The Dopolavoro building in Carbonia. Conservation, renovation, reuse

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Highlights

The special relationship between knowledge project and renovation project leads to the heart of the issue regarding the restoration of the modern, addressed in this paper. The study of modern architectures from the Construction History point of view is developed through a strategy based on a critical reading of the existing features and its structural processes over time, as well as heritage values, which is also the prerequisite to reshape the meaning of this architectures. The renovation intervention has been developed by adopting various solutions based on the compatibility between the building new intended use and its cultural and architectural value.

Abstract

The Dopolavoro for the employees was designed in 1973 by G. Pulitzer Finali and it represents the most authentic modern building in the central square of Carbonia. It is an autarchic work where the wall structure supports prefabricated slender reinforced concrete trusses, adapted from mine industrial buildings. The renovation, started in 2001 by the local municipality with the consultancy provided by the DICAAR, has responded through diversified approaches on the issues arising from new usage needs, deterioration and modification to discrepancies with the original project, the implementation, and following improper intervention works.

Keywords

Modern architecture, Restoration, Construction history

1. INTRODUCTION

The renovation of the Dopolavoro for the employees has been one of the first interventions over a more extensive plan regarding Carbonia public spaces, company town, conceived and developed in the Thirties after the discovery of the major mining deposit in Surbariu, located in South-western Sardinia. It was made by the company “Carboni Italiani” which allocated the first urban planning scheme and the civic monuments to the Roman Ignazio Guidi and Cesare Valle, and to the Triestine Gustavo Pulitzer Finali. Carbonia is a peculiar variation of the European garden-city, expression of the autarchic policy, re-proposing the use of local material and resources in an updated framework taking into account new technologies and international references. Considerable issues regarding the regeneration and the reuse affecting its
building heritage are compounded by difficulties in recovering the modern as well as the specific ones linked to the autarchic stage. Such issues got much worse in the late ‘50, only two decades after its foundation due to the mine crisis which caused a gradual closing, calling into question the identity and the survival of the city itself. For this reason, from 2001, the municipal administration and the Department of Architecture of the University of Cagliari have signed a memorandum of understanding in order to carry out a broad-based strategy to redevelop civil architecture structures and the mass social housing neighbourhoods, combining technical planning and pursuing architectural and urban quality.

2. STATE OF THE ART

The foundation of Do.Co.Mo.Mo. International [1] in the late ‘80 unquestionably shows that the recovery of the modern, starting with the one developed during the inter-war period, has gained a new and an initially unprecedented centrality in terms of culture and values [2].

If today the consensus from the scientific community in this respect seems a “fait accompli” (but this is only true when looking at the social consensus), we still face hard work ahead as far as the reconstruction of the extraordinary variety of the identity of the modern (and the contemporary) is concerned [3].

The case of the Italian architecture during the inter-war period, and in particular the one attributable to the autarchy period, is a case in point and it is extremely remarkable to bring out one of the most peculiar mix between continuity and innovation on a design level as well as on materials and techniques of the modern.

The study of this material is, therefore, a considerable part of the Construction History recovery focused on a research strategy based on a critical reading of its existing features and its structuring process over time – and ultimately on heritage values – which is also the prerequisite to reshape the meaning of these architectures. The special relationship between knowledge project and renovation project thus leads to the heart of the issue regarding the restoration of the modern addressed in this paper. The scientific community shows a broad consensus, even if through different opinions, about issues arising from the modern heritage in relation to restoration categories. However, the recovery of the modern cannot be regarded as a new ideology [4]. A need to deal with the request to preserve extreme experimental architectures, often designed on a short-term perspective, highlights the interpretation of the renovation project [5].
3. THE PROJECT AND ITS CONSTRUCTION DURING THE AUTARCHY

With the exception of the church designed by Cesare Valle, the Triestine engineer Gustavo Pulitzer Finali [6] designed the Dopolavoro building and all the other buildings outlining Roma square, which has been the core of Carbonia planning scheme since the first project created in 1937. Pulitzer’s first and crucial training takes place at the Technical University of Munich, under the guidance of T. Fischer.

In such environment, influenced by the H. Muthesius Werkbund ideology [7], he has the opportunity to meet major exponents of the International Style such as B. Taut, J.J. Oud e H. Tessenow. By opening the Stuard Studio in Trieste with the architect G. B. Ceas, he ranged from designing Lloyd’s transatlantic furniture and finishes to the Arsia project, after which he worked on the Carbonia planning and its public buildings, two company towns built near the mines of the ACaI (Azienda Carboni Italiana, Italian Coal Company), created in extreme economic conditions.

Carbonia represents a challenge of strategic and international importance for the regime. This is why it sees designers and companies (many of which were very innovative Italian companies in this sector, such as Ferrobeton, leader in reinforced concrete constructions [8]) committed in an admirable effort to reconcile the autarchic limits with architectural quality thanks to cutting-edge technical solutions.

The designers, who are substantially coordinated by Pulitzer during the first stage, design and develop buildings free from monumentalism and academicism. The Dopolavoro for the employees, located between the cine-theatre and the littoria tower, is the most authentic modern building of Roma square.

Here the town hall arches in fascist architectural style, opposite the Dopolavoro building, give way to a high portico with a double-height architrave. The church and the tower heavy ashlar work is replaced by a sharp and modular nature of the facade, emphasized by a plaster finish. The high English-style and contrasting windows, aligned with the intercolumniation and framing the back gardens, make the building perfectly permeable.

Actually, the Dopolavoro completing and closing the square on the south side appears to be a paradox because its portico facing north side is permanently shadowed, hence it is a non-functional bioclimatic element, but a fifth monument instead. The real opening with the entrances is, in fact, across the square on the south side, where the building through which the regime progetto di conoscenza e progetto di recupero conduce quindi al cuore del problema del restauro del moderno affrontato in questo contributo. Nella comunità scientifica si riscontra un ampio consenso, pur con declinazioni notevolmente disparate, intorno alla tensione che il patrimonio moderno introduce nelle categorie del restauro, sebbene non si possa pensare il recupero del moderno come una nuova ideologia [4]. La necessità di confrontarsi con l’istanza di conservazione di architetture talvolta estremamente sperimentali, molto spesso non pensate in vista della lunga durata, enfatizza la dimensione interpretativa del progetto di restauro [5].

3. IL PROGETTO E LA COSTRUZIONE NEL CONTESTO DELL’AUTARCHIA


Soprattutto Carbonia tuttavia, che costituisce per il regine una sfida energetica di portata strategica e internazionale, vede i progettisti e le imprese (molte delle quali erano compagnie italiane molto innovative nel settore, come la Ferrobeton, leader nelle costruzioni in c.a. [8]) in uno sforzo ammirabile di conciliare la scarsità autarchica con una ricerca della qualità architettonica, con soluzioni tecniche anche avanzate. Pulitzer e i progettisti, che nella prima fase egli sostanzialmente coordinò, progettano e realizzano edifici scoperti da monumentalismo e accademismi, ed il Dopolavoro per impiegati, innestato tra il cine-teatro e la torre littoria, è l’edificio più autenticamente moderno della piazza Roma. Qui la architettura in stile Novecento del Municipio, che frangeggia il Dopolavoro sul lato opposto, cede il passo ad un alto portico architravato a doppia altezza e il pesante bugnato della Chiesa e della Torre vengono sostituiti dalla nitidezza e dalla modularità del disegno di fasciata, enfatizzati dalla finitura a intonaco. Le alte finestre all’inglese, allineate sull’intercolonnio e contrapposte, rendono l’edificio perfettamente permeabile e incorniciano i giardini sul retro.

In realtà, il Dopolavoro che completa e chiude la piazza sul lato sud appare oggi come un paradossale,
monitored the staff time off work integrates with recreational open spaces. The result is a project where the space design is characterised by the repetition of a few structural components, namely pillars, high and narrow windows, and reinforced concrete trusses. From the building site and booklet drawings emerges an autarchic building, where reinforced concrete is used on the roof’s main structure and on the ceiling joists.

The Dopolavoro building shares some perimeter walls parts with the theatre and the tower, and it is connected directly to them through two back entrances at the ends of the portico [9]. It is a parallelepiped (about 40x10x7m), covered by a hipped roof and divided into two different areas: the area towards the theatre is built on two storeys, where the offices and the reading room are on the upper floor while a cafe/bar is on the ground floor. On the side towards the tower there is the double-height great hall (about 200 sq. m.), dedicated to employees’ recreational activities and to socializing. This area’s central role is emphasized by the interior finishes and by a small loggia on the side towards the tower.

Such loggia is served by a L-shaped staircase under which there are two small restrooms which contribute in supporting it and form an architrave system. The wall covering that surrounds the room is made of 2 cm thick large slabs of yellow-veined Apuan marble large slabs (1.00x1.15m), fixed to the masonry with lime mortar, while the floor is made of marble squares laid out following a regular and simple pattern in black and white. It results in an overall interior autarchic style. The two long façades are characterised by eight high English style openings each, piercing the uniformly plastered wall with a heavily unbalanced percentage of perforations on unperforated parts, in spite of what

Figure 1. The OND building after restoration in late 2001 (picture of A. Sanna).
The building was set out in the ground on 17th January 1938, together with the cine-theatre and the littoria tower whose construction works proceeded in parallel. The elevated walls stand on continuous stone foundations, separated by a layer of waterproof asphalt, whereas the pillars stand on single masonry wainscots. The difficulties in finding the material, documented in the thorough building site booklets, contributed in building inconsistent masonries composed of a mixture of concrete blocks, rough-hewn trachyte pieces, and brick fragments. In such framework the reinforced concrete trusses make an exception: they have a reticular structure, with thin sections, are prefabricated in site and used for almost every gabled-roofed building in Roma square. These are modernising elements directly borrowed from the mining sector where they were widely used. In the allocation of roles during the autarchic policy, the mine derived therefore the highest technology development level. An example of small prefabrication is the development of the frames on the openings in slightly reinforced artificial stone, cast and hammered in site when one might expect from a continuous masonry structure. The pillars are made of concrete bricks prefabricated on site and of poor quality mortar, have a thick bush-hammered trachyte wainscoting, give life to 3m light spans, and are 6.55m high. At the same height there is the portico covering, a concrete slab Rex where the perimetral bond-beam coincides with the openings’ architrave. The portico’s floor consisted of squared striped stoneware tiles disposed up to the pillars’ exterior edge, from where the terraced steps run along the colonnade. The terraced steps are made of blocks of trachyte processed with medium bush hammer, on three steps in total. The pillars, the ceiling and the walls are plastered with a base of Terranova straw-yellow lime, as indicated by the construction management as instruction for all the buildings overlooking the square. It is a very resistant material containing in its mixture pigments for colouring surfaces excluding, therefore, following painting operations.

Figure 2. Rex-style brick and cement slab (image taken from IACP archive).
coming in elements more than 2m long and later placed. It is a mixture of concrete and trachyte chippings in imitation of natural stone. Pulitzer gave instructions on how to build already on the original drawings on a scale of 1:100. From the comparison between design and construction emerge some discrepancies due to autarchic needs: the originally planned horizontal closing included a reinforced concrete ceiling and the cavity wall underneath was replaced by a simpler crawl space; the covering ceiling Pulitzer designed with a hollow-core concrete system was developed with a Perret hollow brick structure. Besides, there is a gap of 50% between the original project and the realization of the gutter channel. But apart from these few exceptions, the first realization reflects entirely the idea of the architect also with regard to the details, and the overall quality is the precise result of the original project, designed from the very beginning with the intent of using scarce resources smartly, combining formal essentiality to the modularity of elements taking into account irregular and scarce supplies, the emergency building site set up, the extremely tight timeline. It is therefore a model also for contemporary designers.

4. CONSERVATION, RENOVATION, REUSE

The history of materials, the building site history, and the knowledge of the building construction features, together with the analysis of distributional and use aspects were the instruments to recognize the elements to preserve in their intact spatiality: the great hall, the portico, the rear façade, and the covered walkway.

It has been a critical path affecting the building lifetime, degradation, erosion, additions, conversion works, other than the design and construction phases. The understandable hostility towards the political and cultural context in which the Dopolavoro was built undermined the reading and consequently the approval of its values with the leap to democracy, favouring an introduction of changes that had an impact on the use of the environments and on its urban role.

On the other hand, the lack of structural audacity and experimentation with materials as well as autarchic construction methods enabled the building to resist fairly well over time, at least as far as masonry structures are concerned, showing some deterioration linked to eaves’ clogging up and to mistakes in making the basic crawl space with subsequent rising dump. Also the reinforced concrete sleek trusses, concealed by a false ceiling, made with a Perret hollow brick structure, were in no way damaged.

The renovation intervention was organised adopting various solutions taking
into account the special relationship between conservation and modification. They were based on compatibility of the building new intended use with documental, cultural and architectural value. The great hall regained its original space, but becoming the town council meeting room; some chambranles were replaced by reproductions on the basis of the original ones, but in accordance with new environmental requirements. The façade plaster was restored following its original features wherever they were missing. The south façade is used as a secondary room and as a space functional for the double-height room. The gutter channel, which was completely deteriorated, has been rebuilt.

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Figure 3. Isometric cutaway. 1 tiled roof layer; 2 lime-mortar layer; 3 under-tile Perret roof panels; 4 prefabricated reinforced concrete trusses; 5 dropped ceiling using Perret-style panels; 6 gutter; 7 perimeter beam/curb; 8 Rex-style roof slab, height 12.5; 9 waterproofing layer; 10 block paved concrete floor; 11. continuous masonry foundation; 12 irregular stonework; 13 plaster layer; 14 artificial stone cornice; 15. English window (5.00x1.80m); 16.stone tiles; 17. concrete slab; 18. stone crawl space; 19 steps in trachyte blocks; 20 pillar made from concrete blocks constructed on-site and covered in Terranova plaster (section 1.00 x 0.50m); 21. wainscot in bush-hammered trachyte; 22. limestone bedding layer; 23. Floor in 25cm marble tiles; 24. Rex style slab, height 16. (drawing made by G. Monni).
The knowledge project aimed at the conservation has developed thanks to the expertise from the materials’ technology sector. Thermography and other non-destructive inspection techniques, characterisation of materials through physic-chemical methods, mechanical resistance tests, and experimentation of fundamental components mix design for preservation and restoration – especially mortars – marked the beginning of a scientifically integrated methodology, then applied to following interventions on Carbonia modern autarchic heritage. With regard to methodology, the adopted model has embraced a range of know-how based on an interdisciplinary dialogue where experts, still focusing on their respective field, have been also partially consulted about other subjective aspects linked to their field of research. This resulted in successfully achieving aims and results.

The double-height great hall devoted to relaxing time and recreational activities is the heart of the Dopolavoro. After the fall of the regime, conversions involved the creation of a small area inside the room for commercial business which were directly accessible from the portico. The building urban role was then in part directed towards the square, and the back spaces became peripheral areas. The rest of the room was used as a meeting place until its progressive degradation and subsequent safety dangers. At that point was abandoned and converted into a warehouse.

After being no longer frequented on a daily basis and successively closed, the problems due to humidity worsened: in line with the loggia the false ceiling came down and the remaining part was propped up unstably and temporarily. Due to renovation works, the permeability and the unified space of the room favoured the space to host the town council meeting room. The added partitions were therefore demolished and the walls were plastered and painted. The poorly resistant false ceiling was demolished and replaced by

*Figure 5. Diagnostic investigations for conservation purposes. (images courtesy of P. Meloni).*
plasterboard panels, while a flooring restoration was carried out. Special attention was paid to the inner lining, where marble slabs, in spite of being perfectly undamaged, no longer gripped to the masonry substrate due to deterioration of the masonry and the fixing mortar. Since the slabs were problematic to remove completely because of their thinness, it was decided to inject lime-based fluid mortar from above. Both the shell and the series of pillars were made with poor masonry and plaster. There are no decorations nor technical features. Particular care was taken in preserving these poor elements defining the quality of space. The plaster was then restored and preserved respecting the original colour and texture; a consistent lighting system was installed by positioning on the portico bays’ interaxis the same kind of light fixture used by Pulitzer in the double height room, consisting of a pendant opal glass globe supplied with a metal stem. Although the portico’s floor conditions were relatively good, the project client deemed it crucial to replace it with a stone slab flooring in view of the new building’s function. The south façade renovation has revealed the intrinsic, ambiguous nature the philological approach sometimes entails. Soon after 1938 a part was added on the right side, contributing to worsen the deterioration process of this façade, further exacerbated by the construction of another superfetation on the left side and by other widespread elements of damage. The intervention gave the façade its original configuration back: the superfetation has been demolished, the wholeness of the building was renovated in terms of architecture, materials, and finishes through cleaning and renewing the plaster; the equipment exposed on the surface were removed in favour of in-wall installations. However, the façade intended for the entrances overlooking a green recreation area and served by a road no longer exists. It is now a secondary space and functional for the main room. As a consequence, three portico’s fixtures have been converted into inward openings. This led to add some stairs to the portico’s originally free space. The new chambranles have been made on the basis of the existent ones thanks to the original drawings but using a double-low emission glass, a sealing system, and an essential anti-burglar protection hardware system which also includes a limited number of devices allowing to overturn the opening system. Finally, two chambranles were restored to respect its original design. Another focal point involved the renovation of the covered walkway on the side towards the theatre which linked directly the square and the rear green area at the back side, the portico and the theatre. Besides, there was an internal walkway running parallel to the main portico led in sequence to the stairs, the cafe/bar, tenuta in piedi da puntelli provvisori e precari. Con l’intervento di recupero la permeabilità e lo spazio unitario della sala sono stati ripristinati al fine di accogliere la sala consiliare. Si è quindi proceduto alla demolizione delle parti aggiunte e all’integrazione degli intonaci e della tinteggiatura. Il controsoffitto, che non offriva più garanzie di resistenza e durata, è stato demolito e sostituito con pannelli di cartongesso, mentre la pavimentazione è stata sottoposta ad un restauro conservativo. Particolare cura è stata riposta nel restauro del rivestimento interno, le cui lastre in marmo sorgevano perfettamente integrate avevano perso in alcuni punti l’aderenza con il supporto murario a causa del degrado della muratura e della malta di fissaggio. Inoltre, l’esiguità del loro spessore rendeva problematico il distacco completo, si è proceduto attraverso l’iniezione dall’alto di malta fluida di calce. Sia l’involucro che la plastronata sono stati realizzati conformi alla condizione povera e con un intonaco altrettanto modesto. Nessun apparato tecnico o decorativo riscattava questa condizione di fine. L’intervento ha posto quindi particolare attenzione nella conservazione di questi elementi, che proprio con la loro povertà descrivono le qualità di questo spazio. Si è quindi proceduto alla conservazione o al ripristino dell’intonaco nel rispetto della matericità e colorazione originaria; all’installazione di un impianto di illuminazione unitario posizionandosi nell’intrarasse delle campate del portico lo stesso tipo di corpo illuminante utilizzato da Pulitzer nella sala a doppia altezza e costituito da un globo in vetro opalino appeso ad uno stelo metallico. Nonostante la degrado della muratura, si fosse conservata in generale in condizioni relativamente buone, la committenza ha ritenuto indispensabile, per rispetto alla nuova funzione attribuita all’edificio, sostituirla con una pavimentazione in lastre di pietra. Il recupero del prospetto sud ha messo invece in evidenza l’intrinseca ambiguità che talvolta l’approccio filologico comporta. La costruzione di poco successiva al 1938 di un corpo aggiunto sul fianco destro ha contribuito a rafforzare il processo di degrado di questo affaccio, aggravato dall’edificazione di un’altra superfetazione sul lato sinistro e da diffusi elementi di degrado. L’intervento ha restituito a questa facciata la sua configurazione originaria: le superfetazioni sono state demolite, è stata ripristinata l’unitarietà sia in senso architettonico che dal punto di vista dei materiali e delle funzioni attraverso la pulizia e il rifacimento dell’intonaco; sono stati rimossi gli impianti visibili in superficie e messi sotto traccia quelli necessari. Ma il ruolo privilegiato di facciata dedicata agli ingressi, servita da una strada e prospiciente ad uno spazio verde dedicato allo svago non esiste più. Si tratta ormai di un fronte a tutti gli effetti secondario e di servizio. Di conseguenza tre infissi del portico sono stati trasformati in aperture verso l’interno. Questo ha comportato l’introduzione di alcuni gradini nello spazio originariamente libero del portico. I nuovi infissi sono stati...
and the hall.

Over time, both the covered walkway and the internal corridor were closed and split, making the original hallways inadequate or even absent. Both were therefore renovated by eliminating the additions and the grilles. This choice generated some difficult issues. It was, in fact, necessary to deal with the fire escape staircase close to the two arches of the covered walkway and with the fact that the square and the space at the rear were no longer directly linked. The renovation of both indoor and outdoor passageways required the renovation of the openings, the frames in artificial stone, the plasters, and especially the heights being paramount in connecting the different parts of the building. Such renovation was carried out on the basis of historic analysis and taking into account the surviving parts.

Some other issues arose with regard to the apparently marginal intervention on the gutter channel. When there is a discrepancy between the original design and the construction work process, if deterioration is widespread to the extent that suggests demolition and reconstruction, which solution is to be adopted? Such issue was made even more complex because of the changes on the covering ceiling in harmony with the original project but lacking from a technical perspective.

Figure 5. Ground floor plan of OND for employees. Above: the original building with extensions and alterations. Below: the restored building (drawing made by G. Monni).
The clogging of the drainage system caused in some points the concrete cover and hollow flooring blocks’ ends to detach, the oxidation of metal reinforcements and the superficial concrete degradation. These events were also caused by the erosion of cornice contours. Such state of decay caused the thin Perret under-tile hollow brick structure to collapse, made even contrasting Pulitzer’s advice, who had opted for a sturdier concrete slab Rex instead. In the ‘80s the hollow brick structure was replaced with a thicker and more resistant hollow-core concrete ceiling which undermined the gutter channel which, among other things, was not very effective from the very beginning. Drawings and site booklets revealed that Pulitzer intended to create a strong protrusion of the eave profile. Such detail was an important compositional feature for him, as it emerges on the hotel for the workers, where the gutter cornice respecting the project guideline, achieves a 60cm long protrusion. It has a full protective function, mitigating its “domestic” nature linked to the use of tiles and a gabled roof. While maintaining its traditional structure, the roof itself absorbs a “modern” appearance with a terrace roofing. The renovation involved therefore the irreversibly deteriorated gutter channel, according to the original project dimensions but in harmony with the hollow-core concrete ceiling height. While this aspect seems to be of minor importance, it represents quite effectively the underlying approach of this work, achieved by pursuing the most consistent interpretation of the project through a non-ideological approach in harmony the aims, the values, and the resources.

Figure 6. Operation on the gutters. From top to bottom: the original project solution; the alterations made; the restoration operation. On the right, image showing the rear façade shortly before the end of the restoration works (drawing made by G. Monni, picture of A. Sanna).
5. REFERENCES


