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Programmi di ricerca cofinanziati - Modello E Relazione scientifica conclusiva sui risultati di ricerca ottenuti - ANNO 2007 prot. 2007K8WPSZ

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|---|---|
| 1. Area Scientifico Disciplinare principale | <i>08: Ingegneria civile ed Architettura</i> |
| 2. Coordinatore Scientifico del programma di ricerca | <i>TODARO Benedetto</i> |
| - Università | <i>Università degli Studi di ROMA "La Sapienza"</i> |
| - Facoltà | <i>Facoltà di ARCHITETTURA Valle Giulia</i> |
| - Dipartimento/Istituto | <i>Dip. ARCHITETTURA E COSTRUZIONE</i> |
| 3. Titolo del programma di ricerca | <i>RIQUALIFICAZIONE E AGGIORNAMENTO DEL PATRIMONIO DI EDILIZIA PUBBLICA. LINEE GUIDA PER GLI INTERVENTI NEI QUARTIERI INNOVATIVI IACP NELL'ITALIA CENTROMERIDIONALE</i> |
| 4. Settore principale del Programma di Ricerca: | <i>ICAR/14</i> |
| 5. Costo originale del Programma: | <i>363.000 €</i> |
| 6. Quota Cofinanziamento MIUR: | <i>149.160 €</i> |
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10. Obiettivo della ricerca eseguita

As is the case with most European nations, during the 20th century Italy developed a significant public housing stock, which despite its at times relevant urban and architectural quality encounters today major problems jeopardizing its future. The ever-dwindling public finances produce great difficulties in many cases even to carry out the most basic maintenance processes, not to speak in the perspective of the wide-ranging transformations which would be necessary to ensure the survival of this great endowment for the future.

The problems of public housing are clearly not an architectural issue only, since its very existence embodies all components of urban life. However, in many cases of public housing refurbishment recorded world-wide - only a fraction of which have been carried out in Italy - it must be observed that the urban and architectural perspectives are mostly absent, if not merely in the technical interpretation of energy performance. This "sectoral" approach is in our opinion largely problematic, since it implies the risk of sacrificing urban and architectural quality in the name of mere efficiency.

Although Italian urban culture has been a model for ages, with few exceptions the growth of cities during the past century has largely relinquished this ancient quality, brutally supplanted by waves of speculation. The second half of the 20th century in particular has witnessed massive urbanizations lacking any form of efficient, quality-producing planning (Insolera, 1983; De Lucia, 1989). Although with different dynamics, this exploitation of space is still going on today, with visible and often critical results in terms of overall urban quality (Clemente, 2010).

In this panorama of weak and inefficient planning, public housing estates have usually been capable of defining a "different" way of building the city. Despite what can today be clearly highlighted as shortcomings, if compared to the drab, characterless sprawl of the unplanned city, the public housing estates have generally yielded recognizable, structured urban spaces. After the first decades of life have worn away social tensions, and inhabitants have increasingly grown accustomed to these realities, social housing projects are capable of standing out from the anonymous context of the 20th century Italian city. As such, many of these estates are effectively becoming a piece of modern heritage: not only in relation to their greater or lesser artistic or aesthetic quality, but as pieces of urban history, which must be therefore balanced between conservation and sensible transformation.

Under this light, urban and architectural culture must be capable, in the near future, of identifying viable, efficient and sustainable strategies to guide the process of transformation, acquiring a form of pragmatic knowledge to be shared with the public authorities in charge of this process. Although social and economic considerations are central in urban renewal, the aspects connected to urban and architectural quality cannot be relegated to the background.

These are the considerations underlying the research project carried out in the past three years, focusing on the strategies for the urban and architectural re-definition of public housing estates in central and southern Italy. The main objectives of the research were to define possible guidelines to be used by local housing authorities in the event of major refurbishment or transformation projects, and to identify a common methodology for both analysis and intervention.

11. Descrizione della Ricerca eseguita e dei risultati ottenuti

The large amount of public housing estates realized in Italy between the 1930's and 1980's display a wide diversity in terms of general layout, as well as of design and building solutions: each of these different orientations eventually produced specific and characteristic problems. Despite this, it is possible to identify a number of common critical issues, which served as the starting point for the framework of the design guidelines to be produced.

A critical distinction was operated by highlighting those specific issues where an actual intervention could be considered feasible as either a reduced-budget initiative, promoted by a public administration, or through more consistent investments provided by the private sector. In both cases the time factor was taken in consideration, as well as the potentiality of producing an effective transformation governed by general design guidelines.

In this perspective, which focuses on the design aspects of public housing estates, it was decided not to consider all those criticalities caused by poor management on behalf of the housing authorities, or to the insufficient if not altogether absent connections between the neighborhoods and the surrounding city (as in the case of lack of public transportation, interference with major infrastructures, presence of environmental pollution etc.). Given that most of these external critical factors cannot be reasonably mitigated through design actions limited to the residential areas alone, except, where applicable, through the use of screening systems, the main focus of the research was concentrated on design-oriented transformative actions belonging to three main areas: functional adaptation, structural and / or constructive refurbishment, transformation of housing units.

The various criticalities which can be solved through feasible and sustainable structural or constructive interventions can be grouped according to the greater or lesser impact on the existing buildings. The research group therefore used the criterion of "aesthetic impact" to organize the different intervention strategies, with the aim of allowing potential decision makers using the guidelines to orient their action on a case-by-case basis, selecting solutions through a cost-benefit analysis.

The research methodology adopted in this project set out from the creation of a common, comparable knowledgebase for all case studies. This included archival research on the original projects, collection of statistical data, as well as the surveying and representation of all analyzed neighborhoods from their urban layout to the information related to building construction and current conservation and performance problems.

On the basis of this documentation, a number of design workshops within each research unit was carried out, with the aim of identifying, through a substantially empirical approach, the main categories of intervention strategies. The outputs of these workshops were then compared, outlining a "matrix" of partialized actions. Using a SWOT-like analysis, the various actions were then compiled to produce a set of multiple guidelines for the intervention on public housing estates. These were subdivided in terms of scale (from the urban dimension to the construction detail), and in relation to the various critical aspects, from functional issues to the aesthetic impact of interventions. This matrix can be used both as a classification of interventions, and to assess the potential and impact of any proposed transformation.

Case study selection and general description

The case studies selected for the research project were proposed by each unit with the intention of achieving a wide coverage of the different types of public housing developments built in Italy during the 20th century. Both before and after World War II Italian governments and local authorities launched major housing campaigns, meant to provide affordable housing to the rapidly increasing urban population. Various national laws regulated the development processes, and eventually led to the realization of an extensive stock of social housing which is today still largely owned and operated by public authorities.

Each social housing program launched during the past century was guided by regulations defining several critical factors such as building types, dwelling sizes, economic factors and at times even construction methods. These sets of laws, usually of national validity with some significant regional interpretations, produced recognizable "families" of housing estates, clearly influenced by each period's urban design and architectural culture.

Despite the strong social tensions which have characterized a significant part of public housing developments in Italy, and still today represent a major criticality, these neighborhoods are often valued for their standing out from the unregulated growth of Italian cities. Originally located in extremely peripheral areas, most have been by now incorporated by speculative developments, and frequently enjoy today a favorable urban location, especially in comparison with the sprawling growth of recent decades.

This consideration provides the central criterion adopted in the selection of the case study: public housing complexes which have been capable of producing, at the time of their construction or over the following decades, a recognizable urban situation, providing inhabitants with a significant living space. The urban and architectural qualities of these estates have been taken into account to the extent in which they were capable of establishing this recognizable character.

Further criteria adopted included the specific conditions found in each case study, the use of special or innovative construction materials or techniques, and the exemplary character of some estates, which can be considered as representative of several other contemporary public housing projects.

The ten case studies can be divided in four distinct chronological groups: those built between World War I and World War II under the Fascist regime, those realized in the 1950's and 60's with the INA-Casa housing program, and the estates regulated by Law 167 of 1962, which paved the way for three decades of social housing in Italy.

The Alfa Romeo complex in Pomigliano d'Arco by Naples (1939-1943) is an outstanding example of workers' housing, a sequence of four large courts located in the automobile factory's vicinity. The linear layout of the three-storey buildings was designed to create a urban front on the north side of the complex, while providing space for vegetable gardens inside the courts. The orchards were meant to be maintained by the inhabitants of the buildings, but over the decades these common spaces have increasingly been saturated by informal structures substantially altering the original architecture.

Borgo Appio, near Grazzanise in the Province of Caserta, was built in the same years. It is a small rural settlement, part of the Fascist regime's development policy which spawned a vast amount of such hamlets throughout the national territory, but particularly in Italy's less developed central and southern regions. This complex comprises both housing and agricultural facilities, a church and community services, all built in rustic style. Even though the area and its surroundings are still today largely agricultural, the original buildings have been subjected to significant transformations.

The Quarticciolo neighborhood in Rome (1941-1943) belongs to a series of housing districts built under Mussolini to house former inhabitants of center-city slum clearances. These estates, known as "borgate", were built in very short time and with an extreme economy of means, adopting simple yet efficient urban layouts based on consolidated dimensional and proportional systems. Although today's demographic structure has substantially altered their usage pattern, and the general maintenance conditions are very poor, the surviving borgate in Rome are increasingly appreciated because of their sound urban structure.

The Borgo Ulivia housing complex outside Palermo was built starting 1958 in the framework of the INA-Casa program, the largest housing initiative of the post-war years. Its articulated, granular urban structure and use of diversified building typologies allowed this neighborhood to be well accepted by inhabitants. Today, as is the case of many other public housing estates, many problems are dictated not so much by the intrinsic urban and architectural conditions, but rather by the "overgrowth" of the unplanned city, which brings its strong criticalities to the gates of these neighborhoods.

The Vanvitelli neighborhood in Caserta (1962-1966) is another realization of the INA-Casa program. As in the case of the Alfa Romeo workers' housing, the typological model is that of a large court harboring open spaces dedicated to sporting and other outdoor activities in its center. The court is enclosed by five-storey slabs on pilotis, articulating the terrain gradually sloping from north to south, and the urban design is completed by four six-storey towers. The main criticality of this neighborhood is the largely improper use of collective spaces, and the interconnections with the surrounding city.

Piombino, a seaside town in Tuscany and home to one of Italy's largest steel industries, hosts the CECA-Italsider housing, a model workers' complex built between 1964 and 1972. This estate's particular interest is connected with the experimental building technologies adopted and their conservation problems. The articulated building typologies used in the complex allow a flexible engagement with the sloping terrain, as well as the creation of a distinctive urban space, which is still today in comparatively good conditions.

Z.E.N. in Palermo (1969-1982) and Vigne Nuove in Rome (1972-1980) are two emblematic examples of housing estates developed under the 1962 National housing

law. Architectural culture of that period prompted for large, radical developments, semi-autonomous cities which could at least in principle function with no connection to the preexisting city. Previous urban design strategies focusing on an organic articulation of separate buildings were substituted by a mega-structural approach. Independently from the overall urban or architectural quality, which is at times very high, these developments often gave rise to harsh social tensions, which are in many cases still unresolved even after various decades. Apart from issues connected to the “ghetto effect” occurring in most low-income neighborhoods of this period, there is an objective difficulty bound to the limited “identification” in inhabitants of large scale, repetitive housing developments. Both Z.E.N. and Vigne Nuove, which are characterized by a strong architectural character, have substantially failed in creating public spaces, community identification, and are to different extents burdened by social problems, at least in part caused by the urban and architectural structure.

Slightly later interventions such as those of Adrianello by Tivoli near Rome (1976-1987) and Monticchio by L'Aquila (1983-1986), both built under the same 1962 housing Law, return to smaller dimensions and less radical layouts. Contemporary trends in urban design and shrinking public financing led to realizations of more down-to-earth character; nevertheless, the overall poor management of public facilities and open spaces has brought these estates to accumulate significant criticalities not unlike earlier complexes. In both neighborhoods the urban quality is influenced by the lack of public services, and the abandoned common spaces starkly reducing the perception of security on behalf of inhabitants.

Main criticalities and proposed intervention strategies

Exterior spaces

A significant range of the criticalities observed in the case studies, and arguably belonging to many more housing project in the Italian public housing stock, are related to public spaces and common areas. The actual efficiency of such spaces is generally of fundamental importance to ensure the appropriate operation of residential complexes, even more so in large-scale neighborhoods, as can be observed in several of the case studies.

In general, the scarce regard paid to public spaces sharply contrasts with the high architectural quality of buildings, a counterpoint typical of a large share of Italy's 20th century design culture. The careful experimentation on the housing units, aiming at realizing increasingly efficient machines à habiter for ever-growing numbers of inhabitants, clashes with the often careless indication of interstitial spaces between buildings as “public park”. Large swaths of land were left “floating” without any kind of mutual interrelation, and the principle of urban design was often sacrificed for the sake of other priorities.

The critical node of public spaces varies in nature depending on the period in which the neighborhoods were designed. From the 1930's to the 1950's, the layout of buildings generally follows rather linear schemes, influenced on one hand by early 20th century picturesque town planning traditions in Central Europe and England, on the other with some clear hints at Rationalist avant-gardes. These at times “hybrid” models frequently produced high-quality spatial situations, with well-dimensioned urban configurations and an adequate functionality.

Nevertheless the open spaces, once actively used by the population as an outdoor complement to individual dwellings, a natural place for community life such as children's playgrounds, were increasingly abandoned due to the demographic shift, rising urban security issues, invasion of vehicular traffic etc. Lacking any form of enclosure or privatization, these public spaces are today scarcely utilized; in other cases, they have been informally occupied and privatized by the very inhabitants, increasing use and reducing potential risk, but also substantially altering the original spatiality.

In later years, notably from the 1960's to the late 1970's, the layout of public spaces is strongly conditioned by the large-scale, often abstract composition of the buildings. The main focus was shifted to the general, at times almost territorial scale of the neighborhoods, bearing a distinct recognizability. This strongly marked character, at times used to provide an anonymous urban outskirts with an identity, in other instances with a clearly artistic intention, is frequently detrimental to the actual livability of these neighborhoods. Several examples of housing estates originally intended as “pilot projects” have become ghettos, rejected by users and somehow by the city as a whole, highlighting the shortcomings of many radical designs, striving for an overly utopian ideal of social change through architecture. Although design alone can never be blamed for this kind of failure, the difficulty of assigning a specific use to sometimes vast and undefined open spaces eventually favored either their abandonment or entirely improper uses, in both cases leading to hardly manageable situations.

This specific criticality, typical of housing estates of the 1960's and 1970's, often extends from the open exterior spaces to common interior areas. In this latter case refurbishment actions can prove even more complex, since they directly impact on the buildings' structure.

From the early 1980's onwards the radical designs of previous decades give way to smaller, less imposing projects, however still characterized by high territorial density and assertive, distinctive urban and architectural character.

The criticalities related to public and common spaces in each housing neighborhood are central to the research project and to the drafting of the intervention guidelines. This concentration was prompted by the fact that the public property of these areas makes it more likely to foresee actual interventions, as well as by the evidence that a significant amount of shortcomings was occasioned by the erroneous organization of these spaces.

One of the most relevant issues in this sense can be considered to be the lack of interrelation between private and public spaces, a condition which can be recorded in all analyzed case studies. In addition to the poor maintenance of public spaces, this has led to a substantial abandonment and decay of most collective areas and green zones. The ensuing security issues clearly prompt for transformative interventions.

A further widespread criticality recorded in the case studies is the absence or scarce efficiency of connections between individual residential units and the exterior areas: this is generally caused by the reduced number of staircases, the limited amount or functionality of elevators, or the excessive length of common distribution corridors. Likewise, parking spaces are frequently undersized, unprotected and poorly illuminated, thus leading to their scarce use due to security issues: this becomes particularly critical when these areas are located in proximity of building entrances, since their presence negatively impacts on the overall usability of public spaces.

Public spaces, furthermore, are often used in improper ways, either because of bad design choices, leading users to appropriate spaces in ways originally unforeseen, or as a consequence of cultural or social mutations occurred during the lifespan of the buildings. Such improper uses become particularly critical in the cases of squatters' occupations, where informal dwellings are wrought out of common spaces, technical areas, or at times even basements. The living conditions can be often critical, and the very presence of squatters can become an element of conflict due to their non-acceptance on behalf of “regular” inhabitants.

Any form of transformation to be proposed for public housing neighborhoods must take into consideration the fact that public space cannot survive unless it is somehow assigned to a specific function, or use, or be subjected to the care and control of a group of users, while preserving its collective character. This is a specific cultural trait of Italian cities, where public spaces frequently fall in disrepair because they are not perceived as being a common good. Large and non-functional public spaces must be therefore subjected either to densification or partial privatization, in either case acquiring a specific character ensuring their appropriate use and maintenance.

Interior spaces

In general, the criticalities analyzed above can be solved through actions related to public or common spaces, with the exception of the refurbishment of individual housing units. Since these impact on the dwellings, their actual feasibility is strongly reduced by the need of relocating inhabitants, at least for the duration of the construction works. Nevertheless, most case studies would benefit from this kind of transformation, since nearly all public housing estates in Italy have been designed in a timeframe where the average household structure was substantially different from the present situation.

Up until the 1980's, traditional families, composed of a household with adults, several children and often also seniors, all sharing the same living space, represented the vast majority of users in public housing estates: today's close-to-zero birthrates in Italy have drastically increased the number of households composed of one or two individuals, in many cases elderly citizens. Although official data is often difficult to obtain, it is clear that many housing estates are today widely under-occupied. Apartments originally assigned to 8-person households may today only be inhabited by two persons, starkly reducing the overall number of inhabitants. This situation shows that Law 457, over three decades old now, is no longer capable of providing a significant response to contemporary housing needs, neither in the case of new building nor in that of housing renewal.

The sharp reduction in traditional households has gradually transformed the way families use domestic spaces. Increase in female occupation over the past decades

has also modified the traditional model of women widely occupied in domestic labor, thereby prompting changes in the use of spaces as well. The increased number of home-working individuals further requires different dwelling types to be implemented.

These new and more diversified lifestyles prompt for a far greater flexibility in the use of interior spaces, thereby requiring transformation strategies to foresee multiple, different living solutions within units which were usually designed in a serialized, repetitive manner. Today, a significant amount of housing units are over-dimensioned or, in the case of diversified household composition, lacking the necessary flexibility to respond to user demands. Any transformation of these units would therefore require the achievement of a far greater flexibility in terms of interior space organization, in order to introduce the possibility of increasing or reducing dwelling sizes, producing variability on a medium to long-term basis. Clearly enough this kind of flexibility is strongly dependent on the housing typology, the location and functionality of staircases, as well as the unit aggregation system within the building. The possibility of transformation is further conditioned by the buildings' depth, and is also directly related to its accessibility. The possible modifications on the buildings' structures is obviously dictated by the available resources: these can range from simple, light-weight transformations, limited to the renewal of technological components and the displacement of separation walls, to radical alterations of the residential spaces, potentially subverting the existing typological aggregations.

Building refurbishment, structural adaptation, energy performance

Clearly enough, the adaptation of housing units allowing for flexible dwelling solutions is often constrained by the presence of rigid structural systems, particularly as in the case of prefabricated construction from the 1960's and 1970's. In these cases, any transformation would require heavy interventions, producing a significant impact on the original structure and also implying costs rendering such actions not economically sustainable.

Structural safety is another fundamental issue concerning a wide range of public housing estates. Although situations of severe criticality have not been recorded in the case studies (with the exception of L'Aquila's Monticchio neighborhood, partially damaged by the devastating 2008 earthquake), analysis of several existing structures have highlighted potential hazards, especially in relation to seismic events. Minor damages in the buildings' construction can also produce dangerous situations, and sensibly reduce the overall efficiency, together with the structures' appearance.

At the building envelope scale, a common negative aspect of existing public housing estates is their low energy performance, both in terms of comparison to current standards, and of the buildings' physical obsolescence and weathering. Evidently, the energy performance aspects of housing renewal are those which tend to produce the greatest impact on the existing structures, even at times prompting the complete substitution of existing building envelopes.

All weaknesses so far outlined can be acted upon through interventions producing greater or lesser impact on the neighborhoods' overall appearance, and consequently on their identity. The drafted guidelines therefore aim at suggesting actions which, besides being actually feasible, tend to preserve the constituted identity of places: a fundamental decision to allow urban renewal interventions to be accepted by users and become truly efficient.

12. Problemi riscontrati nel corso della ricerca

Although in general the research activities proceeded quite smoothly throughout the project's implementation period, inevitably the vast group and related organization suffered a number of problems.

At the operational level, the participation of the Department of Architecture and Urbanism at the University of L'Aquila was severely compromised, for several months, due to the April 2009 earthquake, which caused the Department to be displaced, and also produced a significant loss of collected data. Although fortunately the Ministry for University and Research granted all projects involving the University of L'Aquila a six-month extension, the gap was never entirely filled. Furthermore, the case study the research unit was working on was damaged by the earthquake, and access to the buildings was not granted for a prolonged period of time.

At the scientific level, the research produced rather satisfying results, despite the fact that it was carried out with a group of research units usually adopting rather distinct methodologies applied methodologies. Especially in the initial stages of the project, this led to the need of establishing a common methodological basis, allowing each research unit to carry out their individual work while respecting a "common ground".

In this framework, and in consideration of the above-mentioned methodological diversities, the final results of the project, which are in the process of being edited in book form to be published at the end of 2011 / early 2012, are being organized in order to provide a two-fold interpretation of the case studies: on the one hand, at the analytical level, with maximum achievable homogeneity, producing a comparable documentation for each of the analyzed housing estates. On the other hand, in the section dedicated to design experimentation, leaving each research unit a greater freedom to identify specific solutions. The guidelines for the refurbishment of public housing estates in central and southern Italy, which are to be considered the main scientific output of the research project, are meant to be a synthesis of the different interpretations provided in the second part of the work.

13. Risorse umane complessivamente ed effettivamente impegnate (da consuntivo)

| | (mesi uomo) |
|---|-------------|
| TOTALE | |
| da personale universitario | 334 |
| altro personale | 242 |
| Personale a contratto a carico del PRIN 2007 | 74 |

14. Modalità di svolgimento (dati complessivi)

Partecipazioni a convegni:

| | Già svolti (numero) | Da svolgere (numero) | Descrizione |
|-------------------|---------------------|----------------------|--|
| in Italia | 4 | 1 | - Giornata di studi, Facoltà di Architettura, Università di Palermo, 10 dicembre 2009 - Giornata di studi, Facoltà di Architettura, 2a Università di Napoli, Aversa, 30 giugno 2010 - 1° Congresso internazionale Rete Vitruvio, Bari 2-6 maggio 2011 - Parma Urban Center, 27 maggio 2011 - Convegno di studi conclusivo del progetto PRIN, dicembre 2011 |
| all'estero | 0 | 1 | IAPS 2011 Symposium (International Association of People-Environment Studies), Daegu, |

Korea, 12-14 ottobre 2011

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| TOTALE | 4 | 2 | |
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| | Numero | Descrizione |
|--|---------------|---|
| su riviste italiane con referee | 0 | |
| su riviste straniere con referee | 0 | |
| su altre riviste italiane | 1 | <i>Paesaggio urbano, Aprile 2010</i> |
| su altre riviste straniere | 0 | |
| comunicazioni a convegni/congressi internazionali | 1 | <i>IAPS 2011 Symposium (International Association of People-Environment Studies), Daegu, Korea, 12-14 ottobre 2011</i> |
| comunicazioni a convegni/congressi nazionali | 5 | <i>- Giornata di studi, Facoltà di Architettura, Università di Palermo, 10 dicembre 2009 - Giornata di studi, Facoltà di Architettura, 2a Università di Napoli, Aversa, 30 giugno 2010 - 1° Congresso internazionale Rete Vitruvio, Bari 2-6 maggio 2011 - Parma Urban Center, 27 maggio 2011 - Convegno di studi conclusivo del progetto PRIN, dicembre 2011</i> |
| rapporti interni | 0 | |
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