

THE VOLPONI'S KILN IN URBINO. INDUSTRIAL ARCHEOLOGY AND HISTORIC LANDSCAPE IN THE CRADLE OF THE RENAISSANCE. DOCUMENTATION, SURVEY AND DRAWING.

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ABSTRACT:

The Volponi's kiln is an historic brick factory placed at the Urbino city gates, in the middle of an imaginary line that links the Santa Chiara's convent and the St. Bernardino's church. Both these two buildings frame this important industrial archaeological object and make of it the bridge between the historic centre and the surrounding countryside. The kiln is really the key to the reading for all the landscape that accommodates the cradle of the Renaissance.

The sight and the perception of Urbino, for those who come from the valley bottom, are strongly marked by the kiln itself; this extends its chimney towards the ancient city walls in a way that resembles an historical competition of strong symbolic value with the Torricini of the Ducal Palace. The former is the symbol of the unstoppable rise of the new industrial production; the latter is the symbol of military power, almost worn and bowed to the sophisticated and intellectual society of the new urban and Renaissance culture, which was given back in its delicate shapes by the Laurana courtyard.

Thanks to the surveying of this factory we want to understand its role and its relations with the city and the landscape. In this way, the work is a part of a wider remark on the heritage of the industrial properties; this heritage, in sociological and traditional respects, represents the possibility of the recovery of recent history events that have been entrusted to the memory of those who inspired industry with their work.

INTRODUCTION

The first productive settlement in the area dated the second half of 1800, but only in the year 1908 there is news of the acquisition by the Volponi brothers of a "kiln with a square in order to make bricks and accessories". Since the first installation, due to a German physician, it showed innovative features as concern the region around Pesaro because it had a Hoffman kiln that let it to optimize the production both quantitatively and qualitatively. To this day it's clearly understandable how the establishment developed starting from the row of the kiln gallery (of elliptical shape) with the following addition of three almost-orthogonal arms, divergent with respect to each other that lengthen almost to catching the hill at the back.

The production activity of the Volponi's kiln lasted till 1971. After 30 years of being in a state of neglect, the great building that covers a surface of approximately 1400 square metres (or 12600 square foot), appears nowadays in a serious state of deterioration, with some collapses of the vertical structures and cave-ins of lofts. The imposing chimney and the sloping walls of the gallery that are already visible from the outside through the double grid of columns in the colonnade, make this architectonic object both charming and recognizable. Another beauty lies in the kiln events that can be entwined with the life of the writer Paolo Volponi, actually the son of one of the owners.

Comparing the uniqueness of this artifact and the particular historical and landscape background with its actual conditions poses the pressing question of documentation, knowledge and recovery, in the scheme of a new reading and a new interpretation of the historic landscape of Urbino. Moreover, the area occupied by the Volponi's kiln has a strategic importance



Figure 1. Aerial view of the Volponi's kiln

for the town, because it is an extra-urban area under all points of view, but it's very closed to the city walls, by the junction between the main thoroughfares that connect Urbino to the main surrounding towns. This happy situation, as concern the road network, makes of the kiln the centre of all the present and future set routes around the city of the Marches. The actual possibilities of development and the location of the kiln in the area of the disused railway Fano-Urbino (that was the main element for the productive activity too), oblige to make wider remarks on the flows that the artifact witnessed and that can call back.

Because the main part of the records of the Volponi's kiln has been lost, the primary mean of improvement is the survey. After overcoming the obvious difficulties in getting closer to a site in such a state of neglect, the survey with theodolite has been complemented with photogrammetric instruments and the use of GPS devices. As concern the connection of the area with the relative coordinates of the national network IGM of

topographical points, according the Gauss-Boaga reference system, GPS site measuring was made with Differential Positioning, whereas the DTM realization has been done through a cinematic survey with differential GPS and with a sampling every three seconds. Two GPS TOPCON Legacy, tuned to the reception of L1-L2 frequencies, have been used for this work. For the striking sites a stop-and-go survey has been done, using the Legacy as a GPS master station and the GSM 2 as a rover tuned only to the reception of the L1 frequency.

Thanks to the drawing (or better the redrawing) of this artifact we want to create the conditions for its return to the city.

Besides, the responsibility to protect and pass on this property is more exactly connected to the architectonic value not only of the artifact itself but also of the buildings around it. Knowing that it is a factory for building, the kiln constitutes a potential bridge towards the historic architecture of Urbino too, as the renovation works of the Ducal Palace testify, when bricks expressively made by Volponi's Factory, with an engraved flower, were used for the floor.

With the knowledge, documentation and redrawing of the Volponi's kiln we hope to animate the debate over the industrial archeology, giving some guidelines for the design and the compatible reuse. In defining the intervention hypotheses for a project overview, we cannot neglect the references to the proposals that arose from the ILAUD workshop organized by Giancarlo De Carlo and then enhanced by the Land Use and by the Specific Plans signed for it.

1. HISTORY AND RELATIONSHIP WITH THE LANDSCAPE

The four Volponi siblings decided to buy a little kiln to make bricks and similar accessories near Castagneto, along the highway Urbino-Fano, in 1908.

This kiln has been existing for years because it was built by a German doctor name Uckmar around 1800; he built it for the creation of bricks used to build bridges in areas near Urbino.

It's known that Volponi's already had experience with the production of bricks because they already had two kilns before becoming the owners of the one in Urbino. The type of firing they have been using so far was rather primitive, because the kiln was made up by an underground ring filled with rare material and covered by timber for nine-ten days.

On the contrary, in the new kiln there was the Hoffman oven, which contributed to improve both the quantity and the quality of products, speeding up all the operations from the clay excavation to the transport of the completed bricks.

As for the greater part of kilns with this type of firing, the core of the building was made up by a tunnel constituted by two parallel straight frames jointed at the ends with two semicircular channels; the tunnel was essentially the firing room and was divided in many compartments, each of them with a door connecting the indoors with the outdoors and a pipeline that headed towards a collector near the central fireplace. The feeding was done thanks to canals on the vault of the roofing and the draft was done thanks to openings at the bottom, near conduits equipped with valves.

The "Volponi" was a real factory in those days, but it didn't have much trust and had to close. Beyond any doubt, it was one of the few industrial realities of the city. With its work, it contributed to develop a new working-class, giving momentum to the renewal of the city itself.

Paying attention to the choice of the clay, the Volponi factory could offer its materials made with the same process of the former times. For this reason the Volponi was involved in the

restauration of the city walls and the Ducal Palace, and for the latter it created floor bricks expressly made: they are square bricks with an engraved flower.

Volponi always stood out on the market as a manufacturer of a wide range of high-quality products, with 45 different types of bricks. Because Volponi didn't specialize on the production of one particular type of bricks, it struggled to compete with the big industries that were more technologically advanced in the 60's. Moreover, the much lower competitive prices and the introduction on the market of machines that made bricks similar to the hand-made ones, doomed the Volponi Company, which didn't manage to produce at low cost because the production was hand-made. Incapable of creating a competitive strategy, it preferred to close in 1971.

The Volponi kiln is placed inside the Urban Park in the oriental sector that borders the city walls, and neighbors with the highway. It's close to the entrances to the historic centre for those who come from the main adjacent centres (i.e. Pesaro and Fano), so it marks somehow the entrance to Urbino.

It's moreover an important connection to the system of Territorial Parks. As the crow flies it's placed in the middle of a imaginary line that links the St. Chiara's convent and the St. Bernardino's church: these are two Renaissance buildings on the opposite sides of the valley that have important roles, the former as concern the historic centre and the latter as concern the surrounding countryside. Hence, its figure appears to be strategically important for the morphologic balance of that part of territory that surrounds the city. It's afterwards fundamental to highlight how its image, the image of an industrial architecture, is able to merge with the landscape without changing it radically.

The kiln location is not random at all, but it's due to the nearness of a cave of clay and to the fact that that area was not intended for residential use (that naturally has been heading towards North since 1800). The isolated position with respect to the built-up area was therefore the main prerogative for the particular type of manufacturing process that, using high temperatures, was not compatible with the houses.

The peculiar trait of this industrial building is the formal and typological matrix, coming from the rural tradition, which reckoned farming as the only source of sustenance for these places. As in all factories that are in the Region, the main goal of the architecture is practical: every structure has been planned to optimize the manufacturing process that happens within. Anonymous builders and artisans made the construction according to the clever and cheap solutions of the building technique developed in rural areas, using timber and bricks. This, with the presence of green all around the building, allowed the amazing integration of the factory in the environmental background.

2. SURVEY OF THE AREA AND OF THE ARTEFACT

The understanding of this extraordinary and peculiar artefact, the cognitive approach to its relationship with the surrounding landscape and the historical city of Urbino has had its fundamental node in the relief.

This survey, as it has been showed in the preliminary phase, could not be related to the only architectonic survey of the manufacturing structure, but had to consider all the working area of the kiln and beyond: it was necessary to relate all the closed structures with the wide open spaces or the arcades of the brick-drying, and then survey the area, consisting of 10 hectares of morphologically differentiated terrain.

More in particular, it was expected (from now on) to be able to track down with better evidence the relations that, from the productive cycle perspective and, in general, from the perspective of perception of the landscape, existed between the artefact and the little valley that accommodates it. For example, the positioning and survey of signs, such as the natural valley and both the surface and the underground system of canalization of the waters which feeds it, let us to reconstruct today the genesis and dynamics of manufacturing.

Moreover it's unavoidable, considering the past and present hypotheses on the reuse of the area, the understanding of the communicating system around the kiln: the roads that mark off the top area and the approaches, including the peripheral branch of the railway that was the chosen transport for the bricks made in the silk.

To the huge extension of the surveying area has been added the lack of detailed cartography which was the base material to arrive at a topographical survey (i.e. scale 1:1,000 or 500). Indeed, the existing cartography for the City of Urbino hits scale 10,000. Moreover, it's not been possible to make an aerophotogrammetric survey in a bigger scale, because there are not striped areas: the Urbino's territory has not been included in the cover by the flight paid by the Marches region, for city halls with less than 10,000 inhabitants.

Hence, the survey started from the existing cartographies, used for instruments of urban planning.

At the beginning three stations have been materialized *in situ*, and their joining with the coordinates of the national net of topographic points IGM, following the Gauss-Boaga system, has been done with GPS measurements (method of Differential Positioning). The two ROVER1 and ROVER2 receivers have been used and position on two points of the national net, Calmazzo and Fermignano, and on two stations (ST1 and ST3). On the occasion of the flight with helicopter above the area, done in order to film the real state of the Volponi kiln, some photographic shots of various kinds have been done too. Thanks to them, the work group expected to do an aerophotogrammetric survey using data processing software. The first approach, made by photogrammetry with the program Photomodeler, lead to not-acceptable results: actually, the control points underwent huge errors in the pictures. The other procedure to control the results, consisting in "seeing" the residual (in pixel) of the point options, showed not acceptable results too: this is because the standard deviation is, for some points, around tens of pixels.

The second elaboration, made on photographic shots by metric camera with the program RFD Evolution, achieved more refined results as concern the error, but nonetheless it wasn't enough to make an exhaustive survey, especially considering both the missed covering of the shots of all the area and the visibility problems of the points on the ground due to the thick growth of vegetation.

Being impossible to realize a planimetric and altimetric survey of the area by photogrammetric methods, it was used the instrumental survey by differential GPS and with sampling time of 3 seconds, in order to obtain a DTM, 3D model of the terrain. For this job, two GPS TOPCON Legacy, tuned to the reception of L1-L2 frequencies, have been used. For the main points, it was done a stop-and-go survey, using the Legacy as a GPS master station and GSM 2 (tuned to the reception of the frequency L1 only) as a rover.

The survey, despite the inevitable problems of signal reception via satellite caused by the orography of the area and the cover of some zones with many trees (and so inaccessible to the signal itself), gave good results and with errors around the centimeter, and they were reckoned acceptable with the expected restitution scales. Actually, to create the Digital

Terrain Model it was sufficient to increase the number of useful points when carrying out the cinematic survey, and trying to cover completely the area of interest avoiding, as much as possible, the losing of satellite signal.

Hence, the result of the GPS survey has been treated, in the restitution phase, with the program Surfer 8 that, thanks to interpolation, transforms X, Y and Z data into publishable high-quality maps. So it was possible to model the terrain, visualizing the landscape and analyze the surface, and moreover 2D maps were developed for immediate use. Furthermore, this device was chosen because, giving the option to save as different formats (DXF, WMF, TIF, BMP, JPG et cetera), we expected an easy integration with the survey and the restitution of the architectural object.

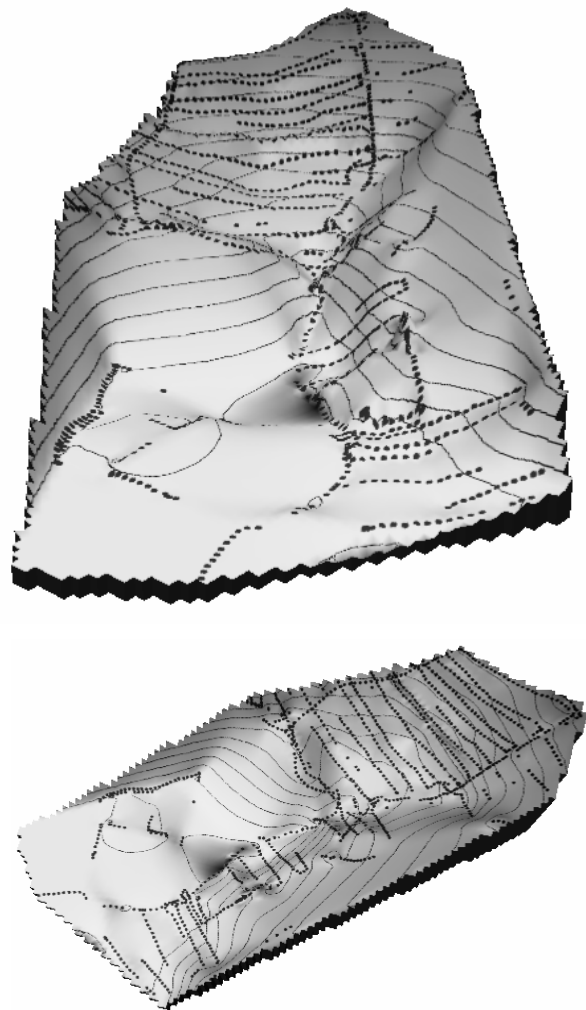


Figure 2. DTM of the terrain, elaboration by Sergio Scortichini, title of laurea thesis: "Tecniche miste di rilievo aereo e terrestre Il caso della Fornace Volponi ad Urbino"

As concern the architectonic survey of the Volponi kiln, it was obvious since the beginning the impossibility to lead a fast survey, and more in particular, the photogrammetric device was thought to be inadequate to understand the artifact. So, direct and instrumental survey was preferred, in order to have a reasonable selection already while acquiring data, thanks to the material relationship with the survey object. Mainly because of

the serious state of neglect and the large number of collapses of the supporting structures that happened in the recent years, there was a problem about the different buildings reading, understanding of different elevations, sometimes inaccessible for vegetation or collapses.

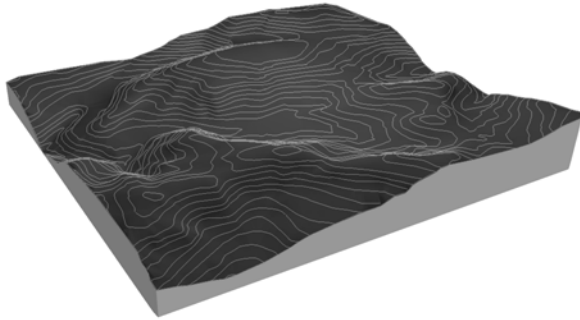


Figure 3. DTM of the terrain, elaboration with 3D Studio Max

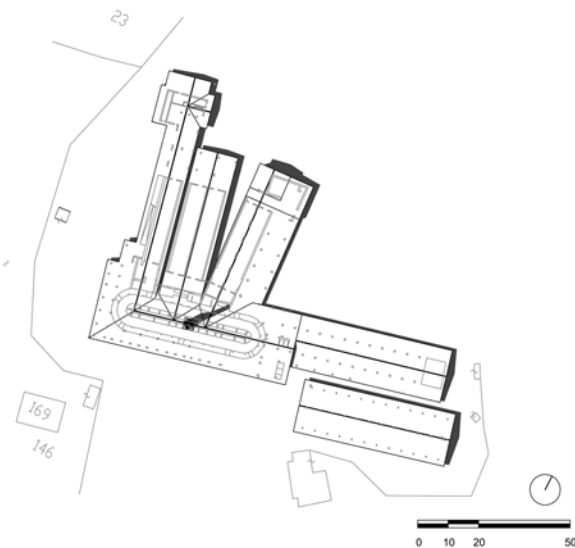


Figure 4. Survey of the Volponi's kiln, ground floor and volumetric plan

To define the highest encumbrances of the building and the delimitation of various buildings, it was proceeded with a survey via total photogrammetric station GPT 7000, increasing the initial number of stations prepared too: three stations were used, each for any artefact main front.

The prismless modality measurement allowed to survey not accessible areas, such as covers, floors of the ground floor, bases and top chimney and cube on which it rests. The instrumentally surveyed points were chosen to give a uniform grid on the artefact, in order to define it on its development, and also to try to discern its stratigraphy, the original bodies, the older ones and the additions.

A second surveying phase with metric wheel and distance meter laser was then realized in order to define the geometrical ratios of the bodies, especially the ones not visible from the outside, such as the three wings for the brick-drying in a covered place. Moreover the arcades on the facades are well detailed, even if

in a traditional way, succeeding in surveying the roughness of the bricks pillar mesh and filling the holes of the collapsed parts, and so preparing already from the surveying phase a big part of the restitution drawing work of the artefact.

A particular care has been used with the bound parts of the Volponi's kiln, i.e. the tunnel of the Hoffman oven and the chimney. For the latter, direct survey has been validated and supported by photogrammetric survey, with photographic shots appositively done and successively revised with the Photomodeler software. In this case, it seemed particularly interesting to reach a 3D model by photogrammetry, and then mapping it with the same photos.

Survey and restitution of data, in this last part of the work, have proved to be linked: actually, the dimension and complexity of the architectonic emergence of Volponi's, amplified by the state of neglect, casts doubt and stop phases on its re-drawing, obliging many checks and new surveys.

3. DRAWING TO KNOW AND PRESERVE

At the actual state, that cannot be considered ultimate until an in-depth survey about the state of neglect is done, it's preferred to rebuild the unitary image of the kiln of Urbino as it was seen in the mid 70's. To do so, and in the absence of proposals or any yard design, 3D modeling was implemented, and a fundamental resource was the historic photos of the Fotoclub archive in Urbino and the private archive of the eng. Domenico Fucili. In particular, the pictures of the area of the kiln made by the city guided the restitution of the covers, the most ruined parts.

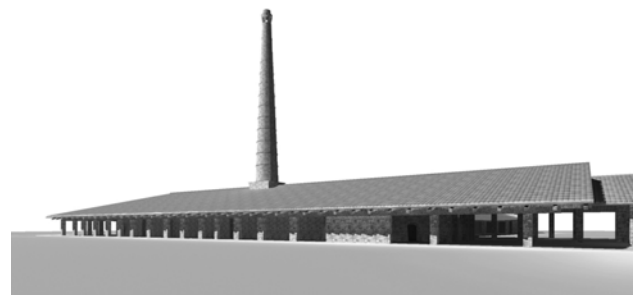


Figure 5. Photorealistic 3D model of the Volponi's kiln and photorealistic 3D model with Urbino in the background

All the 2D and 3D maps were drawn with Autocad, except for another modeling with 3D Studio Max. At the end, the 3D models have been mapped with photorealistic materials and, to increase the impression of the reality of the rebuilding, photomontages have been made, not only to recreate the original state of the artefact but also to express the peculiar and unique relationship between the Volponi kiln and the city and S. Bernardino too.



Figure 6. Photorealistic 3D model of the inside

The moment of drawing restitution of the surveyed data was an undeniable moment of knowledge and interpretation: the artefact design and the surrounding landscape strongly recalled the importance of the cognitive character during the surveying work, especially as concern a research project in the industrial-archaeological field.

The artefacts that belonged to the story of our enterprise are likely to change in short time from big unused containers to “scraps” of the economy and society, but the charm and peculiarity of these finds lays maybe in not having anymore a use or a function.

The great suggestive capacity of the spaces which belong to the industrial archaeology is the result of far distant echoes of the work that animated them and that cannot repeat again, because of the technological innovation and the economic laws that make of these big buildings, of their machineries and manufacturing processes outdated things.

As the American historian George Kubler claimed: “An object, thought to create an emotion – and this is one of the significant traits of a work of art – differs from a utensil because its significance goes beyond the use.” These factories can be read, and especially the Volponi kiln, as true work of art, given the value and the relevance accredited to it despite thirty years of neglect. Moreover, if it’s preferred not to consider them as work of art, they have to be considered to all intents and purposes as cultural heritage.

Hence, it seems clear that the understanding of the artefact, the unveiling of its intrinsic charm is mainly, and above all, in the comprehension of the lost relations between shape and function, installation and necessity of production. Therefore, it has not to be neglected the understanding of the structural organism, of the hierarchic relations between the building elements, the

variety of supporting and supported elements, the different materials involved.

Actually, the approach by the work group for the restitution, that is to say a 3D rebuilding of the object at the time of its maximum expansion, obliged to deep remarks on this kind of arguments, which in a first phase were considered details, but then constituted the backbone of the work itself.

So, it was possible to understand how the Volponi kiln developed, as a consequence of the necessity of the productivity, in a imperfect manner, without a project or a precise planning, and in some cases without adopting those minimum tricks that were required (pushing covers made up of beams, rafters and the cover mantle: not differentiated use of full or empty bricks and concrete for pillars). This explains the flaws and temporariness in many parts of the building and furthermore explains the quick decay after few years from closure.

Nevertheless, the awareness of the easy perishability of an artefact like the Volponi kiln, is confirmed by many studies on the heritage of industrial archaeology. Francesca Fatta outlines: “In spite of the nearness in time and the outward solidity of the structures that compose it, the history of the industrial process is mainly founded on perishable material such as the metals themselves, that are subject to corrosion, recycling, and the industrial buildings themselves, and are conceived for temporal use and specific technologies only. Moreover, their duration is in relation with the functionality of their use and an obsolescence greater than civil building trade and traditional architecture.

The same can be said about the archives of the enterprise and for the technical drawings that, being finalized to production, are doomed to be used temporarily”.

Actually, also for this last trait, the studied case of the Volponi kiln is exemplar: complete absence of sure documented sources, especially iconographic ones, but it will be possible to compensate for them thanks to the comparison with the manuals of the period, that documents with clarity the regularity and plentiful use of drawings, constructive and formal traditions.

4. THE FUTURE OF THE KILN

We spoke about the perishability of the Volponi kiln: actually the issue of its fate was a complex matter already after its closure. In fact in 1977, and after in 1993, the International Lab of Architecture and City Planning (Laboratorio Internazionale di Architettura e Urbanistica, ILAUD), organized by Giancarlo De Carlo with the help of lecturers and students both European and American, dedicated two files of its journal to the “reading” and development of projects related to the kiln. Even if, from these works, the Local Administration couldn’t find a solution that could be applied directly, it was clear that the area has to be rebuilt to continue to be an element of mediation between the City and the surrounding landscape.

The ILAUD committee of 1977 suggested some ideas to reuse the area of the kiln starting from the awareness that the Urbino economy was based mainly on the University and tourism, and that its territory was mainly agricultural and rural.

Hence the hypothesis to create an agricultural cooperative that was intended to become the research centre and environmental education, aimed to the planning of a more advanced agriculture. From the scholars’ point of view, the structure of the kiln itself was complex, especially as concerned the joint of spaces and the absence of external walls. The goal was to extend the project also to the university area, creating footpaths to link them, all immersed in a green framework. Of all the

complex of the old kiln, different parts were used, but the oven was the pivotal element and had to be kept integrally, because it was the symbol of a past reality that had to be persistent in the memory of the new generation.

In 1993 the ILAUD committee tackled the problem again, not giving anymore interest to reading of the possible effects on the landscape: the city, the periphery, and the countryside, considering every changing that was going to disturb the balance of the territory. Furthermore, its goal was to understand how and with what means the area could have been reused without creating an unbalance with the surrounding environment. The study began with considering the site as part of a big hollow, an amphitheatre where the towering chimney of the kiln visually linked the observer both with the city and the St. Bernardino church. The place was a pure and real theatrical scene, seen by the paths above. The maintenance of some of its formal parts, i.e. the chimney and the oven, turned out to be inevitable to keep having a role in the Urbino's cultural memory. Moreover, the study aimed to reinforce the already existing infrastructures, as well as revitalize the railway system, and this was proposed again by Giancarlo De Carlo in the PRG of 1994. It also seemed of fundamental importance to recover alternate routes, which linked the city, in the point where the St. Chiara's convent arises, to St. Bernardino, passing through the kiln. In this way, the Volponi kiln was identified not anymore as an object but as a true element of the landscape, included in a background bigger than its borders.



Figure 7. The importance of the Volponi's kiln in the landscape, in a plastic model of the Workshop ILAUD, 1993

The proposals arisen by ILAUD workshops have been re-enhanced by the urban planning signed by Giancarlo De Carlo. Up to today the debate about the future of the Volponi kiln and the surrounding area is open and particularly alive. Thanks to this work of documentation, survey, and design we hope not only to animate, but also to direct for the best, the planning activities for the recover and the exploitation of the artefact.

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