HISTOIRE ET SAUVEGARDE

DE L'ARCHITECTURE INDUSTRIALISÉE ET PRÉFABRIQUÉE AU XX^{e} SIÈCLE

sous la direction de
FRANZ GRAF
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TORRE RANIERI: POST-WAR EXPERIMENTAL HOUSING ESTATE IN NAPLES

Original Features and Upgrading Issues

Paola Ascione

The neighbourhood of Torre Ranieri was built in two phases in the years 1949 to 1957 as the outcome of an experimental programme launched in Naples in the aftermath of World War II by the Centro Studi per l'Edilizia, Università Federico II. Luigi Cosenza, engineer-architect in charge of the Centre, devised a highly attractive research programme in three phases, and this district was the first feature to be completed, even if the entire programme was never realised. While in Milan Piero Bottoni was at work on the QT8 experience, in Naples Cosenza experimented combining systems of prefabricated modules and procedures based on manual work, which characterised the building industry at the time, notably in southern Italy. In the context of post-war reconstruction schemes benefiting from grants made available by the Public Works Ministry, the building work made use of innovative systems that experimented with non-traditional procedures. The technical solutions concerned two structural categories, in particular, vertical load-bearing walls in prefabricated elements and free-standing, industrialized vertical load-bearing elements manufactured in the workshop or on site. In view of its significance as a historical document and the numerous interesting features of this singular experiment in council housing in Naples, this study focuses on the methodologies and technical solutions required for the technological and energy upgrading of the buildings in Torre Ranieri. There are three levels of investigation: the first identifies the peculiar features of the original project and the specific technological and typological characteristics of each building; the second surveys the alterations made, the shortcomings and the current requirements; and the third lays down the methodologies for the upgrading.

Quartiere Torre Ranieri. Panorama. 2013.

The Quartiere di Torre Ranieri is situated on the crest of the Posillipo ridge, which separates the bays of Naples and Pozzuoli, in what is truly a "picture postcard" location. It comprises sixteen blocks, none more than four storeys high, erected on a triangular plot where the roads leading from Mergellina and Vomero to the Parco Virgiliano (at the end of the ridge) converge. This small housing estate, built in two stages in the years 1949 to 1957, is actually one of the most singular examples of public residential building in post-war reconstruction. The estate testifies to the research pursued by Luigi Cosenza (with the collaboration of Francesco Della Sala and Adriano Galli for structural questions), which focused on construction and technique as key design elements, crucially important for developing new residential models. The project for the small apartment blocks in Naples mirrored the QT8 estate of prefabricated housing in Milan,[1] in the context of the same government programme. It is in fact this experimental nature which characterises it and makes it wholly anomalous with respect to other examples of public residential building dating from the same years in Naples.

At this time Cosenza felt the need for industrialization "in the sense not of an arid and mechanical standardization of construction but as a permanent tool of architecture, in order to release construction technique from the current form of handicraft and transfer it to the higher economic and cultural plane of industrial design and realization".[2] Even prior to the war his contacts with leading figures in the European architectonic community and the milieu of *Casabella* in Milan had given him an awareness of the most advanced and diverse trends in modern design. At the same time, thanks to his friendship and collaboration with Bernard Rudofsky,[3] he nurtured a profound interest in typically Mediterranean rural architecture, the product of a venerable craft-based technique "in which the forms [...] have to be considered in their genuine pedagogic value, in the direct and total participation in the technique, in the bond with folk life and tradition [...]. Such lessons, far from being negligible, are vital, above all for the way they can orient our enquiry in the sectors of the environment, materials, influence on forms and the relationships between people and architecture".[4] This recognition of the rich heritage of architecture is the key to the attention Cosenza (at once engineer and architect) paid to certain elements of traditional construction techniques, which he reinterpreted through the well-thought-out use of new technologies, never previously experimented with in a reality that was not yet ready to assimilate the major social

The newly built houses. In the background landscape with the sea and Sorrento, late 1940s.

The same view in a present picture, 2013.

1 Cf. Albani, Francesca, *Post-War Experimentation in Italy: the QT8 Housing Estate in Milan. Construction, Episodes, Perspectives*, in Franz Graf, Yvan Delemontey (Eds.), *Architecture industrialisée et préfabriquée : connaissance et sauvegarde/Understanding and Conserving Industrialised and Prefabricated Architecture*, PPUR, Lausanne 2012, pp. 240-271.

2 Cosenza, Luigi, *Esperienze di architettura*, Macchiaroli, Naples 1950, p. 14.

3 Villa Oro (1936), built in collaboration with Rudofsky, is an example of the attention paid to the autochthonous character of architecture that is well suited to the essential nature of a modern concept of housing.

4 Cosenza, L., *Esperienze di architettura*, *Op. cit.*, p. 14.

The experimental housing estate in triangular plot on the crest of Posillipo, between the gulf of Pozzuoli, and the gulf of Naples, 2016.

and productive changes which were clearly under way abroad. In the design phase another important factor was Cosenza's awareness of what was being done at Noisy-le-Sec, the French village comprising fifty housing units for individual families which featured analogous experimental procedures.[5]

The cultural significance of the ambitious project for Torre Ranieri imposes a particular respect for this residential park, whose characteristics clearly correspond to the canonic features of rationalism in the interests of wellbeing and the overall hygiene of the housing units, with green areas and satisfactory ratios between building volumes and distance between the buildings. Today this small estate stands as a nucleus of heterogeneous blocks, in terms not only of its architectonic and constructive features but also of the conditions of disrepair. Most of the buildings are apparently in good condition, but some show evident symptoms of disrepair in the façades, and rather more display external alterations due to sporadic interventions of maintenance and restructuring. The agreeable atmosphere of the location, the small scale of the buildings and the generally good care taken by the inhabitants of their houses all go towards preventing the conditions of wholesale disrepair found in other suburbs. Nonetheless precisely this care and attention (deprived of the necessary awareness!) have led to evident modifications of the original façades, which in some cases have exacerbated critical technical issues or paradoxically altered the building's performance in terms of energy efficiency and, more generally, comfort.

The experimental programme

Each of the sixteen buildings features a different construction system, so that they form a repertory of the techniques then available, ranging from traditional masonry to a frame structure using prefabricated beams and pillars. In this post-war experimentation the most advanced technologies were employed together with proven local technical culture, on a worksite where handicraft-based practices still predominated and with a non-specialized workforce, in a conscious attempt to arrive gradually at that "epoch-making transition"[6] from traditional building

5 Cf. Caroux, Hélène (Ed.), *Réinventer la maison individuelle en 1945. La cité expérimentale de Noisy-le-Sec*, Somogy Éditions d'art, Paris 2012.

6 Poretti, Sergio, *La costruzione*, in Francesco Dal Co (Ed.), *Storia dell'architettura italiana. Il secondo Novecento*, Electa, Milan 1997, pp. 268-293.

View from via Petrarca: the traditional party wall in Vesuvius stone and the experimental construction, late 1940s.

The same view in 2013.

practices to the industrialization of construction. The creation of ad hoc prototypes for this Neapolitan and southern Italian reality was based on years of study of the local residential culture. "Two years prior to the constitution of the Centre Technique et Scientifique de l'Habitation [*sic*] in France",[7] Cosenza demonstrated his keen awareness of the opportunities for renewal by setting up the CESUN, Centro Studi per l'Edilizia dell'Università di Napoli. This research centre carried out in-depth studies of the distribution schemes for rationalist housing units "analysed in terms of distribution but also taking into account the contribution and suggestions they could offer in the technological sector, above all with reference to the needs and actual possibilities of southern Italy".[8] But the need to test new technologies to produce modern housing clashed with the obstacles that prevented technical experimentation in public residential construction work. The organizations funding such work, whether public or mixed, were obviously willing to carry out building programmes featuring new distribution schemes to ensure more rational and hygienic housing units, but it was not "possible to introduce non-traditional construction systems into the specifications for public residential building, and still less to impose the realization of Public Works in the framework of experimental requisites".[9]

In order to realize the prototype units the Ministero dei Lavori Pubblici set up a specific programme with special funding for the experimental projects of QT8 in Milan and the Quartiere di Torre Ranieri in Naples. In fact one of the main objectives of the Neapolitan project, implemented with "a very limited percentage of the money set aside for accommodation for the homeless", was to update the specifications concerning the contracts for public works, seeking to provide a response to the requisites of modern housing with maximum economic efficiency. On the two worksites, in northern and southern Italy, the same (or very similar) systems were applied, although registered under different patents. The Gaburri and Ciarlini systems and the "blocco Togni" were used in Naples as well as Milan, but in different environmental conditions and on the basis of architectonic projects supervised by different architects[10] in order to verify their efficiency in technical and economic, as well as aesthetic and functional, terms when used in public residential building nationwide.

Technical innovations in the construction of modern housing units

The site and emplacement. The Quartiere was modern not only in conception but also for the research that went into the project. It differed from other interventions of post-war reconstruction in Naples for its localization, in a panoramic area rich in vegetation on the Posillipo ridge. The buildings were erected on

7 Cosenza, L., *Esperienze di architettura*, *Op. cit.*, p. 56. This is in fact the Centre scientifique et technique du bâtiment (CSTB) founded in August 1947 by the French Ministry of Reconstruction and Urbanism (MRU).

8 *Idem*.

9 *Ibidem*, p. 57.

10 It is interesting to compare the ground plans and elevations of palazzina 12 in Torre Ranieri and the building erected by G. Mucchi in QT8, which both used the Gaburri system.

The buildings of Torre Ranieri with the different prefabrication levels.

steeply sloping ground, falling several metres from the road that runs along the top of the triangular plot, via Manzoni, to via Petrarca down below. This orographic identity conditioned the layout of the estate, with the buildings being sited round the edge, leaving a steep and craggy central space covered in pine trees.

The distribution of the buildings combines the principles of rationalism with the particular nature of the site. All the buildings are aligned with the heliothermic axis (19° east of north); only palazzina 10, departing from the original planimetry,[11] conforms to the slope of the site and is constructed with terracing reflecting the impracticable character of the terrain. The following comment by Luigi Cosenza encapsulates the project criteria: "the orientation depends on local factors: the configuration of the terrain, healthiness of the different spots, hours of sunshine, proximity of reflecting walls, beauty of the panorama, direction of prevailing winds and showers, position of noise sources".[12] Although he was not here speaking specifically of the Torre Ranieri, it is clear that the orography, the panoramic views to east and west, the

Panorama from the roof of palazzina 12, 2013.

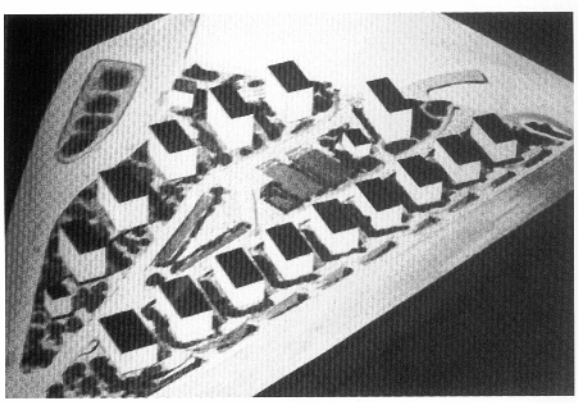
11 The design in question was part of the original project and is published in *Esperienze di architettura*, 1950.

12 Cosenza, L., *Esperienze di architettura*, *Op. cit.*, p. 37.

Plan with the typologies of lodges. The palazzina 10 was built in alignment with the outer road, and has a split level adapting to the slope of the site.

presence of winds (with the gregale predominating in winter), were all decisive factors in the distribution of the buildings.[13]

The residential typologies exploit the dual east-west exposition affording the apartments natural, efficient ventilation and exposure to the sun's rays the whole day through. Care was taken to have no openings in the north-facing walls[14] while the south-facing façades always feature windows, loggias and balconies wherever the construction system permits. The height of the buildings too was conditioned by the structural features of the systems adopted. The distances between them, the ratio between open spaces and built volumes, and the presence of vegetation all set this estate apart from others which Cosenza designed during these years on the outskirts of the city.[15]



A plastic model of the design study: all the building are aligned with the same axis (19° east of north) except palazzina 10.

13 We should recall that throughout Europe the theory of Adolphe Augustin-Rey, Justin Pidoux and Charles Barde was widely applied whereby buildings were to be oriented according to the heliothermic axis, particularly in rationalism. As late as 1945 Le Corbusier had oriented his Unité d'habitation in this way. But, for example, in the immediate post-war years Diotallevi and Marescotti challenged this position, denouncing the risk of overheating in summer in a temperate or Mediterranean climate.

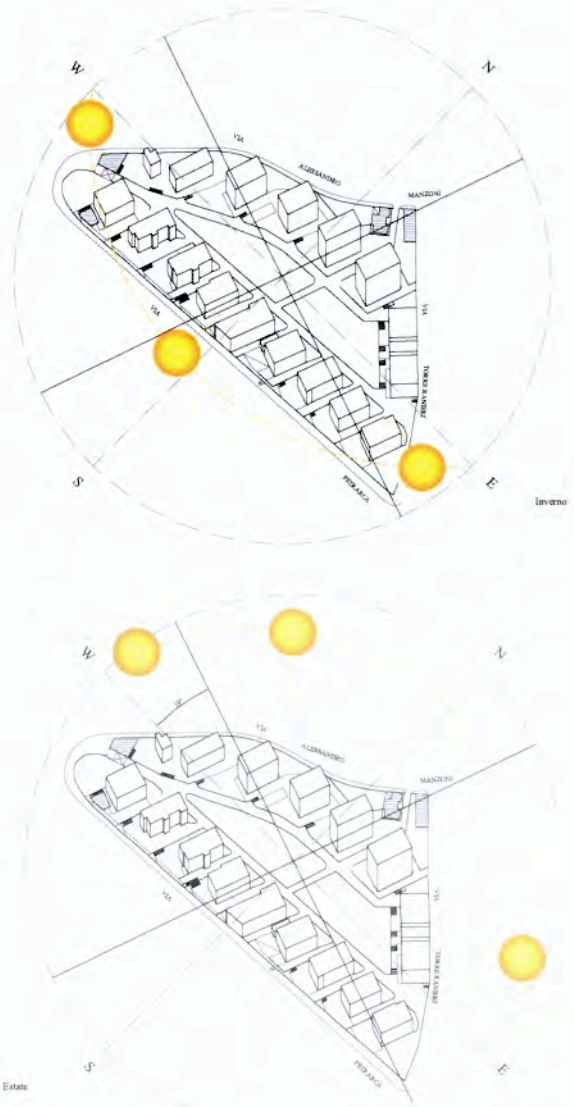
14 In some palazzine these were envisaged in the original project but never installed.

15 See for example l'Isolato al Rione Luzatti, Poggioreale, and Rione D'Azeglio, Barra.

The volumes in Torre Ranieri were nonetheless influenced by the ministerial programme, whereby "with a little over 200,000 lire" as many prototypes as possible had to be produced, while it was necessary to limit the height of the buildings on account of the potential technical and structural hazards of the new experimental systems.

The project for modern housing units. The building typology is quite traditional, consisting above all of constructions of two, three or four floors, with a single central staircase serving two apartments per floor. In just a few cases the units are sited on unequal ground levels or apartments occupy two floors, corresponding to a typological scheme of terracing with independent access points.[16] The free plan was a priority in planning the buildings, and a principal feature of the architecture was technical experimentation.[17] But it has to be said that the research carried out by CESUN also aimed at verifying the margins of freedom which each construction system could allow to the overall project, in particular with respect to the organization of the living spaces and the articulation of the architectonic shell. The idea of the free ground plan was combined with the objective of the free façade which, like the plan, was intended to afford greater construction flexibility, including elements of connection between interior and exterior (loggias, balconies, drying facilities, sunshields) responding to the functional and linguistic requisites of modern housing. The architects were convinced that it was necessary to get away from traditional building materials in order to develop low-cost construction able to transform the architectonic conformation of both the internal and external spaces in housing.[18]

The exceptional nature of the Torre Ranieri placed it in the avant-garde in the immediate postwar years, when the building sector was still largely handicraft-based. In this case technical innovation was regarded as a social value designed to guarantee a new house for one and all in as short a time as possible.



The orientation according to local sunshine in winter (top) and summer (bottom).

Cosenza set out to show that reconstruction represented a unique opportunity to bring about wholesale change in architecture in the south of Italy, with the development of construction and architecture going hand in hand.

Innovatory constructions. From this perspective, the project for the council housing at Posillipo represented, together with the QT8 in Milan, a significant first step in taking a rather less conventional approach to industrialization and its costs, with the support of a

16 See in particular palazzine 10 and 15.

17 For Sergio Stenti the Quartiere di Torre Ranieri differs from QT8 precisely on account of the priority of the technological and construction research, postponing to "later occasions the priority of finishings and aesthetics". For Salvatore Bisogni, Cosenza's experience tends to identify the range of possibilities inherent in industrial production "with which to generate the stylistic, as well as linguistic, structure of the architecture"; Stenti, Sergio, *Napoli moderna, città e case popolari. 1868-1980*, Clean, Naples 2006, p. 129, and Bisogni, Salvatore, *L'idea della residenza: il quartiere Sperimentale di Torre Ranieri a Posillipo*, in Alfredo Buccaro, Giancarlo Mainini (Eds.), *Luigi Cosenza oggi, 1905/2005*, Clean, Naples 2006, p. 143.

18 Cf. Cosenza, L., *Esperienze di architettura*, *Op. cit.*

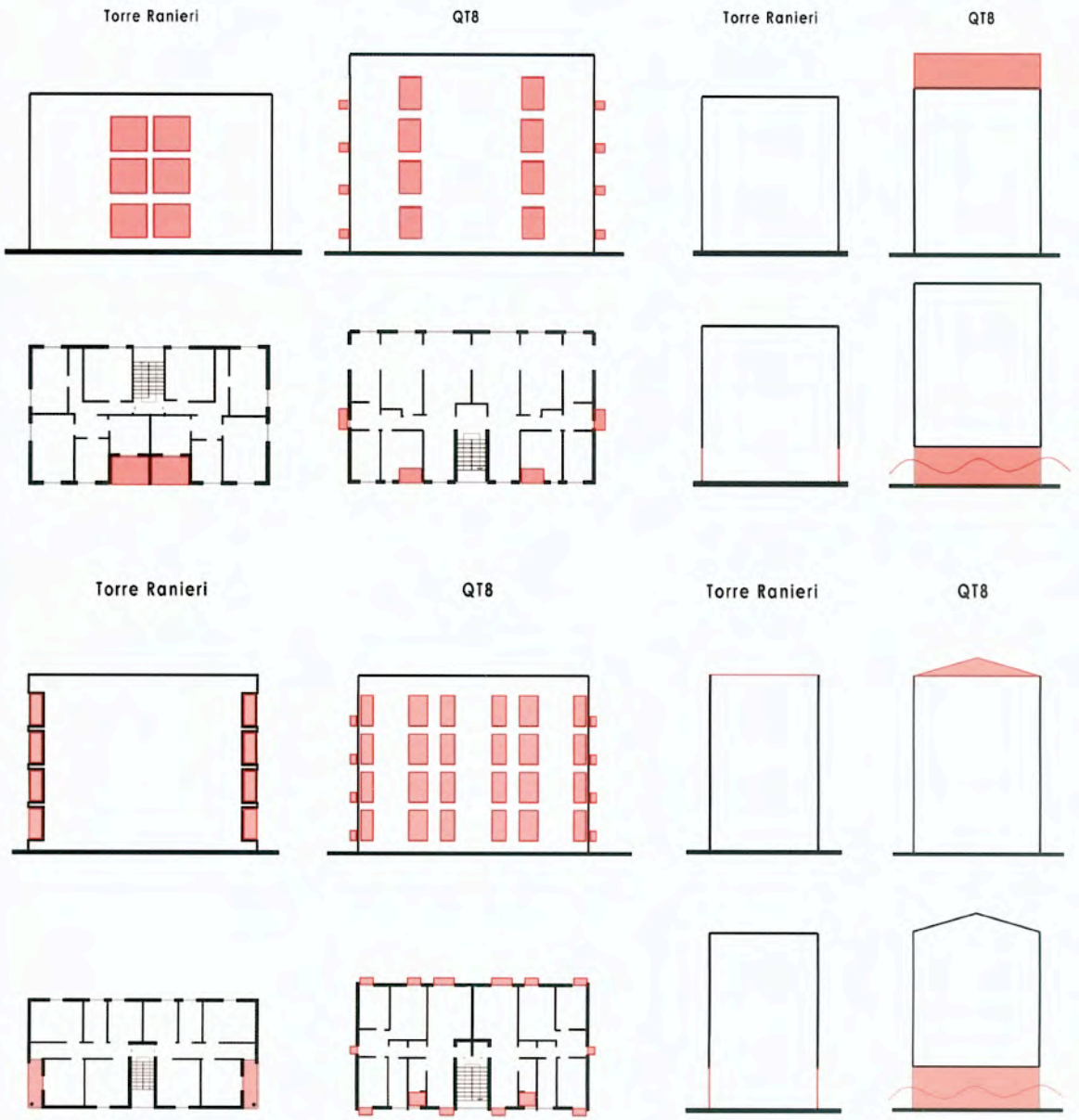
The experimental housing under construction, late 1940s.

specific political and economic programme.[19] Among the technologies adopted in both cases we can mention the systems developed by Ciarlini and Gaburri, together with the patents of Motta and Eliobeton used in Milan and experimented with in Naples using analogous systems. The quality of the materials and systems adopted in the prototypes, the difficulties with the workforce, the time required for installation and the construction costs are all set out in detail in the reports on the experiments. The outcomes were evaluated in terms both of technical and economic parameters and of the possibility of fulfilling the requisites of "modern housing".

With respect to the experience in Milan, the Neapolitan project paid greater attention to procedures which were still craft-based, showing an awareness of the conditions of the building sector in the south of Italy. The technologies covered in the 16 constructions of the Quartiere Sperimentale can be summarized under two main categories: continuous vertical structures with *"murature in tela"*, reinforced walls, made by casting concrete in formworks of various shapes and materials or using prefabricated blocks or panels; and structures with isolated vertical elements made from industrial products. Cosenza also adopted some intermediate solutions using prefabricated elements assembled *in situ* such as slabs of reinforced concrete used as disposable formworks.[20] In just a few buildings the staircases and service units were mass produced.

19 Cf. Vittoria, Eduardo, *Ricordo di Luigi Cosenza*, in "Rinascita", 15, 1984, p. 36.

20 The structural experimentation took two directions: with the load-bearing walls and prefabricated elements in the workshop or on site. The following systems were used by way of experimentation: Savarese, Alcam, del Gaudio, Foschini, Supersacelit, Lapilcemento, System a Getto, Motta, Ghira, Centro Studi (CESUN), Sambito, Ciarlini, Tarallo, Gaburri, Bianchini, and Parasiliti.



Comparison of the experimental buildings built in Naples and in Milan with Gaburri (top) and Ciarlini systems (bottom).

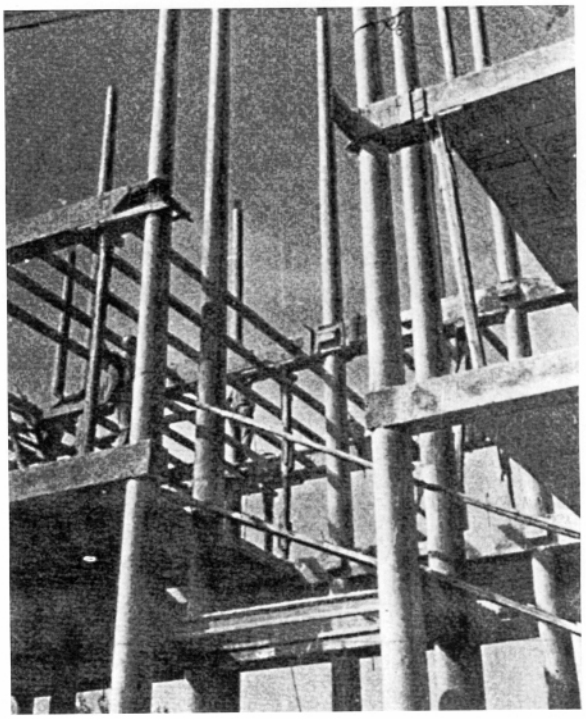
After his on-site experiences, Cosenza described the advantages and critical aspects encountered during construction work, highlighting the complexity of the technological research. Cosenza gives a detailed description of the Gaburri and Ciarlini systems, for free-standing vertical structures involving pillars and prefabricated beams, also used at the QT8. With hindsight, the Gaburri system (palazzina 14) is seen as a "method that fails to match up to the levels of precision" required for the building industry and rather poor in terms of distribution and composition. "The assembly of these elements (prefabricated beams and pillars in reinforced concrete by means of male and female joints) cannot be effected with the desired precision, so that the whole load-bearing structure turns out to be only very approximately installed and

involves considerable expense to correct the perpendiculars and angles".[21]

The Ciarlini system (palazzina 12), using shafts with a circular cross-section, also failed to live up to initial expectations. It was not possible to put in overhangs for the balconies nor produce an exposed structure, limiting the composition of ground plan and elevations. In addition, the saving in assembly time for the SCAC shaft, a prefabricated pillar rising the whole height of the building, was offset by the laborious and complex installation of the reinforced concrete brackets at the height of the ceilings.[22] On completion of the works Cosenza reported a number of technical and operational expedients to overcome these shortcomings, regretting that financial restrictions made it impossible to perfect the system by developing a new prototype. In order not to depart too abruptly from traditional constructions, the in-fills were made using a double sheath of triangular pierced bricks able to contain most of the pillars. However, the injection of insulating material bound together with cement mortar into the cavities caused a considerable increase in the weight of the structure. In practice the preoccupation at not having a workforce used to industrial type technologies placed another considerable limitation on the experimentation.

The system using slabs of reinforced concrete (palazzina 15) was more successful, providing an intermediate solution that "in terms of composition and distribution allows greater freedom of action", albeit within "the limits of traditional wall building", which for Cosenza constituted no obstacle to "the development of a rational and coherent architecture". The slab element proved to be particularly versatile and was in fact used in various contexts and with different roles in the building system. Disposable formworks in the concrete masonry made it possible to have "walls faced on both sides" for the construction shell, while the slabs used in the ceilings represented an excellent alternative to the traditional hollow flat tiles and provided cavities which were useful for lodging tubing and electrical circuits.

One aspect of particular interest, because it marked the start of a line of research that CESUN was to develop subsequently, was the construction in continuous walling of bricks made up of a silicon-limestone compound, with high mechanical resistance, making it possible to limit the thickness of the load-bearing wall without dispensing with the traditional techniques (palazzina 10). Although regarded as an "obstacle" for the free plan and multi-storey buildings, the construction blueprint appears to be perfectly suited to erecting two-storey buildings for housing on two levels. The typology of the unit, with two apartments to each staircase on different levels, was a perfect match for the sloping ground on which the building stood.



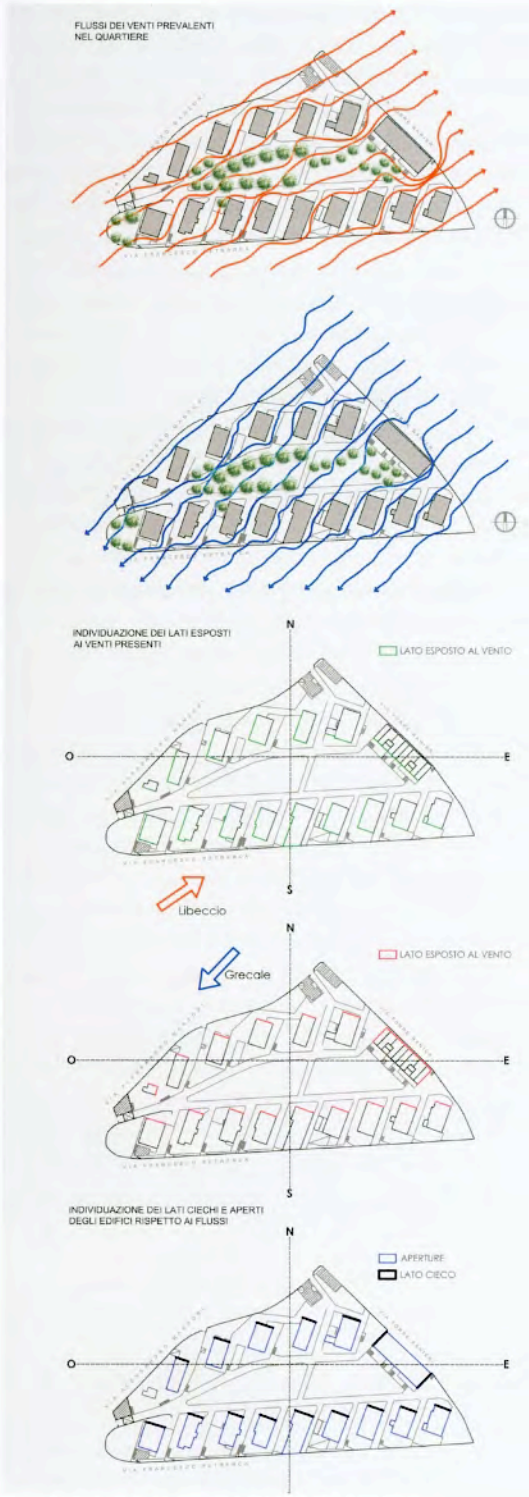
Palazzina 12 under construction (late 1940s).

Upgrading methodologies

The value of this estate lies above all in the experimental character of the project. Today we can appreciate just how modern Cosenza's conception of social housing was, being in the avant-garde in post-war Italy and still valid today, but we can also recognize all the limits of the experience, for it was technically bold and had to be carried out within the financial constraints imposed by the Ministero dei Lavori Pubblici. The

21 Cosenza, L., *Esperienze di architettura*, *Op. cit.*, p. 65.

22 The SCAC shafts were prefabricated elements in reinforced concrete, generally used in the mains electric network; when used as pillars they did not have shelves to take beams for the floors and had to be specifically chiselled.



Orientation and local ventilation of the buildings.

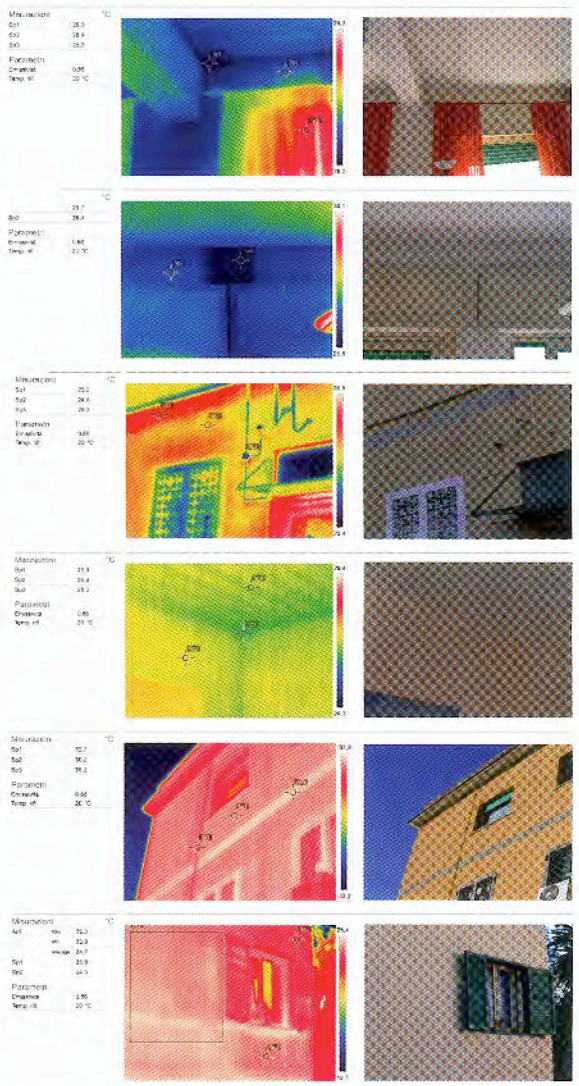
repertory of technologies which had not yet been sufficiently tested covers a wide range of solutions corresponding to different levels of industrialization, in terms of both product (brick, staircase, service units, pillars and beams, formworks in different materials) and technique. Torre Ranieri now stands as an original laboratory for flexible methodologies of upgrading which can be adapted to construction systems featuring different technologies. Over and above the issues of the revival of twentieth-century architecture (quite complex in itself, involving not only states of disrepair but also problems of technical and functional obsolescence), in this "exceptional" case study work still has to be done on the critical parameters for housing with respect to current requisites of environmental sustainability, above all in terms of comfort and energy efficiency.

The work of analysis and evaluation of the phenomena of disrepair, both material and man-made, with the elaboration of a computer-based system carried out in the previous phases of this research project and brought up to date, now involves a further phase of evaluation of the conditions of the housing units and buildings. The methodological approach, designed to identify tools for the technical and architectonic monitoring of the upgrading interventions, starts from a global vision in which the analysis proceeds from the estate to the single unit and on down to the construction detail, seeking to assemble and understand all the components of the original project and match them to today's conditions.

The analysis in terms of technology and performance required to provide the coordinates for the retrofit project has focused on a joint evaluation of the functional, spatial and compositional aspects which have an effect on the overall quality of the architecture. In fact it is clear that the construction elements of the prototype units were derived from a more comprehensive research project: they are the specific details deduced from an architectonic organism that emerged from the experimentation which today still makes the more strictly technical aspects inseparable from the morphological characteristics.[23]

The aim is to build up a repertory of possible solutions with adequate levels of compatibility with respect to the existing architectonic features, taking into account the salient aspects in terms of typology,

23 It must be pointed out that the study is still on-going with "interdisciplinary" aspects that involve the sectors of environmental physics and judicial disciplines.



Thermographic analysis on the building envelope (palazzina 14).

technology and morphology. The repertory, divided up into categories of intervention and levels of transformation (scale and invasiveness of the intervention) according to the compatibility with existing features, is based on the criteria of classification found in many scientific texts and corresponding to good practices in building upgrading. In general the action of technological retrofit involves integrating "new" technical parts or elements in existing buildings. This may be done either by adding bidimensional or tridimensional systems or by applying (and sometimes substituting) semicomponents and components, or again by the stratification of finished and semifinished materials. The integration can be specific or widespread, involving the whole building or additional parts and outbuildings. "Furthermore the retrofit intervention can involve the predisposition of existing parts to house new technical elements and systems".[24] The ensuing wide range of solutions can generally be classified according to two principal intervention models, *addition* and *substitution*. In the specific case of Torre Ranieri, the project also envisages the *subtraction* of volumes, so as to remove all the added parts that are superfluous or harmful (repristinating loggias and roofing) in terms of architecture or performance.

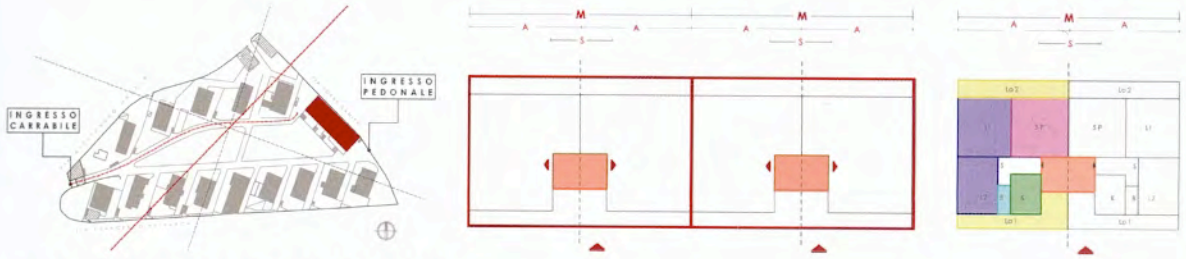
The three models correspond to three operative modalities of the upgrading project having greater or lesser visual impact, with performance levels that may be higher or lower and solutions that vary in compatibility with the existing construction system and the morphological features of the architecture. Ruling out, as a matter of principle, the addition of a skin as "packaging" with panels or systems that conceal the whole volume (a solution that is energetically efficient above all in cold climates but which can be excessive in a temperate climate[25]), the repertory includes the addition and integration of sub-systems or components both specific and widespread, and the regular substitution of obsolete products and materials. This attempt to classify the solutions for technological and/or energetic upgrading can lead to the definition of design guidelines that collect and systematize the outcomes of the qualitative and quantitative monitoring, suggesting possible solutions on the basis of what has been found to be compatible. The aim is to provide not a catalogue of solutions but rather a tool to evaluate the technological and morphological compatibility of those solutions, so as to identify techniques that are appropriate to the specific nature of each palazzina. The features of the systems adopted

24 Cf. Mario Losasso: "Addition is performed by adding new layers, elements and systems whose geometry and morphology may involve the prevalence of one dimension (monodimensional addition), two dimensions (superficial addition) or three dimensions (volumetric-spatial addition). Substitution is performed by removing existing layers, elements and systems and relocating new updated layers, elements and systems, ensuring more advanced and efficient performance, classified according to the predominant dimensions"; Losasso, Mario, *Il retrofit tecnologico per la riqualificazione edilizia*, in Paola Ascione, Mariangela Bellomo (Eds.), *Retrofit per la residenza. Tecnologie per la riqualificazione del patrimonio edilizio in Campania*, Clean, Naples 2012.

25 In some cases high performance plastering can be experimented with, in thin layers, where there are no high transmittances, guaranteeing sufficient levels of efficiency.

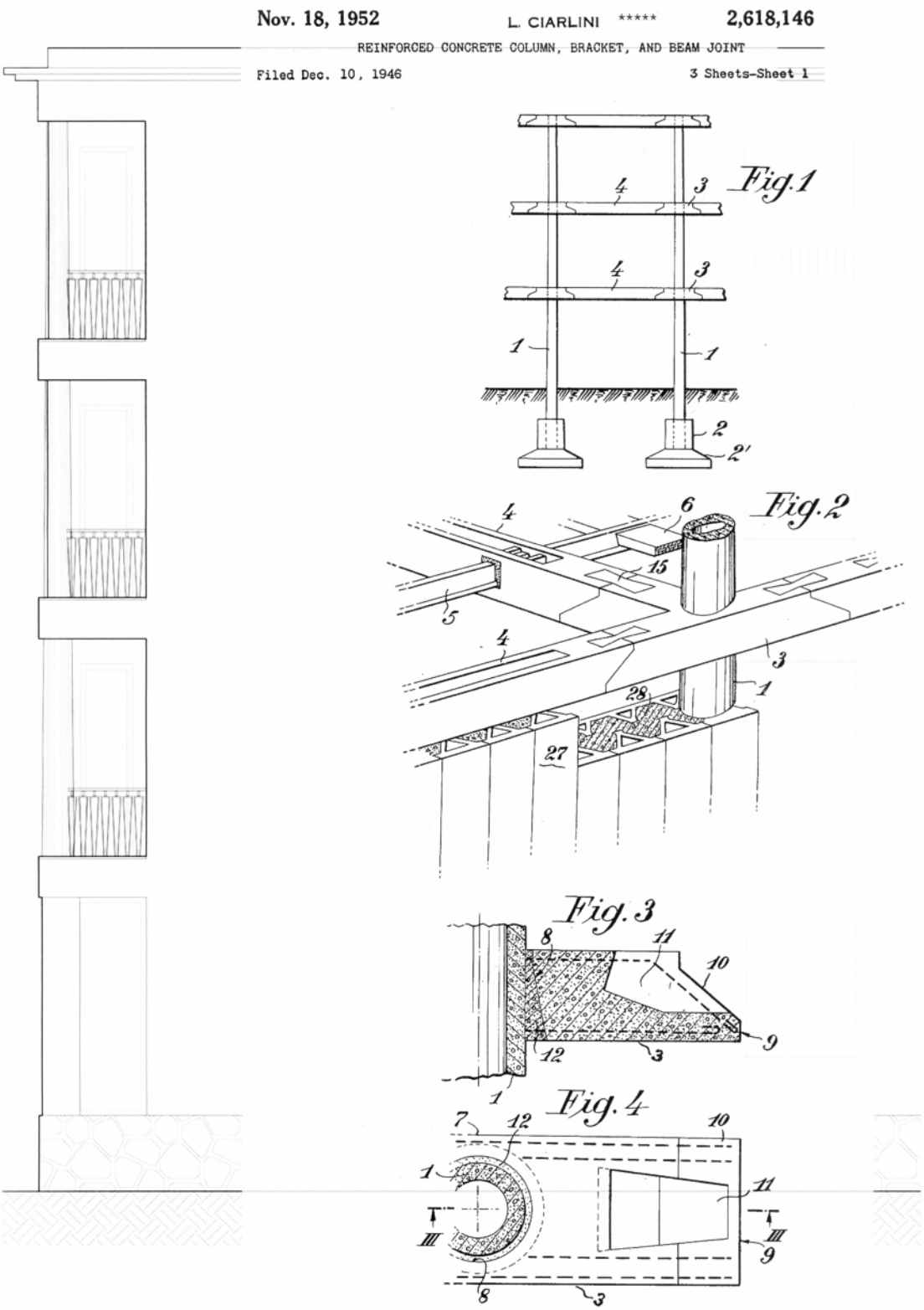
which are still visible and distinctive, and which in the original project were strictly coherent with the compositional elements of the architecture, require particular attention in the upgrading project.

Thus in order to systematize and manage the results of the qualitative investigation we have used a matrix which, on the model of a GIS system, can identify morphological and technological features, on one hand by delineating the distinctive character of each building, and on the other by highlighting what, on the contrary, constitutes a common factor for one or more of the palazzine. The matrix, which will be added to the database, will enable us to come up with the parameters that serve to verify the compatibility between the technical solutions and the construction, material, structural, plant design and expressive

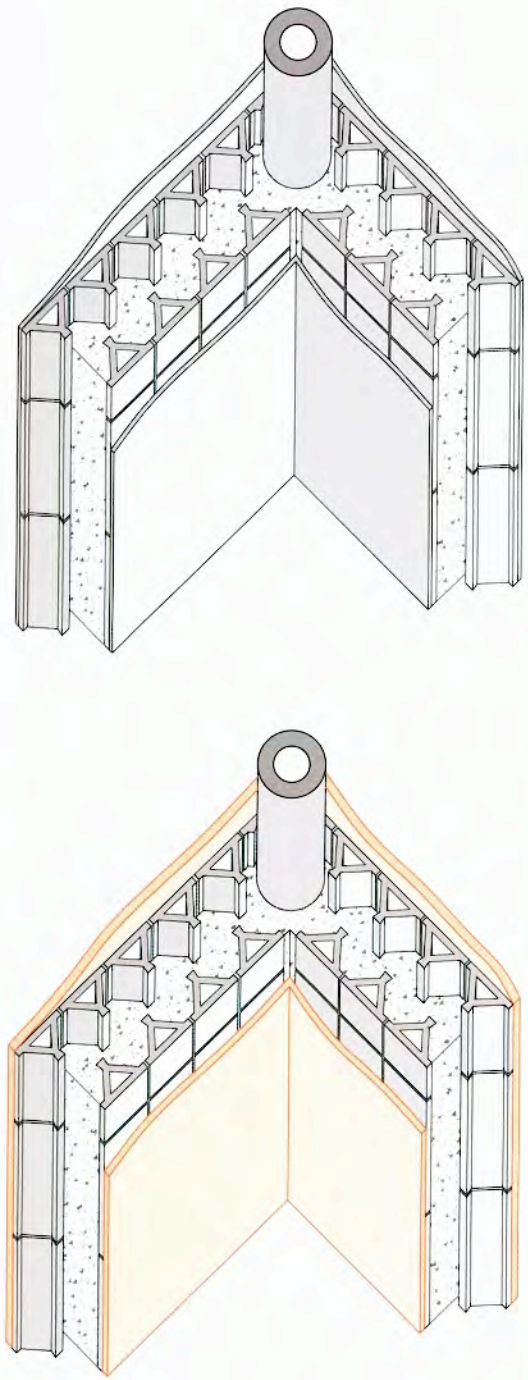


Palazzina 10: functional scheme and modules of lodges.

Palazzina 10: existing condition/new condition.
Loggias have become verandas.



Façade of palazzina 12: detail of corner with column, and the Ciarlini system patent.



Palazzina 12. Retrofit with substitution approach: replacement of existing plaster layers with the thermal insulation plaster protection wall allowing them to breath, according to current regulations. The calculation of the parameters concerned not only the level of transmittance, but also thermal lag and attenuation, very important factors in these climate conditions. This work was carried out with the collaboration of Prof. Francesco Minichiello, University of Naples "Federico II".

characteristics of the existing features. A system of indicators has been drawn up to achieve this (featuring levels of prefabrication and technological complexity of the system, thermal transmittance, displacement and attenuation of the outer walls, response to the environmental requisites, alterations and condition of material disrepair, presence of toxic or harmful materials, static conditions, etc.). We are doing our best to identify a methodology that matches methods for technical and performance-based evaluation with means for the enhancement of the cultural asset.

The study is still on-going, but it is clear that only an interdisciplinary approach with a participatory form of planning will make it possible to develop guidelines for upgrading that take into account different levels of feasibility for the interventions. It is essential to involve the competent authorities and all interested actors in view of all the variables (technical, judicial, economic, etc.) that can affect the choice of appropriate technical solutions and the identification of strategies reflecting the complexity of the case. In addition to technological issues, there are other aspects which make it necessary to identify suitable strategies prior to the project of upgrading itself. When one observes the modifications made to the buildings over the years, it is not hard to see that many interventions of both ordinary and extraordinary maintenance have been carried out as individual initiatives without any coordination, involving one-off and debatable interventions, even when they can claim to respond to the need to bring these "modern housing units" into line with current requisites.

While nowadays one can understand the wish to extend the surface area of a house when this does not respond to the needs of the people living there, it is also true that this generally concerns an increase in the service spaces, and this has to be taken into account in the upgrading project.[26] In other apartments possessing a larger surface area, all too often the

26 A previous research project focusing on the council housing designed by Cosenza at Rione Luzatti revealed the current state of all the apartments, showing that the increase in covered surface areas achieved by blocking up the loggias generally served to increase service units, above all toilets and occasionally kitchens. The addition of such a surface rarely corresponds to a true improvement in the accessibility of spaces (the most evident gain consists in the substitution of a bath for a shower), while we can say that in many cases these transformations alter the rationale of movements and the optimization of spaces, so that the extra area tends to serve as storage space, corridors or access. Cf. Ascione, Paola, *Il patrimonio di edilizia residenziale pubblica del dopoguerra: quartieri d'autore a Napoli*, in P. Ascione, M. Bellomo (Eds.), *Retrofit per la residenza. [...]*, *Op. cit.*, pp. 36-60.

housing potential has not been optimized. Indeed, the alterations often involve a serious discrepancy between the internal distribution of the rooms and the type and localization of the openings, which often has a negative effect on ventilation and thermic stability. Blocking up loggias and balconies and adding inhabitable volumes on the roof or in the basement is a particularly problematic phenomenon in Naples. Since the Quartiere di Torre Ranieri has its fair share of illicit building interventions and volumes which have been awaiting regularization for decades, in many cases still without any response, its upgrading is faced with the acute difficulty of verifying case by case, apartment by apartment, the legitimacy of any actions designed to repristinate the original state, for buildings which are subject to no legal safeguards. This problem needs to be urgently tackled at the territorial level with a serious interdisciplinary project involving a range of experts and the various interested parties, both public and private. In the meantime, greater participation by inhabitants in the phase of study and analysis of the critical points has been useful to verify people's real needs and the relevance of the solutions.

In the case of the Quartiere Sperimentale, believing that cultural value can translate into a factor of quality[27] means first and foremost recognizing its value and making it decisive also in the eyes of the inhabitants, by means of simple but immediate actions of enhancement such as informing passersby what the estate was and meant originally, and illustrating its special features on a board put up at the entry.

To sum up, bringing out the features of coherence between the functional and the formal construction project that go to form a modern architecture, and contrasting them with the alterations that have been introduced over the course of time and with the overall performance levels today, may not be a particularly original operation but it is actually fundamental, above all in view of the truly exceptional conditions of this estate and the lack of awareness on the part of the inhabitants of its specific character. Since we are dealing with residential buildings, the operation cannot simply verify the authenticity of the components, however relevant this is to restoration, but must evaluate the performance aspects of the constructions. This approach has guided the research right from the analysis of the original project, where it emerged clearly that the various elements were designed to make the best use of the environmental resources, and thus the concrete contributions that such elements make, and could still make today, to the new technological (and specifically energy) requisites of the building. This method identifies in the safeguarding of the quality of what already exists a resource for the enhancement of its potential intrinsic levels of performance within the retrofit project. In these terms, a knowledge of the estate needs to involve not so much the fame of its creator and any possible heritage order as the overall quality of the residential construction, and must foster an understanding of the architecture and its potential in terms of performance, also in light of the legitimate aspirations of the inhabitants to have functional units that fulfil the current requisites of decent housing.

27 Cf. Canziani, Andrea, Scaltritti, Matteo, *L'approccio prestazionale alla risorsa culturale*, in "Il Progetto Sostenibile", 22/23, 2009, pp. 22-27.

Torre Ranieri ou l'habitation expérimentale à Naples dans l'après-guerre. Matérialité et réhabilitation

Paola Ascione

KEYWORDS

Ciarlini (system), Concrete prefabrication, Experimental construction site, Functional obsolescence, Gaburri (system), Handicraft-based practices, Masonry, Non-traditional construction systems, Prototype, Reports on the experiments (evaluation).

Alterations, Disrepair, Energy improvements, Guidelines, Maintenance, Rehabilitation (minor refurbishment), Repair (upkeep), Restoration, Retrofit, Substitution, Toxic materials, Transformation, Upgrading project.

Construit en deux étapes, entre 1949 et 1957, le quartier de Torre Ranieri représente l'aboutissement d'un programme expérimental de construction lancé à Naples dans l'après-guerre par le Centro Studi per l'Edilizia de l'Université Federico II. Son directeur, l'ingénieur-architecte Luigi Cosenza, avait mis au point un programme de recherches organisé en trois phases, dont ce quartier constitue la première à être réalisée, la totalité du programme n'ayant jamais été achevée. Alors qu'à Milan, Piero Bottoni met en œuvre l'expérience du QT8, Cosenza expérimente à Naples un système constructif alliant préfabrication et techniques manuelles de construction, ces dernières caractérisant encore très largement l'industrie du bâtiment en Italie, en particulier dans le sud du pays. Afin de bénéficier des subventions du ministère des Travaux publics dans le cadre de la Reconstruction, le chantier recours à des systèmes innovants fondés sur l'expérimentation de procédés non traditionnels. Au niveau structurel, les solutions techniques se répartissent en deux catégories : des murs porteurs constitués de composants préfabriqués et des éléments verticaux industrialisés autoportants produits en atelier ou sur place. Compte tenu de l'importance historique et des nombreux aspects remarquables de cette opération de logements collectifs napolitaine, la présente contribution analyse les méthodes et les solutions techniques nécessaires à la réhabilitation architecturale et énergique des bâtiments de ce quartier expérimental. Trois niveaux d'investigation sont ainsi privilégiés : l'identification des spécificités du projet d'origine et les particularités techniques et typologiques de chaque immeuble, l'analyse des modifications apportées, des défauts et des exigences normatives actuelles, enfin la description des démarches méthodologiques à suivre pour la réhabilitation du quartier.

Archi.

Plus que toute autre période de l'histoire, le XX[e] siècle incarne en architecture l'idée même d'innovation constructive. Celle-ci passe autant par le perfectionnement de techniques éprouvées que par l'introduction de technologies nouvelles, le plus souvent tributaires de la logique de la production industrielle qui finira par bouleverser le secteur de la construction tout entier. Comment restituer la variété et la complexité des systèmes constructifs du siècle dernier ? Par quels moyens conserver les témoins de cette histoire architecturale et technique ? Sans prétention d'exhaustivité, cet ouvrage explore les spécificités de différents systèmes constructifs industrialisés et préfabriqués emblématiques de cette période et analyse les problématiques relatives à la sauvegarde de l'architecture qui en découle. Souvent synonyme de production de masse et de patrimoine ordinaire, cette architecture récente met finalement au défi les conceptions et les pratiques établies de la restauration qui s'exercent sur elle.

Architecture in the twentieth century, more than any other period in history, embodies the very idea of innovation in building. Its innovation embraces both the continued refinement of proven techniques as well as the introduction of new technologies – as often as not dependent on the logic of industrialised production which in itself would come to revolutionise the entire construction sector. How do we recapture the diversity and complexity of the century's construction systems? How do we retain the evidence of its architectural and technical history? This study, while not claiming to be exhaustive in its treatment, explores the specifics of the era's more emblematic industrialised and prefabricated systems, and analyses the problems of architectural conservation that ensue. Ultimately, the architecture of the recent past, often synonymous with mass production and the heritage of the ordinary, demands a rethink of the concepts and common practices that inform heritage conservation in our time.

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