddle. In the same way, Federico Garcia Lorca connects us with the bridges in his "Ode to Walt Whitman", weaving in turn the connection with the next bridge in the research, the new bridge.

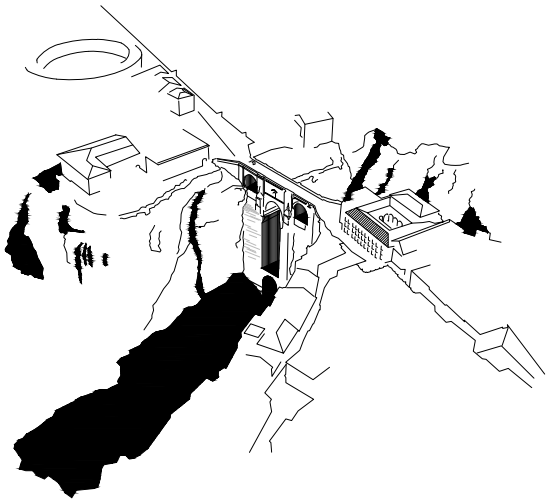


Fig. 1. Habitable bridge in Ronda, axonometric drawing. Elaboration by the author.

Methodology

The methodology carried out in this research has been mainly qualitative in nature. The selection criterion has been to detect six habitable bridges in the European context with special emphasis on detecting a cartography of its own.
Based on the selection of two cases on the Italian peninsula and one on the Iberian Peninsula, to connect the six selected points through poems related to bridges, passing through Germany and the United Kingdom with Bath and London. The graphic language used is based on the line and the monochrome character of the poems. This graphic identity has been created from the reinterpretation of the bridges in axonometric system with the same language to be able to compare them with each other and create a specific narrative related to the intrinsic experience of the infrastructure.

"Along the East River and the Queensborough
the boys wrestled with industry,
and the Jews sold to the river faun,
the rose of circumcision
And the sky flowed across the bridges,
and rooftops herds of bison driven by the wind.
[...] That one too! That one too! Dyed fingers
point to the shore of your dream,
when the friend eats your apple
with a faint taste of gasoline
and the sun sings through the navels,
of the boys who play under the bridges."
[Federico Garcia Lorca 2008]

From odes to (habitable) bridge poems: a graphic cartography

Among the boys from Lorca who play under the bridges we find the mimesis bridge or new bridge (fig. 1) which was considered, until 1839, the highest bridge in the world.
The new bridge, located in Ronda, spans the gorge of the Guadalevín river and is a bridge infrastructure that is a habitable bridge.
It is an example of a literary bridge and a work of engineering of great magnitude, spanning a height of 98 metres in the rocky landscape of a deep gorge. A variable landscape that defines each of the bridges that can be inhabited.
The habitable bridge could be defined as a sum of layers and uses of the city. According to Dethier and Eaton [Dethier, Eaton 1991] it is an "instrument of reconciliation" between engineering, architecture, and city planning. It could be a connecting tool between humanism and technology. It is a "prosthesis" defined as a part, device or substance that is placed in the body to improve one of its functions.
While the general concept of "prosthesis" is the procedure by which the lack of an organ or part of it is artificially repaired. In this case, the prosthesis is a domestic infrastructure that improves the functions of the city.
The habitable bridge can also be framed as a parasite that connects custom-made scales, from the macro to the urban scale to the micro-domestic grafts in the skin of the bridge.
The Vasarian corridor (fig. 2) is an urban continuum composed of the route of the *Corridoio Vasariano*. Parasitizing and creating a continuum from the *Palazzo della Signoria*, passing through the *Palazzo Vecchio*, the Uffizi Gallery, the galleries along the Arno River, the *Ponte Vecchio*, the Manelli Tower and the Church of Happiness until reaching the *Palazzo Pitti* as the last connection. With exits from the *Palazzo* itself and through the *Boboli* Gardens, its urban continuity is a forceful, timeless design strategy.
The old bridge was designed by Taddeo Gaddi in 1345 and the *corridoio vasariano* by Giorgio Vasari in 1564, commissioned by the Medici.
It was the catalyst for providing a passage from the residences in the Pitti Palace to the administrative offices across the Arno River in Florence. "Typological, approach" is the habitable bridge *Ponte Vecchio*, which was constructed in 1345 in Florence, Italy.
This bridge is considered a main reference point in this research to understand the "system" concept of domestic infrastructure as a permanent structure and as an adjustable domestic and commercial mixed-use assembly [De Jorge Huertas 2018].
This urban complex, or "city in the city", is, in addition, a habitable bridge and allows the function of a horizontal skyscraper, ground-scraper or cloud built in the 14th century.
The Vasarian corridor inserted in the *Ponte Vecchio* is a living, inhabitable bridge with trade and houses parasitizing the bridge.
This trade originally consisted of butchers' shops, fishmongers' shops, and other essential goods, and it was not until 1593 that jewellers' shops replaced them. This programme is the same today. As the succession of layers in the figure (fig. 2) shows, the *Corridoio* acts as a horizontal terraced platform connecting *Palazzo Pitti* with *Palazzo Vecchio* across the *Ponte Vecchio* and constructing a horizontal lozenge, the Uffizi Gallery, as a street in the air.

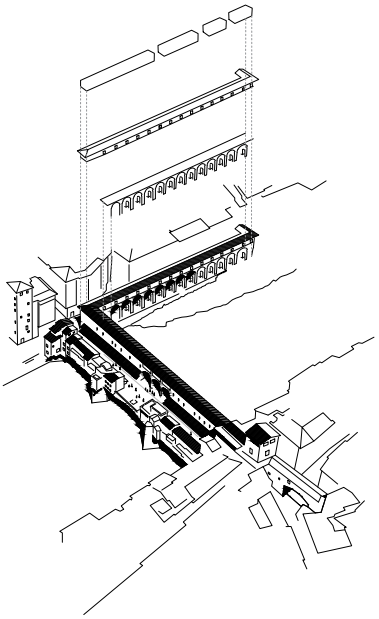


Fig. 2. Habitable bridge of Florence, *Corridoio Vasariano*. Elaboration by the author.

The Rialto Bridge in Venice (fig. 3), on the other hand, acts as a catalyst for movement. It allows the flow of activity to be channelled in the direction of the bridge, but also within the bridge in meandering directions between the stalls. At present, they are focused on jewellery and jewellery and tourism. This urban infrastructure allows us to create a debate around heritage and its relation to urban pieces that should serve its citizens and not, or not only, the underlying tourism in a city like Venice. In the odes to bridges by both Federico Garcia Lorca and Jorge Luis Borges, a parable and connection between bridges and the cities we inhabit permeates. Thus, Borges states:

"The first bridge of Constitución
and at my feet
the clatter of trains weaving labyrinths of iron
Smoke and whistles climbed the night,
that all at once was the Universal Judgement".
[Borges 1964, poem "Mateo XXV, 30"]

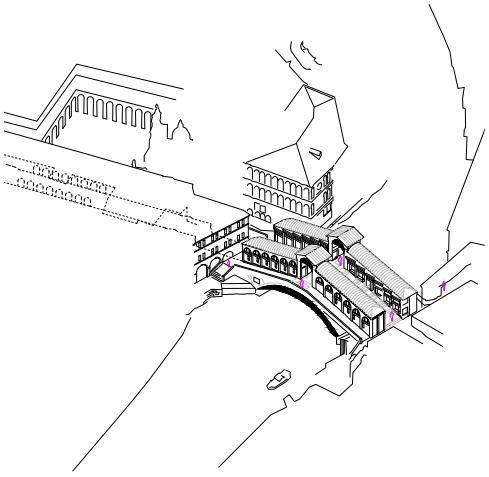


Fig. 3. Rialto Bridge. Elaboration by the author.

"Marco Polo describes a bridge, stone by stone.
-But what is the stone that supports the bridge? -asks Kublai Khan.
-The bridge is not supported by this stone or that," replies Marco, "but by the line of the arch they form.
Kublai remains silent, pondering.
Then he adds: "Why are you talking to me about the stones? It is only the arc that matters to me.
Polo replies: "Without stones there is no arch".
[Calvino 1972, The Cities and the Dead. 1]

In this succession of arch lines, but in another geographical context, with a similar design strategy, is Pulteney Bridge in Bath, built in 1773 by Robert Adam. It is 40 metres long and has two very different facades. As the figure (fig. 4) shows, on one of the façades, which is domestic in character, the houses are hung in the form of heterogeneous and personalised grafts. On the opposite side, of a monumental nature, a homogeneous stone façade, in the manner of a doorway from classical antiquity, forms the entrance to the city.

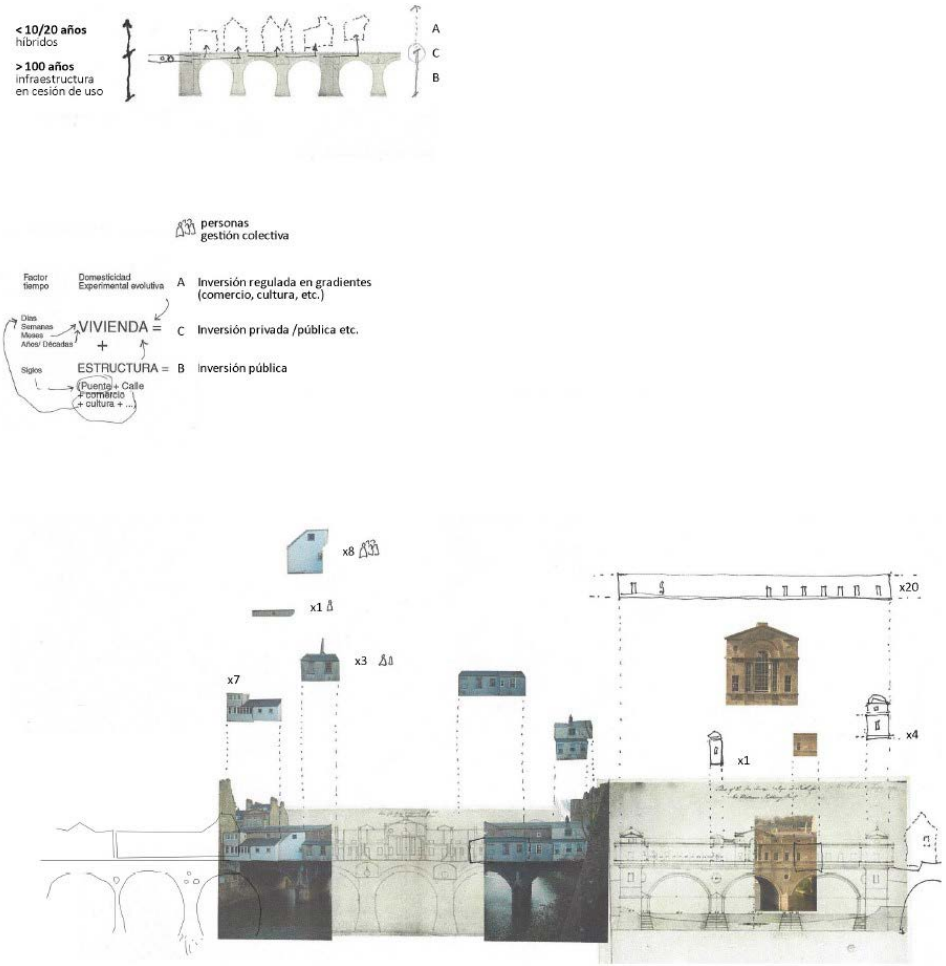


Fig. 4. Habitable bridge, concept. Elaboration by the author.

Over a long period of time, a large number of architectural studios have created new prototypes in paper projects of habitable bridges, from Louis Kahn in Venice, Le Corbusier in Rio de Janeiro with his "city bridge", OMA in Lille, the Nouvel atelier on the river Seine, or Italo Calvino in his "Cities and Signs":

"Other signs warn of what is forbidden in a place:
to enter the alley with the wheelbarrows,
urinating behind the kiosk,
angling from the bridge,
and what is lawful:
giving water to the zebras,
playing bocce ball,
burning the corpses of relatives".
[Calvino, Cities and Signs. 1]

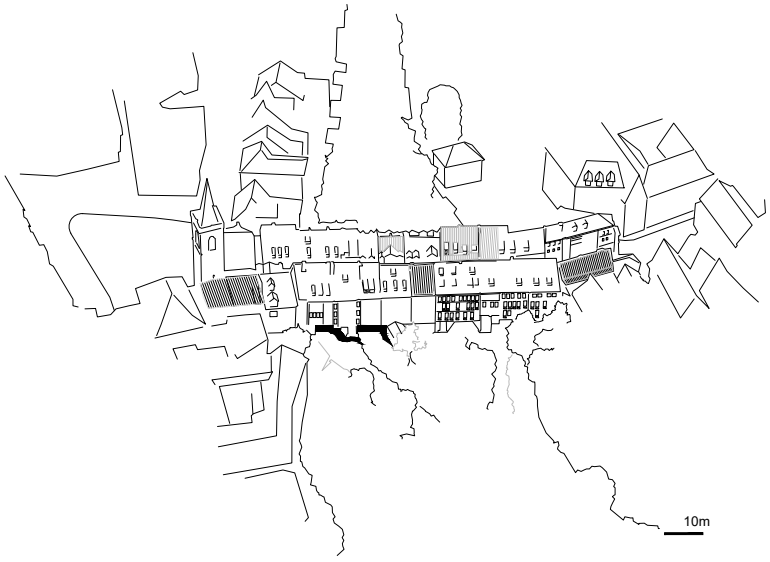


Fig. 5. Habitable bridge of Efeurt, aerial perspective. Elaboration by the author.

In relation to the contemporary approach to habitable bridges we have the *Autostrada del Sole*. The longitudinal route of the *Autostrada del Sol*e, or the A1 motorway, which runs north-south in Italy, allows us to see the grafts or parasites of the habitable bridges of the 'Pavesi' restaurants over the road. Built in the 1960's by means of a simple linear bridge, they are placed on two arcaded legs above the road, connecting the Veneto with Apulia. From an architectural point of view, the habitable bridge can be mobile if it is based on a continuous horizontal linear vertebra with a point of movement as in the specific case of the Galata in Istanbul (Galata Köprüsü).
This habitable bridge is open 24 hours a day over the water. It was designed by the German structural engineer Fritz Leonhardt, known for the development of cable-stayed bridges.
The Galata Bridge accommodates roads and paths on top connecting the banks of the estuary called the Golden Horn. The platform, or plinth, includes commerce along its entire length, and is the connection linking historic and contemporary Istanbul.
The 490-metre-long bridge was reconstructed in 1992, although the first connection of the Golden Horn dates to the 15th century in Byzantine times. In 1912 the Galata was moved to its present location. Its construction and structural model are based on a steel bascule bridge with a 42-metre-wide, 80-metre-long drawbridge span.
The bridge has a dual connection: two platforms, one on top of the other, parallel and linear, with their respective separation of road traffic on the upper part and pedestrian paths with shops and various activities on the lower platform.
London's bridges have one of their earliest visions in the drawings of Anthony Van den Wyngaerde in the plate "London, Westminster, and Southwark, in 1543" in which the drawing

of the "Bridge-House" is detailed (fig. 6). While Manterola (1997) tells us about the deconstruction of Zaha Hadid or Libeskind's projects for the Thames five centuries later because of an exhibition and subsequent competition held in 1996 under the title "Living bridges: the inhabited bridge, past, present and future" [Murray, Stevens, Cadman 1996]. This exhibition focused on showing the evolution of the typology of the inhabited bridge. On the other hand, and, following in the wake of the habitable bridges and their possibilities, Steven Holl's team proposed a bridge of houses for the city of New York in 1979, while Bernard Tschumi's studio designed the bridge city in 1988 for the city of Lausanne, with references such as the ancient London bridge of 1200 or the Rohan bridge in 1336, medieval habitable bridges. The three countries in which they were most developed were Italy, France, and England.

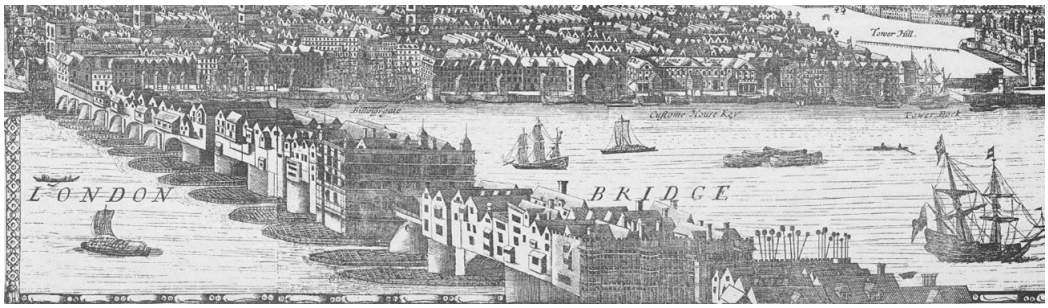


Fig. 6. William Morgan, detail of the "Bridge-house" on London Bridge in a panoramic view of 1682 [London Topographical Society, 1904].

Florence's *Ponte Vecchio* or Venice's stone mask, the *Rialto*, are two centuries-old living examples. In today's search for an intermediate 'urban type' and '*su misura*' between the creation of a city block, the city block itself and the passage of an infrastructure, the habitable bridge is found as an existing 'anti-typology'.
This is what the American architect Steven Holl calls the hybrid [Fenton 1985; Fernández-Per 2009], an "anti-typology". If the hybrid is an "anti-typology" and the habitable bridge is a "new" (forgotten) typology, what is the 'actual' habitable bridge?
The case study in Zurich, Kalkbreite, is a prototype of this [De Jorge Huertas 2019], a contemporary habitable bridge as a 'new anti-typology', or 'typology' borrowed from the world of civil engineering.

Conclusions

The habitable bridge is a hybrid topological typology (or, anti-typology), combining the support of a macro-scale infrastructure with a continuous medium-scale public street, commerce and intermediate spaces of diverse uses, scales and interactions, whose change is produced by collective needs. Finally, as shown in the figure (fig. 2), there are the bespoke, micro-scale spheres, whose mutability and dynamism are linked to the user and their intimacy, their private, domestic and appropriable space.
The spheres are connected by a threshold and a collective corridor.

"In an instant it forges and breaks,
the bridge that goes from the smile
to the broken lightning of anger,
of the beatific madwoman who holds
like a phallus holding a rose in the air
to the car that passes slowly, black,
patrolling the stealthy street".
[Vitale 1992]

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To cite this chapter: De Jorge Huertas Virginia (2024). Inhabited bridges. Connecting drawings from Ronda to Venezia. In Bergamo F., Calandriello A., Ciammaichella M., Friso I., Gay F., Liva G., Monteleone C. (Eds.). *Misura / Dismisura. Atti del 45° Convegno Internazionale dei Docenti delle Discipline della Rappresentazione/Measure / Out of Measure. Transitions. Proceedings of the 45th International Conference of Representation Disciplines Teachers*. Milano: FrancoAngeli, pp. 2761-2768.

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Isbn 9788835166948