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2020
RESIDENTIAL BUILDING DESIGN & CONSTRUCTION CONFERENCE PROCEEDINGS

MARCH 4–6, 2020

THE PENN STATER HOTEL & CONFERENCE CENTER
STATE COLLEGE, PENNSYLVANIA, USA

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State College, Pennsylvania, USA

Edited by
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College of Engineering

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PREFACE

While home builders are continuously challenged to consider various criteria such as affordability, energy efficiency, sustainability, serviceability, aesthetic, utility, and resistance to natural hazards among others, there are varying degrees of adherence to such objectives. The more efforts are made for technology transfer and providing the residential construction industry with the latest advancements in construction materials, tools, methods, and code requirements, the more receptive will be the mainstream builders to incorporation of technological advancements. As always, the Pennsylvania Housing Research Center (PHRC) at The Pennsylvania State University considers knowledge sharing and dissemination of the results of recent advancements in the field as one of its primary responsibilities and is pleased to continue organizing the Residential Building Design and Construction Conference series to serve the housing and residential construction industry for this purpose.

It is with great pleasure that we share the proceedings of the 2020 Residential Building Design and Construction Conference that was held on March 4–6, 2020 at The Penn Stater Hotel and Conference Center in State College, Pennsylvania. As in the past four RBDC Conferences, this 5th conference provided an opportunity for researchers, design professionals, manufacturers, builders, and code officials to exchange the latest advancements in research and practice and to discuss and share their own findings, innovations, and projects related to residential buildings.

The 2020 RBDC Conference hosted 132 attendees and included 56 papers and 102 presentations on various issues related to residential buildings, which encompass single- and multi-family dwellings, mid-rise and high-rise structures, factory-built housing, dormitories, and hotels/motels. Papers and presentations related to the following areas and topics were invited in the conference call:

- Aging-in-Place and Senior Living Housing
- Alternative Renewable Energy Generating Systems
- Building Information Modeling (BIM) Application in Residential Construction
- Building Integrated Photovoltaic Systems
- Building Performance Assessment/Metrics/Verification Methods and Occupant Behavior
- Building Science and Building Enclosures
- Energy Efficient Building Components
- Fire Damage and Protection
- High Performance Residential Buildings
- Indoor Air Quality
- Innovations in Green Roofs and Façade/Envelope Systems
- Innovations in Residential Architecture and Design
- Innovations in Modular and Manufactured Housing
- Innovative and Emerging Housing Construction Methods/ Systems
- Innovative Wall, Floor, Roof, Window, and Siding Systems

- Learning from the Performance of Residential Buildings under Natural Disasters
- Low-Income and Affordable Housing
- Panelized Building Components
- Passive House Design Approach
- Resilient New Design and Retrofit of Existing Buildings under Natural Disasters
- Retrofit of Existing Buildings for Energy Efficiency
- Rural Housing Materials and Construction
- Serviceability and Life Safety Damage Aspects
- Smart Home Technologies, Design, and Construction
- Sustainable Housing Construction Materials and Methods
- Temporary Housing for Disaster Situations
- Whole Building Design Approach
- Zero-Net Energy Homes

As the following Conference Schedule and Table of Contents of these proceedings show, many of the above areas were among the papers and presentations at the conference. In particular, there was considerable interest in Passive House Design and Retrofit, Disaster Resilient Design, Building Envelope and Building Science, and Construction using Cross Laminated Timber. The conference also hosted six Special Session panel discussions, three evening networking events, and a tour of the Building Enclosure Testing Laboratory (BETL) and the ADDCON Laboratory for 3D Printing of concrete, both located in Civil Infrastructure Testing and Evaluation Laboratory (CITEL) at Penn State University.

Two keynote speakers were invited for the conference: David O. Prevatt, Ph.D., PE, FASCE, Associate Professor of Civil & Coastal Engineering, Associate Director NSF - NHERI Experimental Facility at University of Florida and Lois B. Arena, PE, Director of Passive House Services at Steven Winter Associates, Inc. Professor Prevatt discussed his presentation titled "Wind Hazard Resilient Residential Communities—When Engineering Isn't Enough." Lois B. Arena shared her presentation titled "Passive House: A Proven Path Toward Resilient, Affordable & Energy Efficient Housing." The conference also hosted a closing plenary session by Jay Arehart, Senior Research Fellow at Project Drawdown and Tom Richard, Director of Institutes Energy & the Environment at Penn State, entitled "Buildings as a Drawdown Solution: Getting to Zero and Beyond."

We wish to thank the members of the International Scientific Committee of the conference for their contributions in promoting the conference. The support of the PHRC staff for logistics is gratefully acknowledged. In particular, special thanks goes to Rachel Fawcett for her contribution as the Conference Coordinator.

Proceedings Editors:
Ali M. Memari and Sarah Klinetob Lowe
March 2020

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NO PAPERS *(See presentations at PHRC.psu.edu/Publications/Past-Conference-Proceedings.aspx)*

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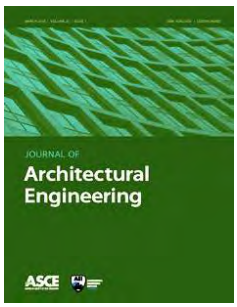

The American Society of Civil Engineers' (ASCE) Journal of Architectural Engineering (JAE) is running a Special Collection on Housing and Residential Building Construction. This peer-reviewed Special Collection covers various aspects of residential buildings, such as single- and multi-family dwellings, mid-rise and high-rise apartment buildings, dormitories, and hotels/motels, and includes technical research and development, technology transfer, case studies, and state-of-the-art review types of papers. See published papers here,

https://ascelibrary.org/page/jaeied/specialcollectionhousingandresidentialbuildingconstruction

If you would like to convert your RBDC Conference paper to a journal paper for this JAE Special Collection, go to the following site: *http://www.editorialmanager.com/jrnaeeng/*. When you see the "Additional Information" section, in response to the following question: "Is this manuscript part of a Special Issue? If yes, please provide Special Issue title and guest editor name.," type the following in the dialogue box: "Housing and Residential Building Construction; Ali Memari". For more information, contact Dr. Ali Memari, *amm7@psu.edu*.

PENNSYLVANIA HOUSING RESEARCH CENTER

The Pennsylvania Housing Research Center (PHRC) collaboratively engages with the residential construction industry to catalyze advancements in homebuilding through education, training, innovation, research, and dissemination. The PHRC envisions a residential construction industry equipped with the knowledge, skills, and technology to build better homes. Administered within the Department of Civil & Environmental Engineering at Penn State, you can learn more at *phrc.psu.edu*.

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Existing residential neighborhoods in Italy: from strategy to project to activate a sustainable mutation process

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Keywords: Heritage- Sustainable Mutation- Reconditioning

Abstract

There are numerous residential neighborhoods built in Italy from the 50s until the 21th century that are in precarious conditions, social, spatial and constructive. Its redefinition takes place with a theoretical and methodological approach that includes memory, innovation and sustainability leading the mutation of spaces towards the assumption of new value by using tools of hybridization.

The proposal of the conversion of public residential buildings, and now characterised by a spatial and social alienation, is based on the architectural theory of *circular re-conditioning*: the contamination between place and object capable of reactivating the identity of "discarded" urban elements, where the absence of adequate space and energy-intensive buildings has led to a physical and symbolic obsolescence. The main tasks are the ones that follow:

- A circular strategy based on the re-conditioning of the existing by recognizing a value to the current waste;
- Define new adaptive intervention tools able to change spaces and redefine the boundary between reception and exclusion, and make buildings energy sustainable;
- Equipping buildings with porous spaces to accommodate those in need (for example for homeless but not only)

The methodological process uses the one proposed in 2003 by Haeckel, *Adaptabily loop*, updated on 5 points (one new): the *sense*, which defines a new spatiality for housing, the *interpretation* where the elements of the process take shape, both circular and adaptive, redefining the sense of identity through architecture and a participated communication, the *decision* defines the intervention strategy, **resilience**, the ability of a system to adapt to change following a high impact event; the *act* determines the operative tools, a series of "adaptive grafts"; the *outcome*, a project that combines architecture's own tools with social and and energy savings ones that can revitalize a neighbourhood and make it habitable again.

BACKGROUND

The continuing excessive growth of the capitalist system has led, in the last decade, to an ever-increasing confrontation with the dramatic climate changes and the consequent economic and social crises.

The construction sector accounts for around 40% of the consumption of material resources and available fossil energy. In Italy the residential suburbs, built from the end of the 50s to the present, are the first cause of CO2 emissions, a disorderly and uncontrolled consumption of soil that has led to a series of consequences with which we

must now confront, first of all those of of the environmental sustainability of the system, but also the social sustainability of this set of uncontrolled expansion.
Living then becomes the fundamental element from which to start again with particular reference to the peripheral condition of the many residential districts designed by the Modern.
In Italy, after the Ina-Casa experience ended, in which an attempt was made to mediate between the dictates of the Modern and those of the compact city, typical of the Italian urban experience, new suburban residential districts arose that refer to the lesson imparted by the quantitative development and the serial of the Modern: dormitory quarters, physically separated from the historic city, used only by less affluent classes, an expression of monofunctionality, and fruitional segregation. (Figure 1)

Figure 1. Pilastro residential district in Bologna: first nucleus, 1966. (Acer Bologna photo archive)

The spaces are clearly identified through some predetermined elements: standardized housing defined in each individual environment, buildings mostly for residential use only, linked to the logic of zoning and equipped with very few services; the open space conceived as a ‘technical room’ intended as an anonymous distance between the buildings, a generic void declined in parking lots or undifferentiated green, linguistic styles that are repeated indifferently in every context, typologies in line or tower, multi-storey, of considerable size.
In 1956, the historian Siegfried Giedion, arguing over Le Corbusiers Marseilles unit in Marseilles, warned against the danger of seeing simply constructed residential architectures built with "*the juxtaposition or stacking of individual living cells*". (Figure 2)

Figure 2. The “Virgolone” from the Pasolini park in the Quartiere Pilastro, Bologna, 1980 (Acer Bologna Projects Archive)

This is the most cumbersome legacy of the Modern Movement to have denied architecture a linguistic capacity based on the semantic value of its elements, in favor of a research that, starting from the function, focused on the syntactic structure of the project, a kind of composition mechanics, which in the logical paradigmatic void of modernity, represents the continuous search for a universal validity method.
These neighborhoods became, between the end of the last century and the beginning of the new one, a place where the social condition: a place of confrontation between different communities and ethnic groups, between inequalities social also expanded by the illegal occupation of empty housing (housing without any internal service and without the main technological networks), a place where the clash took place daily in the spaces of degradation, leading to a functional and technological obsolescence of housing, to a intolerance towards the conditions of living, which started a process that has definitively segregated these districts into "trash” of the city. Within these Quarters the containers of social marginality, to which social isolation is often accompanied, have affected different groups and subjects traditionally excluded from the benefits of development such as unemployed young people, low-income elderly people, single-parent families, parents separated and their children, low-income and temporary employees, foreign immigrants who by ethnicity, religion or language reduce relations with the outside and fail to achieve social integration. The demand for a different dwelling, which in some cases takes on a precarious character precisely in relation to the classes considered weaker, seems to insistently require interventions devoted to a regenerative logic of what exists and to find that "common territory" and that "social agreement” ”that has ensured a "dialoguing "habitation in the past. The effect of the disintegration and decomposition of social ties has had serious consequences: the concept that was at the base of these neighborhoods of a popular nature was that of

mutual support among the inhabitants. The family social structure and the common working status in which the inhabitants found themselves, had ensured a rich fabric of mutual aid and support for the weakest segments: the disintegration of this social "agreement" led the group of unskilled workers to leave from the world of work. (Figure 3)

Figure 3. Corviale residential complex, Rome (Photo G.Chieregato)

We believe, therefore, that in order to respond to the complex conflicts of contemporary living, it is necessary to cross thresholds that until now have not been crossed, get out of the disciplinary areas so far used and enter the fluid world of the hybrid that permeates the complex everyday life for provide more appropriate answers to the solution of peripheral residential neighborhoods within the difficult world of multiabilities that contemporary living requires.

The meaning of the verb to inhabit that we are trying to propose in this paper is very different from modern experiences and begins from the assumption that living is organized around the body of the inhabitant, of his person, united in a Community and crystallized in the structures that contain it. Therefore, living is interpreted as an expansion of the self within the Community, as a production - between the latter and the space - of quality relationships, as a custody in and with it of emotional and emotional relationships. Of a resilient community, meaning at the same time a physical place and a cohesive social context, meaning architecture and the community, as a system that continually redefines itself and sustains and produces itself from its own interior.

The city must offer new forms of accommodation, promote integration, include diversity, combat tensions with gestures of concrete intersocial training.

Starting again from a dwelling where not only the hygienic or functional parameters of the modern are present, or typological cuts between 70s and 80s in which the demand-performance building process based on components and not on systems, has failed to produce living of quality, but a domestic life, in which the relationships between people take on the main importance, a dwelling in which it is possible to co-respond, a dwelling where the different conditions of today's living can be expressed. By now living in any part of the planet, with some exceptions, unlike some years ago, is subjected to a change "*obsessive, compulsive and unstoppable*" [Prigogine 1986, VI], and has as a minimum common denominator a sense of fragility , provisionality and vulnerability that leads to constantly changing one's state, and being in a perpetually "*unfinished and indefinite*" condition [Prigogine 1986, VI].
The periphery lives of distance, of discontinuity, of everything that is fragment, collage, mosaic, is not connected, identity is recognized in the distance. Thus the dichotomy between urban homogeneity and the production of peripheral differences is actually its dramatic strength. The problem of recognizing the suburbs is solved through the acceptance of the discontinuity of space and through the intensity of the architecture. To reconstruct the sense of belonging, the periphery must be expressed through conflictuality, through the language of differences, or as Persico said, through the "[...] *substance of things hoped for* [...]." [Persico 1935]
The redefinition of meaning and sense of this heritage takes place with a new theoretical, methodological and applicative approach, which includes memory, innovation and sustainability, accompanying the mutation of spaces towards the assumption of new value with hybridisation tools.
To work through this vision means to enter into that system of thought in which the concept of "translation" is introduced, understood as a spatial element in which one's own and the stranger cohabit which are therefore not brought back to a single thing or an absolute knowledge, but they are unified on the model of hospitality and coexistence: as George Steiner states, "to understand is to translate". It is that attitude to receive, transmit and assimilate what derives from the context, and to register ourselves in the contemporary world as a complex reality in which both the universalism of the hypermodern society and the defense of the Communities and identities coexist details.
If the Modern had modeled objects that were defined through their masses, the organization of full and empty spaces, the constructive system and functional organization, basing on this compositional grammar the pride of permanence and the challenge to time, today this is the re-appropriation of the pre-existing heritage, the collective memory that places are able to represent, the key to shifting the search for a community's sense of belonging from a crisis level to a responsive one.
"*Beyond a peaceful and sterile coexistence of reified cultures (multiculturalism), we must move on to the cooperation between cultures that are equally critical of their own identity, that is, to enter the stage of translation*" [1].
In other words, we can try to "rewrite" history to the benefit of plural stories, that is, we can work on history through an identity approach in which past histories are "overwritten" with those present, using instrumentation in "agreement"[6] with expressive identity drives.
"If the fundamental artistic question is no longer" what to do again "but" what to do with what we have available "... we must activate processes in which alternative

protocols are developed for representations and narrative structures already existing:" learning to use forms it means first of all knowing how to make them their own and inhabiting them "passing from a culture of consumption to a culture of activity, from a passive attitude to a form of resistance based on the reactivation of denied or marginalized potentials" [2].

The great signs, the great works of architecture, the urban projects aimed at reconfiguring entire cities or parts of them are no longer part of the new vision of the world. A majestic infrastructural signs rather than imposing new districts or renovation projects of entire residential compartments, a strategy must be replaced that foresees much more targeted interventions, whose sum leads to the whole, but that even only a part of it has a defined character and concluded.

Mutation spaces, open systems, interstitial projects, projects in constant progression, solitary insertions capable of rebalancing a system of relationships and reciprocal relationships that are completely inhomonous today, aimed at defining the evolving form of urban environments through punctual non-invasive interventions, pragmatically oriented to construction of rhizomatic networks of new urbanities.

AIMS & OBJECTIVES

In this new dimension that Alain Touraine defines as "post-social", it is necessary to redefine the methods and tools of the project through a new and hybrid approach in which both the global economic actors and the new subjects that are emerging in our society can coexist. Ethical *informal communities* united in individual subjectivities [3], which create flows of opinions able to change our lifestyles with a typically *glocal* [4] approach, thanks to the new tools of technology.

This approach establishes the temporary end of architecture as an autonomous thought. And this is not a novelty in architecture. Aldo Rossi has already confirmed architecture in history and its elements, just as for Robert Venturi architecture is communication and can recover the expression of latent cultural values within a given social group and translate them into symbolism historical, or for Peter Eisenman architecture finds confirmation in a language endowed with a structure and syntax proper to the semiological linguistic theory.

Consequently the architectural thought in this continuous and amplified flow of the "social types" and of their multiple instances, cannot avoid the attempt to understand their needs, nor limit themselves to a realization of only response to quantitative dynamics, but must be able to activate qualitative processes that can respond to the needs of a multiple and mutant contemporaneity: only in this way will it be possible to carry out interventions capable of satisfying the different and heterogeneous needs of society.

The replacement, in contemporary design, of the closed idea of composition (the exact and designed establishing of parts) with that of "system" (an "open" mechanism or ideogram vector, capable of favoring varied combinations and different formal manifestations), is one of the first examples of paradigm shift. [Habraken, The structure of the ordinary].

The architectural system of function, or the post-modern concept of exaltation of the concept / design born from a totally personal approach, is opposed to the systemic organization. The new architecture is defined and made comprehensible through non-Euclidean canons, through a process logic of the organization of relations with the

different elements present: information, communication, temporariness, spaces and their conditions, the topographic and morphological type, historical, community values, activities, proximity and reciprocity.
The concept of processualism that can be declined through strategy is assumed as a paradigmatic element for the contemporary architecture project: processualism understood as a plan of actions conceived and designed to achieve a particular objective, identifies the goals and direction of the project that is accomplished through a series of actions /instruments. A strategic approach that allows us to respond over time to the ever-changing and increasingly accelerated programs that the mutation space will undergo over time.
The architectural project is called to contaminate its theories, methods and strategies in a new project method that is a strategic approach inclusive of the changed cultural, social and architectural scenarios closer to the circularity, to the recovery of resources and existing spaces.
Circular system [5] that in architecture declines, unlike the linear one characterized by the continuous consumption of soil and resources, in a vision determined by the containment and arrest of this consumption, in which sustainability is not only understood as a technical element but above all modus operandi, immanent value, to collect and decline the multiple instances, with particular regard to environmental and social ones and in which it is necessary to introduce different methods and tools typical of the architectural project.
It is therefore necessary to include the architectural and social "waste" in the process of mutation in order to carry out a process of overall regeneration of the degraded spaces. (Figure 4)

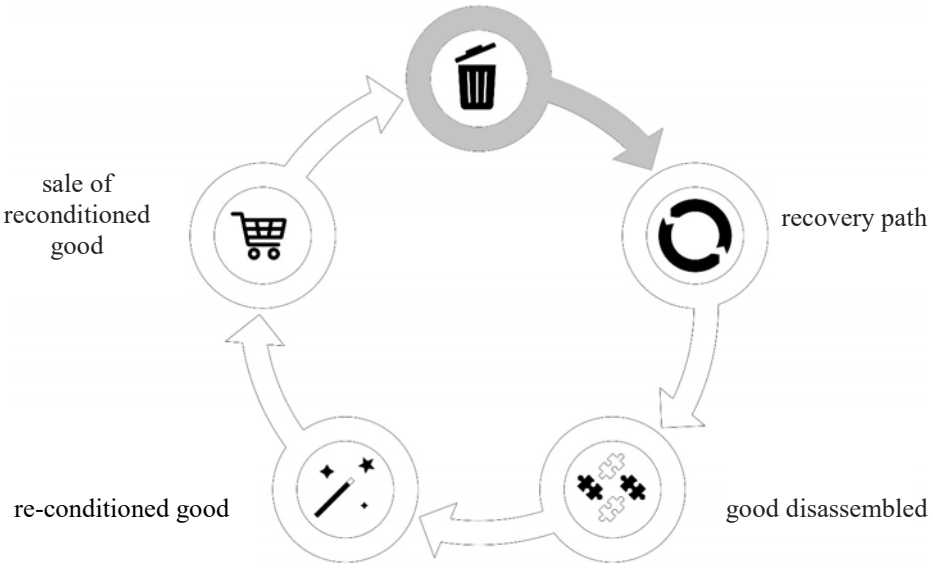

Figure 4. Circular design process

These conditions lead to a set of interventions on the city and its architecture that is no longer unitary, but fragmentary, with the conviction of reinterpreting and creating a new

link with the specific context, based on a new agreement between architecture and sociality.

Working on the already built, on the memory of the pre-existing, with the figures of re-conditioning rather than with those of infinite growth, seems the most convincing way for contemporary architectural thought.

In order not to run the risk of operating with considerations that include large-scale problems, it becomes fundamental to define a reflection of necessity that is implicitly identified in the relationship between theoretical thought and action in architecture.

The main objective becomes the definition of a new design method, sustainable and circular, reversible and adaptive, able to involve the different communities and socialities in the project system, as well as the different spatial scales of the built, urban and architectural, through:

- *The use of a circular strategy based on the re-conditioning of the existing recognizing a current value to the current waste;*
- *Involve in the project the opportunities present in the urban fabric, recovering them in a system logic and making them accessible to the community, making them new polarities capable of bringing regenerative phenomena into the internal fabric, using new tools to redefine housing and elements such as compatibility between ethnic groups, waste and consumption;*
- *Redefining the limit by changing it into a margin, so as to take on the role of a meeting interface between the new and different socialities and between the internal / external spaces of the housing generating a new perceptive value and elements of energy containment;*
- *The use of the "technical vacuum" between buildings as an element of "environmental restoration" through urban-farming, densification of trees and needs identified by the community*
- *to expand the public portion of the buildings, "inserting", on the blind sides "parasites" able to allow "disadvantaged" social groups the use of a "temporary" shelter.*

A circular, adaptive process system that defines its operability through the architectural project.

METHODOLOGY

Re-conditioning therefore becomes both a theoretical assumption and the operational purpose of the discussion, but also that "relational" system of connection of the differences is that symbolic element able to highlight and emphasize the sustainable change of linear to circular system. [6].

Theoretical assumption as it defines a new explanation of the relationship between the existing and the new, from the scale of architecture that of the anthropized landscape, passing through the city, through *"an attitude proper to architecture to adaptation, to subversion, to the reinvention, to dialogue with one's own time, and the call to measure on new conditions the search for new attitudes"* [7].

Operational purpose since it is based on the response to the opportunities of mutation of existing architectures and spaces, in which ada ptive intervention tools are defined that are able to change, adapt and rename the existing and change the gap in value.

The intervention on the “discarded” architectures of the city, becomes *a pretext*, in its sense of non- substantial ornamentation (the Latin *pretextum*), an occasion for the

launch of social sharing platforms, premise, *pre-text* of a new social and urban story, able to favor the transfer of interest (transference) from the technological object of the *virtual community* to the place of life of the real community.

Using re-conditioning as an overwriting operation and known practice means starting from the analysis of the typical elements of the new forms, even virtual, of community and sociality and of the physical element, building or space and defining a design system of the discarded spaces of the city.

Operating through a procedural system, understood as a plan of actions designed to achieve a particular objective, identifying the aims and direction of the project that is accomplished through a series of actions / tools, allows us to answer a series of questions on the history of the single building or specific part of the city occupied by the community. Verify if it has a historical testimonial value or belongs to a minor vocabulary, if the collocation in the context, both urban and landscape, suggests possible relationship scenarios, if the insertion of new needs is possible in relation to the existing structure / space, if the mutation operation is sustainable both socially and economically, they become the cornerstones of the process.

Re-conditioning as a new paradigm is rooted in contingencies, and is the occasion for the definition of tools and techniques belonging to one's own cultural system of mutation of the existing which, recognizing a dimension of history in which the relationship space time is not reduced only to the present, it moves between the recognition of necessity and the search for a new definition of expressive tools capable of giving a different answer to the relationship between *"notum"* (in the meaning of finding what we have buried and forgotten or “discarded") and *"novum"* (in the sense of inventing "what is proposed and required) [8], and it is proposed as a new paradigm for the architectural project.

This strategy becomes a tool for mediation and contamination between pre-existence, heritage, identity and new ways of interaction, organization and participation of people, gathered in the Community, in a "shared" space.

New application tools are defined to be able to investigate and work with existing tools. heritage and left in dismantling in our cities, which are the theoretical and disciplinary nucleus of architecture and to allow us to regenerate what is today abandoned or discarded, leading to functional, structural and aesthetic obsolescence.

“[…] *to look at architecture as an achievement on the world of our life that translates and specifies through the project. Architecture asserts itself according to its own expressive means, affirms itself in the culture of its own time: it is an expression of change, but jointly offers itself through the resistance of the place of its establishment and its necessity to relate to the context*” [9].

The design process proposed in 2003 by Stephan H. Haeckel, *Adaptably loop* [10], is the methodological starting point of the procedure. It is based on the multidisciplinary of knowledge and content and on the synergistic interaction between all the components. Based on four points, the *Sense*, the *Interpretation*, the *Decision*, the *Act*, for Haeckel the process allows intersections and interactions between different knowledges. The application of this design process evolves into a personal interpretation of the four points with a fifth one: The *Outcome*. However, the Haeckel process applied to the various complexity of the phenomena typical of the contemporary leads to reconsider the original reading of the contaminations between the many and

infinite stories of the social and architectural elements that define the design. They relate, intersect, hybridize, allowing a continuous "adaptation" to the fast and changing conditions of the project itself.
The *Sense* becomes a field of action to work and try "*to break the vicious circle that links the growth of empathy with the increase of entropy*" [11]. The *Interpretation* outlines the elements of the process. The *Decision* defines the intervention strategy through the elements of the circular and adaptive process. The *Act* determines the operational tools to implement the strategy. The fifth one, the *Outcome*, is the result of the application of the tools. (Figure 5)

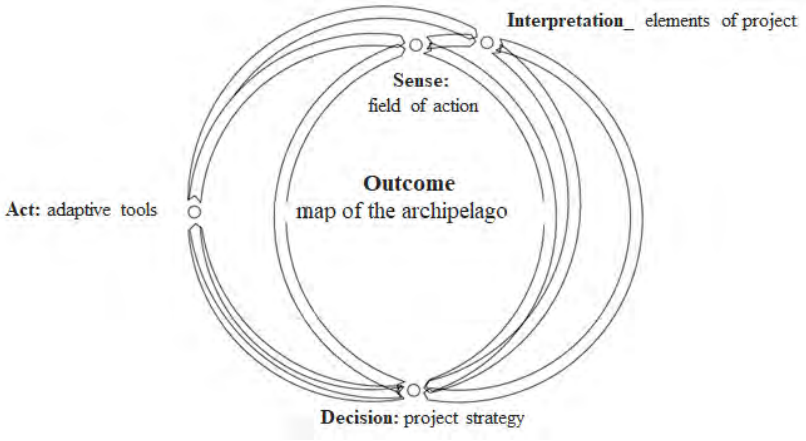

Figure 5. Circular design process

Sense*: area of intervention*

The planned *re-conditioning* operation does not require a revolution, but rather a reorganisation, limited to repairing the spaces rendered unusable by time and introducing a new design system that uses adaptive tools. It is a whole series of actions that imply an accurate documentation of the architectural and social state of art. Not only as a support element of the architectural concept, but as a true reference tool for the constitution of the architectural project, the economic program, the relationship with the inhabitants and the management of the intervention.
This proposal arises from the need to practice a new vision of the operations of reconversion and mutation. A vision that arise awareness to the re-conditioning not as an outcome, but as a process, constant and continuous, in which the role of the architect changes from being a pure technical of the project to a strategist architect, skilled amanuensis of *urban overwriting*.
A consequent device of integration between what exists and new insertions, implemented with the logic of minimum intervention and translating the circular system into the entire design process and not just as "technological sustainability" or re-assembly (re-cycle) [12] of components used in other contexts or uses. A design strategy based on punctual urban insertions able to revitalize the object itself first and then the whole surrounding area through an osmotic principle. This strategy can be implemented gradually, even temporally, step by step, area by area, through clusters; it can be realized starting from a small space with simple interventions able to gradually transform it and redesign the area.

Interpretation: *Elements of the process*

It is therefore intended to *re-condition* part of the existing, starting the mutation of the neighborhood starting from the mutation of housing through light, temporary insertions able to allow continuous mutations in a continuous process of mutation able to satisfy the continuous and changing needs of family units and redefining the threshold space between inside and outside.
This relationship is the circular reinterpretation of the concept of boundary, no longer a line of physical separation but a band of overlapping cultures, ethnic groups, events, different tourism systems, mobile margins that are always in continuous discussion and mutation. The *margin* is an interface tool that is based on the concept of social and architectural proximity.
The social one is based on a new way of seeing the permanence of people within a group whose intentions are shared, and which include processes of integration. The architectural one is where the internal and external common spaces become an interesting complex of intents in the definition of a barrier. It is intended as a margin, threshold, which acquires thickness, and which is modulated to meet the different needs of use.
The *margin* is an element that refers to a variety of situations adjacent to something that is physically recognizable. Areas of proximity, hybrid interfaces, in which the social and intergenerational encounter takes place. It is a tool that captures the elements of permanence and memory to be privileged and actualizes new ones through which the project will develop.
No more boundaries, i.e. lines that mark a separation between different entities, or limit, which reinforces the concept of separation. A porous space between the elements of the "*relationship*": that conception of proximity between people and things that can generate and generate an identifying space between the different entities that make up the scene. The *margin* as an interface then becomes the instrument with which to communicate and the space where the different social and architectural realities that make up the scene meet.
Decision: *project's strategy*
The main concept behind this method is the architectural and social **resilience**. **Resilience** is the ability of a system to restore conditions following a high impact event by adapting to change. This capacity is expressed through an innovative method underlying the circular project system.
In this way, referring to those scientific investigations that reveal how natural structures "evolve in the context", as complex adaptive forms, it was decided to change and intervene on existing buildings and not to perform a demolition or a replacement operation.
Likewise, as natural systems present a diversity and redundancy, have an interconnected structure and have the ability to "self-adapt" the distribution of structures is on scales so the project system has tried to resign the same characteristics in the field.
It is proposed to shift the emphasis from the pure building, object of design, to an element of transit for a social change: the intervention becomes an opportunity to start sharing platforms, the premise of a new social and urban story through the introduction of a new urban alphabet, new tools, minimal interventions.
Act: *Adaptive tools for urban overwriting*

The adaptive tools used have been applied to the architectural scale and define a new urban alphabet of minimal interventions: a reconfiguration with light elements, temporary housing, to equip them with all those services that contemporaneity requires. The pre-existing heritage, the field of identity, becomes the field of action of the social and architectural project; their relationships, the selection that will be made on the existing elements will trace new hierarchies and allow the introduction of new tools for sustainable mutation.
The tools, precisely because they are child of a strategy and not of a language, will have the characteristic of being "adaptive" with respect to the project, that is, able to satisfy the possible reconfigurations over time. (Figure 6)

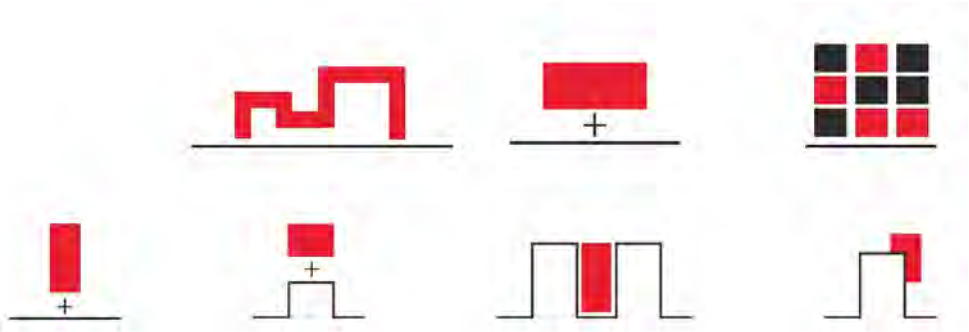

Figure 6. Urban alphabet of minimal interventions

So we work through a series of juxtaposed figures, hybridized together to interpret the previous layers and introduce new ones
The strategy therefore uses adaptive tools that include interventions on different scales and on different spaces:

- **Grafting** [13], In their original configuration, the lodgings were organized in all the buildings and on all the floors according to an identical basic structure. Room elements, usually of a square shape, are connected directly in simple or in double row, separated by a central wall.
  With the use of new tools and the inclusion of new elements, we preferred to create spaces without a precise destination, adaptable to different needs in space and time that do not define a function a priori but are subject to the hybridization of living and working in the contemporary. Temporality is the central element.
  In this way it has been possible to create a mix of housing divided in all different layouts into the same building organism, usable by a various type of users.
  The new simplex and duplex accommodations were then designed interconnecting rooms and were articulated using light elements positioned by the user according to their life styles to detail the spaces without a defined use.
  That includes the kitchen block, only two different types of bathroom, a single type of staircase for the duplex, only two groups of cabinets made with light "temporary" and "reversible" wooden parts. (Figure 7)

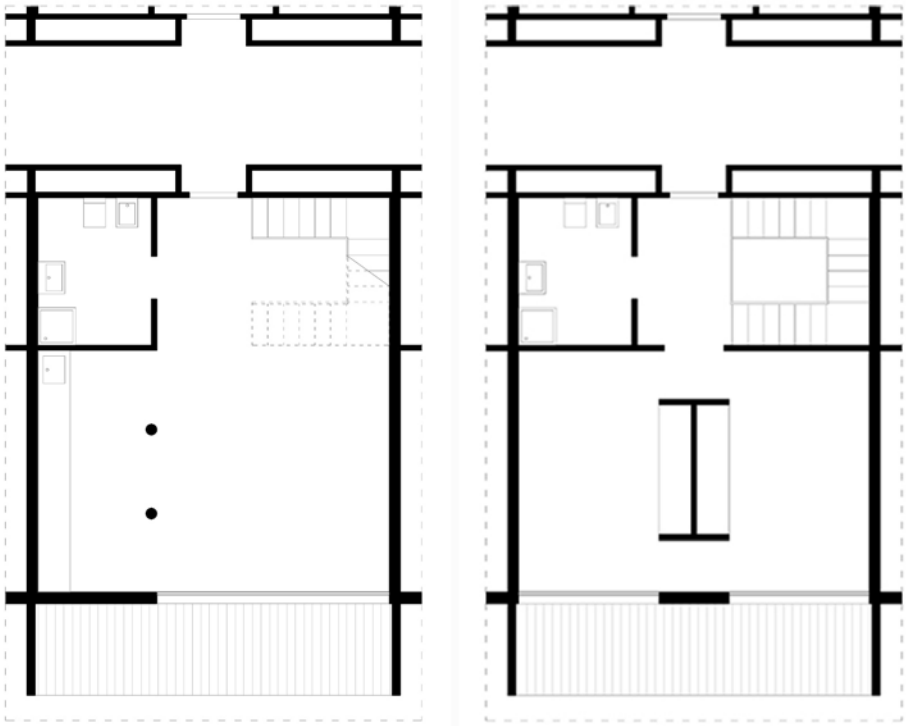

Figure 7. new housing configuration with both the new "boxes" and the "parasite" inserted

- At the same time, it will also operate on the main facades, making the external walls completely windowed where a "parasite" will be "inserted". The idea of the residential building is hybridized, eliminating repetitiveness and enhancing self-adaptation. In this way, rather than creating collective interpretations of individual life models, we have tried to achieve prototypes that represent individual interpretations of the possible collective models. This interaction was made possible through a communication with the inhabitants mediated by the social facilitators, who have rather openly suggested the pressing need for a new and mutable organization of living space;
- **Parasite** [14], operating on the faces of buildings by inserting a new element with its own structure that allows a different perception of the external space. To this new internal configuration we can think of adding a new mediation space between the interior and exterior of the buildings, building a new space on the long facades of the buildings, opening, where possible, the existing external walls, composed of an autonomous frame, able to define new “covered or uncovered” spaces, which allow a greater surface area of the lodging, to relate to the external space, but also to interface as an element of bio-climatic management bringing warmth during the winter months and mitigating the sun during those summer. This parasite, with a mixed wood-cement structure, will have glass walls and will serve, as well as an element of "relationship" also as an element of energy management in the different months of the year. On the blind sides a similar autonomous structure in steel or wood / cement can be inserted, able to accommodate small cells for temporary housing or for homeless. (Figure 8).

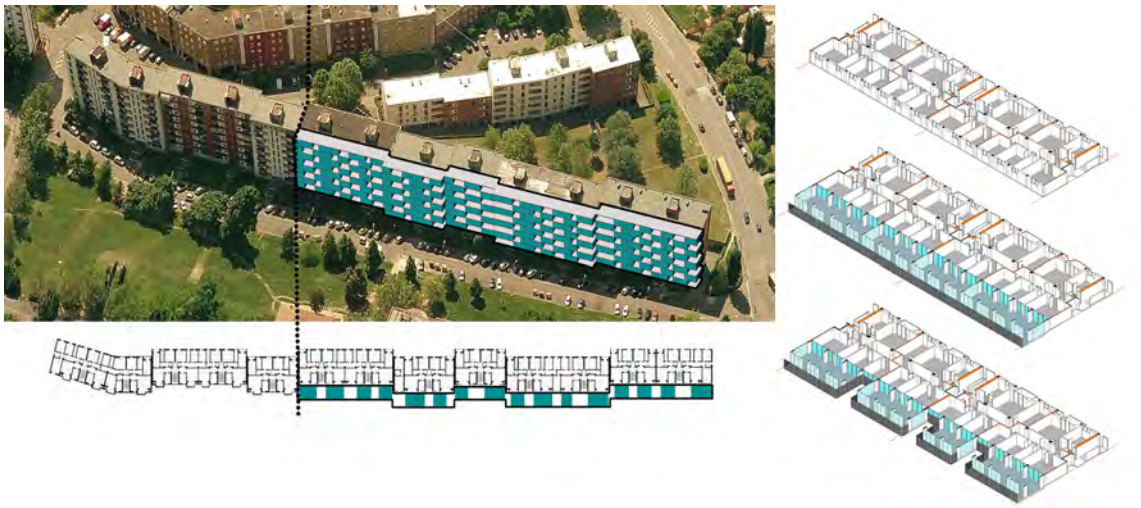

Figure 8. New configuration of building Pilastro Quartier in Bologna. New external parasite for to have a new margin. Right up existing above possible configuration of new margin.

- **In-between**, of the open space between buildings, which should no longer be understood as "generally green" but as a space where the community finds itself and dedicates itself to its own pastimes, to its sustenance through urban gardens, to the place where to insert plants to improve air quality: it must be "densified" by the community.
- **Level 0,** housing must be converted into hybrid spaces for the community. These spaces will have to find conditions of necessity with respect to the requests of the Community and will have to be translated into services for the same: such as, for example, small kindergartens where single mothers can keep children for those who work, small bicycle repair shops and local refills electric.

The design tools derive, in part from an interpretation of the typological classification system as an evolutionary and dynamic principle applied to spaces and situations not yet codified. Partly from adaptive logics to the use of a circular structure that changes and configures according to the conditions of the context.

Outcome: *map of the neighborhood Archipelago*

The result of this design method is to propose a regenerative intervention approach, able to promote the renovation of the existing and a quick configuration in continuous change, attentive to the city development. That makes the project adaptive to the flow of time, in harmony with the real, cultural and immaterial changes of the context. Working *in and with time*.

An operation managed with this methodological design approach will lead to the *real-time* reactivation of the social and building connection within the Residential Quarters, allowing over time that continuous overwriting of the space and therefore of the relationships between the people who would re-establish the waste today existing speed between the urban development of the city and the community. Working with the present Community, prefigures a continuous monitoring and interdisciplinary management system of the results able to guide future choices within the design process. As temporary and light, the use of adaptive tools will allow a stable

reconfiguration in infinite possible solutions, in relation to the continuous and dynamic changes of those who live in the districts.
In this way a series of specific interventions will be set up which will form a *neighborhood archipelago* [15]. It determines a map no longer **outcome** of planned transformations, but fragmentary and solitary insertions deriving from the relationship between the strategic project and the progressive check-change following the needs expressed by the local community of the inhabitants.
The final result is therefore the great variety of possibilities to change the internal organization and the size of the housing since the households, mostly immigrant households, from a recent survey, are numerically larger. Working with and for the communities of residents allows users to become co-producers of the mutation and therefore share the project choices understanding and translating the needs.
The introduction of a new threshold space between inside and outside allows the user to relate to the common space and to have a platform space to be used: as an internal space it allows to have a closed, semi-closed or open space to be used according to the needs of the family; with regard to the external space it becomes the space in which the "technical void" of the modern is attacked, giving it a space of relationship between the different families and the outside. This type of intervention, at low cost, also allows to mitigate the temperature inside the house both during the winter months, when this space becomes an accumulation of energy, and during the summer months when it is a space of shadow and therefore mitigation and ventilation.

REFERENCES

[1] Bourriaud, N. (2014), *Il radicante*, Translated by M. E. Giacomelli, Postmedia books, Milano. p.27
[2] Chiodi S. (2005)., book presentation *Post Production. Come l'arte riprogramma il mondo* di Nicolas Bourriaud, Alias, Persiani, Bologna.
[3] Touraine, A. (2017), *We human subjects*, Translated by M. M. Matteri, Il Saggiatore, Milano.
[4] Robertson R. (1992). *Globalization. Social Theory and Global Culture*, Sage, London
[5] Braungart, M. and Mcdonough W. (2003). *Cradle to Cradle Remaking the Way We Make Things*, North Point Press, New York.
[6] Lacy, P. and Rutqvist J. and Lamonica B. (2016). *Circular Economy, Dallo spreco al valore*. Translated by M. Vegetti. Egea, Milano.
[7] Fabrizia I. (2014). *Re-cycle. Op-position II*, edit by di Sara Marini, Sissi Cesira Roselli, Aracne editrice, Roma, , p.36
[8] Dionigi, I. (2019), *Osa Sapere. Contro la paura e l'ignoranza,* Solferino, Milano. p.13
[9]Cantone D., Taddio L. (2011). *L'affermazione dell'architettura*, Mimesis, Milano, p.16.
[10]Hugh Dubberly H. (2004). *How do you design?,* in Dubberly Design Office (edit by), San Francisco, USA. P. 131
[11] Rifkin J. (2009)., *La civiltà dell'empatia*, traslated by P. Canton, Mondadori, Milano. p. 28
[12] Ciorra, P. and Marini, S. (2012). *Re-cycle*, Electa, Milano.

[13] Zucchi, C. (2014). *Innesti-Grafting*, La Biennale di Venezia, 14° Mostra Internazionale di Architettura, Marsilio, Venezia.
[14]Marini, S. (2008). *Architettura Parassita, Strategie per di riciclaggio della città*, Quodlibet, Macerata.
[15] Aureli, P. V. (2011). *The Possibility of an Absolute Architecture*, The MIT Press, Cambridge.