

A conservation plan method for historical city centres

Franco Braga, Giorgio Monti
University of Rome La Sapienza, Rome, Italy

Giuseppe Scalora
City of Siracusa consultant, Siracusa, Italy

ABSTRACT: This paper represents a contribution to the study of the urban fabrics through an innovative structuralist and interpretative method. This method has allowed to achieve remarkable results in the interpretation of the form of historical city centres, shedding light, in a more systematic and critical way, on the complex logic/aesthetic relationship between philosophical theory and urban spatiality. The aim, rather than that of applying the concepts of generic urban planning to the theme of historical centres, is that of proposing an operational approach of authentic urban restoration, comparable, in terms of both conceptual rigorousness and care for the built environment, to the projects of architectural restoration. The methodological and operational final aim is to develop a macrodesign strategy to define different levels of *transformability* of the historical built environment, envisaging and spurring the possibility of a more precise final formulation of the art, at the scale of the building microdesign. An application of the method is presented in this conference in a companion paper (Braga, Monti, Liberatore and Scalora 2006).

1 INTRODUCTION

The process of understanding the urban fabrics in an historical town is particularly demanding due to the richness and multiplicity of its urban image. This is generally determined, starting from its founding act, by a continuous evolutionary development process, possibly in the presence of traumatic events, with a complex stratification of historical phases.

The space of an ancient town is dense with lines, angles and crossings – *walls which leap forward elongating their axis – walls which bend at different angles and create new intersections – walls which slide forward and cause misalignments* – that together create the closely knit connections among the building cells.

Understanding of the form is neither achieved by shedding light on the matter needed for the physical reality, nor by enumerating each single segment of the urban fabric or all block's cells with the relevant dwelling typologies, but by *critically interpreting* – in a coherent vision – how the city developed starting from its establishment.

This means that the built environment, due to its specificity, uniqueness and *ambiguity*, cannot be reduced to an empiric description of the observable *things* – without thus denying the regulatory and systematic character of the analytical experience.

Dealing with the fabrics of the historical town in a *unitary* way implies the integration of the “aesthetic” principles of the form with the planning, political and financial aspects of the transformation processes, *i.e.*, the town as *urbs* and as *civitas* respectively.

Under such a perspective the restoration policies cannot concern just the single buildings or the single monuments, but must develop taking into consideration the aesthetic dimension, the

issue of town planning and environment requalification, controlling/monitoring the relationships between the old functions and the new ones.

Thus, the ultimate end of our actions is that of revealing the identity of the sites and of preserving the specific *long duration* characters of the *form*, by warranting its physical preservation through modalities of ‘critical-conservative restoration’ and, where necessary, of seismic ‘amelioration’.

2 TOWARDS A PHILOSOPHY OF CONSERVATION – THE STRUCTURALIST THEME

These latter considerations constitute the underlying cultural and technical grounds for the application of the *structuralist method* in the effort of a hermeneutic contemplation aiming at the interpretation of an historic city.

The term *structure* is here used to introduce a formal and relational analysis method, whose main aim is to determine the system of correlations among the elements (in a first instance, the spaces and the buildings), rather than the ‘things’ as single or singular objects, as well as to know the different phases of the mutation/transformation process.

In particular, the process is recognized as the progressive and dynamic transcription of spaces and architectural volumes in the ‘form’, and it is investigated starting both from an *archetype*, which influences through time the movements plot and the possible morphological variations of a site, and from the ‘motion’ of users/customers – in and out those spaces.

Under such a perspective the block is for us the minimal element where the relationship between serial architecture and historic town can be measured, by investigating the relationships of building with themselves and with spaces determined by them.

The building, in turn, as a morphogenetic element with a specific relationship with the other units in the structure, participates to the overall composition of the block.

Lastly, the cell becomes the connection between the single basic components of the building structure (walls, slabs, roofs, etc.) and the building it belongs to.

In other terms, the objective structure resulting from the concrete activity of understanding is not the simple material collection or physical sum of the things present in it, that is, it cannot be considered as a mosaic of independent parts.

The false confrontation between a realistic approach to structure and a conceptual one dissolves however as soon as we understand the relationship between a *synchronic reception* (systematic investigation) of the object and *diachronic oscillation* (historical evolution) of the aggregation/mutation process.

The synchronism appears through the arrangement of thickness, through the corners on which the wall decomposes or breaks, through the sliding and rotation of the volumes of different size and form; diachronicity appears through depth, can be perceived through the shadow of the external walls and the positioning of staircases.

3 THE ANALYSIS OF THE FORM

The current arrangement of the space is not of interest just because being objective, involving “the relationships between coexisting things” within the structure; it is of interest for what it can express to us through its lines, its planes, its figures, and its volumes, in other words, through its form (*i.e.*, *what makes the thing as it is*) through an interpretation of the factual data, in an historical and problematic dimension of town planning and architecture.

In such a perspective *we mean by form the result of a forming and development process which, being dynamic, includes the time of production (in the long term) and the transformation action (in the short term)*.

The concept of layer and of the underlying history are therefore a constant reference in the study of an urban context settled over time.

The meaning of *form* is not to be mistaken for the aesthetic (outward) one of “*aspect*”.

In fact, the form, by configuring the housing space, includes both the aspect and the matter used for the representation, and composes them.

The form is born and develops through a complex net of transformations that arrive at a form – which is essentially individual – whose content expresses the relationships between the founding and the founded, between the unity and the multiplicity of things.

4 STUDY ON A METHODOLOGY OF URBAN RESTORATION

4.1 A work method for the historic town

The analysis and design methodology developed in this research aims at assuming, during the cognitive process, scalable and integrated levels of ‘typicality’.

From here stems the necessity, firstly, to interpret and describe the formal and spatial aspects of the *existing* physical form, with particular reference to the notions of building and aggregation of buildings, to gradually study, through a pragmatic mesh of cross-references, correspondences and intersections, its several dimensions: material, technological, technical, distributional, functional, archaeological, historical, social, economical, etc.

In this way the methodological and operational limitation of an exclusively sectorial reading is abandoned; instead, a multidisciplinary and integrated, *i.e.*, *holistic*, approach is developed.

The cognitive investigation of the structure is to be carried out by continuously looking for a *critical* convergence between the data extracted/deduced from the *logical-formal* analysis of the urban space, and those verified/obtained through the multi-scale explorations of inductive type.

In particular, the investigation is carried out on:

- The level of the *relationships between the processes of aggregation and organization of urban fabrics* (organized through the distribution of lots and building types) and the evolution of the street system (obtainable through archeological and stratigraphical studies);
- The level of the *main events* (or sequences of events: earthquakes, plagues, wars, invasions, laws, rules, etc.) that have had an impact of the morphological aspects of the historical built environment (obtainable through historical and document sources);
- The level of the *relationships of the system of routes and empty spaces*: analysis of street morphology (course, width, turning point in the layout, and misalignments of the building fronts), identification of the characteristics as to the arrangement, dimensions and hierarchy of the courtyards (next to street or internal, with direct entrance or through a lobby, in a lateral or central position with respect to the lot front), location of the stairs within the courtyard. This study favors the comprehension of the creation and transformation process of blocks, lots, built parts and free portions with respect to the phases of their use;
- The level of *walls*. Wall system: alignment of walls; verification of orthogonality with respect to the street course; identification of prolongations, rotations, intersections and sliding of the wall axes. This helps in identifying the walls as to their construction synchrony and then to define their degree of connection; and in identifying probable damage mechanisms, as in the case of two misaligned fronts;
- The level of the *cells*. Cell system: for each level “recognition” of the basic types, *i.e.* of the elementary spatial relationships, and analysis of formal qualification of the single building cells. That allows to distinguish cells with respect to the saturation processes of the open settlement spaces;
- The level of the *differential elements*. Cell system: for each level the ratios of regularity, repetition, modularity, etc.;
- The level of the *linguistic characteristics*. Formal coherence of the fronts: form and position of the holes on the front walls (axiality, symmetry, repetition and rhythm). The analysis of the shape and position of the holes on the fronts allows to determine the weak areas in the transmission path of stresses, as well as to detect the changes over time;

- The level of *type structuring*. The critical-processive reading of the building types allows to recognize the type characters and the distributional and spatial relationships recurring within the urban fabrics, as well as to detect the formal structures persistent at the various layers of the building. Developing the abstract layout schemes of the Type in a precise environmental context provides a relevant element of reflection, to interpret and understand the system of historical structuring of building aggregates, the “deformations” and the “violations” with respect to a “pure” or basic form, the crossings and the plot of spatial connections among the single building cells and the elements constituting the buildings, their chronologically subsequent stratification;
- The level of *construction lacks* and of *seismic weaknesses*: misalignments and tapering of walls, thin walls or walls falsely resting on the underlying floor, elevation misalignment between adjoining floors, etc. Such informative layer provides indications both to look for possible damage sources related to vertical loads and seismic events, and to refine the interpretation of the growth mechanisms of the urban fabric detecting the presence of building violations and unauthorized developments;
- The level of the *identification of stair type*. The reading of the different placement of stairs in the urban fabric, within the single cell walls and outdoors in the collective space of the courtyard, contributed to identify the relationship between the built environment, the street front and the courtyard (or the pertaining area) of the buildings;
- The level of the *formal interpretation of the fabric*, and therefore the historical-morphological recognition of the individual building systems in the structure/entirety of the settlement space and the identification of the ties that each building established with the others.

4.2 ‘Structuralist’ analysis of the fabrics

We refer to the *Continuous Building System*, that is, a multiplicity/aggregation of buildings characterized, from the morphological and spatial standpoint, by continuity, or at least contiguity, of just the vertical walls.

Coherently with the nature and the purposes of the *hermeneutic-structuralist* method developed in this paper, the physical and spatial organization of the continuous building systems is in turn characterized by, more or less complex and *ambiguous, parts*, inter-correlated according to the settlement configuration of the context/*entirety* they belong to.

In particular:

- a) the structural unit,
- b) the building unit.

The following paragraphs deals with these items in terms of: Definition, Development, Recognition.

4.2.1 The structural unit

Definition: The *structural unit* is defined as that part of the *Continuous Building System* made up of the three-dimensional aggregation of cells inter-linked in elevation and on plan by a common and identifiable settlement and constructive process of development and organic growth or of extended and extreme building transformation.

Development: Each single *structural unit* represents then physically in the space the architectural form, organized, either on purpose or not, with respect to both static and dynamic actions.

Recognition: The identification of the characters and of the behavior of the *structural unit* takes place through the recognition of, respectively: a) the form of the building and of its relative position in the continuous building system (morphogenesis); b) the quality and the effectiveness of the spatial connections between adjoining cells, with special care to the context and the juxtaposition and overlapping mechanisms.

As a rule, the *structural unit* shall be bounded by adjoining buildings identifiable by aggregation/arrangement rules on the scale of the continuous building system (or, more in general, of the block) or by their morphological and formal characters, or by construction bodies built ac-

ording to different constructive and structural types or at different times, or finally by open spaces and structural joints.

Further elements to consider for the qualification of the *structural unit* concern respectively: a) the overall evaluation of the spatial-formal and technological-constructive aspects of the building unit; b) the survey of the conservation state of materials; b) the historical analysis of the crack pattern; c) the evolutionary study of displacements and deformations.

4.2.2 *The building unit*

Definition: The *building unit* is defined as that part of the continuous building system made up of the aggregation of cells, sky to ground, that expresses its own typo-morphological, architectural and spatial individuality.

Development: Under this viewpoint the *building unit* represents the physical and formal result of the relationship between the urban context and the building type. The morphological richness of the historical built environment arises from their multiple combinations through time and space. In such a perspective the type characterizing the built entity is overcome by the *form* it gets in the 'slow' production of the architecture.

Recognition: Each *building unit* is then characterized by its present level of structuring and formal evolution in relation both to the morphology and architectural coherence of its *figure* and to its *form*, and is recognizable "case by case" on the basis of its original configuration, typically coincident with an elementary single-cell type for the serial buildings, and of the critical interpretation of its process mechanisms of growth and transformation.

The knowledge of the architectural and formal characters of the buildings (and of the pertaining processive movement of "long term" production) must always come first and direct the structural and anti-seismic design of the building systems, in an inseparable connection between geometrical/spatial configurations and physical/structural ones, between preservation of the morphological and constructive characters and performance of the materials.

A building unit may be recognizable as:

a) single structural unit (*e.g.*, house in line produced by aggregating elementary bordering rows (or pseudo-rows) and by subsequent synchronous stratifications; building obtained by complete refurbishing of adjoining and individual buildings, and then with a substantial change of the original structural configurations; single architecturally closed building, expression of a unitary design and realization unchanged over time also from the constructive and structural viewpoint);

b) made up by a number of mainly individual structural units distinguishable within the building by their development and morphogenetic mechanisms on the scale of the block or by their type and constructive characters or by their building age (*e.g.*, aggregation of mature serial houses through holes on the common wall, with a number of floors equal to the present one, and keeping the original elevation of floors, and architectural, formal and techno-constructive characters.

4.3 *The articulation of fabrics by units*

The identification of the system of mutual relationships that each building establishes with the others represents the methodological phase of the identification of the urban fabrics as the aggregation ways between single buildings.

On the basis of their dominant characters (spatial and distributive relationships and constructive elements) the single buildings of an historic town, though in the variety, complexity and articulation of their formal identities, are generally distinguishable as:

- a) *Mansions*: of variable size and relevance, characterized by a distribution of the rooms around an open central space and by a unitary and easily recognizable architectural look, typically produced by the aggregation of a number of lots;
- b) *Small mansions*: downsized reproduction of the mansion type model, they occupy a single lot or fractions of it, they exhibit a number of independent units on the ground floor and single flats on the upper floors;

- c) *Multi-family small mansions*: characterized by a number of independent stairs sky to ground, they can be derived from the division of single-family mansions, by aggregations of smaller units or by an original building system;
- d) *In-line buildings*: they are generally distributed on a number of floors as the result of the aggregation of a number of elementary units, they typically exhibit a single entrance and a single staircase that serves the several settlement units distributed on the various floors;
- e) *Serial houses (or pseudo-ones)*: typically with two or three elevations on the ground, with monocellular front (4-6 m), the staircase is contained within the cell. Invariant characters are the sharing of the side-walls with the adjoining serial houses, the presence of the pertaining areas or of the courtyard spaces on the opposite side of the front, the double view on the street and on the courtyard and the possibility of progressive growth of this area.

5 A NEW URBAN PLANNING FOR THE HISTORICAL TOWNS

5.1 *The normative language*

Booklets, technical studies concerning various application sectors, treatises, manual, practice codes, guides, technical specifications, building regulations and guidelines, international recommendations (whose coverage is supposed to be universal) certainly contribute to improve the knowledge of the construction heritage, enriching the lexical and syntactic knowledge of the building industry and developing a background rich with historical, technical and formal suggestions. However, at the same time they can lead to schematic interpretations that are harmful for knowledge and preservation

The risk one envisages with preoccupation is that of activating, in the analysis phase as well as in the design one, that risky equation that matches a list of damages with a list of interventions, *i.e.* the exhibition of a set of solutions and/or intervention proposals that are automatic and uncritical with respect to each identified technical problem.

The theoretical and methodological axes that have been chosen to define a new set of ruling and management tools for the distributed interventions in the historical town develop through a formal and relational analysis of the urban fabrics, a critical interpretation of the different growth mechanisms and the creation of methodological directions and criteria capable of warranting precise behavior rules for the interventions both on the scale of the single building unit and on that of the real estate unit.

The *interpretation of the whole system* (or of meaningful spheres) must therefore get the leading role in the investigation and cognition activities on the housing heritage of the historical centers.

We must not fall prey of the ambiguity or of a self-consolatory temptation to consider each building entity as a event to be dealt with individually, extracting it from the fabric of which it is instead an integral part.

The methodological and operational final aim is to develop a macrodesign strategy to define different levels of *transformability* of the historical built environment, envisaging and spurring the possibility of a more precise final formulation of the art, at the scale of the building microdesign. This can be obtained through a system of prescriptive rules and of *performance-based* criteria and directions (with a look at the aims rather than at the means), derived from: a) the *critical* reading of the architectures observed in their process, b) the *problematic* interpretation of the complex relationships of the built environment, and c) the evaluation of the present conditions of preservation and use of the physical objects.

5.2 *The operational systems*

In the case of an historic town, with reference to the forms of language of the rules and to the degree of prescriptive binding, it looks suitable to develop six integrated and complementary operating systems:

- *THE SYSTEM OF PRESERVATION*
Aim of the system: preservation and value increase of the materials, elements, types, forms and set of environmental relationships in their historical context, that characterize the urban fabrics of Ortigia;
- *THE SYSTEM OF INTEGRATED TRANSFORMATION*
Aim of the system: to rule the physical transformation of the historical town through a process of actions and tools aimed at preserving the characters of identity, recognizability and usability of the urban fabrics, *in an integrated and complementary vision* with the preservation of the ancient, the design of the new, the promotion of architecture, the reception of functional and social requirements;
- *THE SYSTEM OF REQUALIFICATION*
Aim of the system: building requalification interventions to remove incoherent aspects both through the use of local materials and through the formal, constructive and structural characters of the building system and of the urban fabric, especially in the case of ascertained decay for the purpose of static safety;
Environmental requalification interventions to gradually remove the extraneous architectural elements as to the choice of materials, finishings, type and colour, especially on the façades, in the external closure (steps, thresholds, door frames, windows, railings) and on the balconies and galleries;
- *THE SYSTEM OF NEW CONSTRUCTION*
Aim of the system: qualification of a program leading to the realization of the works harmonically inserted in the surrounding environment, on the basis of the functional, social and formal requirements;
- *THE SYSTEM OF DEMOLITION*
Aim of the system: work within the blocks coherently with their present level of formal structure and with the evolutionary process that have determined the present spatial and morphological relationships between the constitutive elements of the urban environment; identify the resistances that hamper a coherent and organic reading of the building systems;
- *THE SYSTEM OF MATERIALS*
Aim of the system: development of a set of interventions to carry out gradually and with an intensity depending on the nature of the element at hand, *e.g.* plaster, stones, wood, other, and of its preservation state (criterion of the *minimal intervention*). In any case the interventions shall be carried out looking for *compatibility* (physical-chemical, constructive-mechanical, structural), *durability*, and, where possible, *reversibility*.
In the case of use of innovative material for the structural reinforcement of the buildings, a critical evaluation of the intervention is required with respect to the standards for preservation and restoration. The actual effectiveness of the intervention shall be objectively proven, with the solution ensuring compatibility (physical-chemical, constructive-mechanical, structural), durability and reversibility.

5.3 Guidelines and illustrated rules

It appears useful and appropriate to the contents and to the normative language elaborated to create “guides” to show the cognitive paths developed during the experiments conducted on the building fabrics, and “illustrated rules”, whose function is to describe the transformation frameworks and the allowed interventions, that the users of the plan will be able to get and critically interpret to draft their design to be submitted to the licensing procedures.

5.4 The Minimal Intervention System

According to this method of ruling the *conservation* processes of the historical built environment, the minimal intervention system represents the minimal operating dimension for a building project.

The identification of the *minimal size of the intervention* cannot be indicated *a priori*, but has to be determined, *case by case*, by the designer in charge, based on the contingent system and

the foreseen interventions, the degree of spatial and relational complexity of the building in the urban fabric, and the criterion minimizing the fragmentation of the direct interventions.

As to the seismic performance, we require the identification of a more extended aggregation system, allowing for simultaneous interventions with a system approach on a number of buildings which are individual but structurally interdependent. This represents the most effective operating dimension to develop and qualify the formal, constructive, and structural relationships of the buildings both between them and with the open areas.

The minimal intervention system may concern the single real estate unit or the building unit it belongs to, or a more or less extended portion of a building aggregate.

This approach considers two different situations:

1. the synchronic intervention, *from sky to ground*, on the set of building units making up the building, *e.g.* in the case of a seismic improvement project;
2. the partial intervention on single building units, and in this latter case interventions are allowed that are coherent with the morphological, architectural and constructive characters of the building, *e.g.* in the case of planned maintenance interventions.

In other words, the individuality and the specificity of the handwork (also considering its state of conservation) prevail on the intervention category.

That means that an intervention regulation cannot claim and aim at being unique and equal everywhere, following standard general principles, but, by recognizing the diversity and the complexity of phenomena, must get each time the reflective character that the historical fabric demand.

6 CONCLUSIONS

The method presented in this paper considers the following issues:

1. the complex spatial articulation of the continuous building systems of historical towns needs, where possible, unitary and synchronous actions on homogeneous portions of the fabric, *e.g.* compartments or entire blocks, especially if highly vulnerable to future damage.
2. in order to activate an effective process of repopulation of the spaces the building interventions, must be inserted in an environmental requalification project, and be therefore of a planning nature, including several integrated and cross-actions: projects concerning the land (routes and public and private spaces) and the town decoration, insertion and/or integration of services and functions, restoration of architectural landmarks (churches, palaces, convents, etc.), integration with the overall urban system of transportation and mobility, etc.
3. the particular characters of the urban form requires, in the case of direct building interventions pertaining to the single building system, specific prescriptive and performance rules. These should control the system of internal and external relationships configuring the building system in the environmental reference context and control the formal outcomes, constructive and mechanical, of the intervention.
4. the preservation of the historical centers, due to the complexity of their meanings and to the stratification of their values, cannot be obtained without the participation and the multilateral support of society.

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