

Project Report

The Recognition of Cultural Value as an Element for the Preservation of the 20th-Century Heritage: Application of the ICOMOS Multidisciplinary Approach to the ex S.M.O.M. of Pozzuoli

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Abstract: The actions for the preservation of cultural heritage must work on the identity and specificity of the places, paying the utmost attention to the context relationships. The analysis of these elements is fundamental to the recognition of the intrinsic “value” of the building, of the cultural, architectural, and landscape type and of the “value relations” that the building holds with the surrounding context of the social and economic but, above all, cultural and identity type. The methodological approaches defined by the ICOMOS Document of Madrid–New Delhi recognize the identification of the cultural value as a fundamental passage for the promotion of the 20th-century heritage. The contribution analyzes the design process developed by applying the ICOMOS methodology for the preservation of the cultural value of a building complex in Pozzuoli dating back to the early 1900s. The evolutionary history of the different volumes and the configuration of the “modern ruins” give rise to prospective relationships with the local reality that today assume a stronger identity value than that connected to the original project. The different construction techniques used and the state of conservation of the buildings lead to the identifying of different elements of value and, consequently, to the elaborating different design choices.

Keywords: 20th-century built heritage; materials and construction techniques; reinforced concrete; cultural value; ICOMOS



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1. Introduction

The methodological process of design aims to provide a technical response to real needs that are more often expressed in the form of critical issues by one or more of the beneficiaries and by the reference context on which the project impacts [1]. The renovation of the building, which also includes its re-functionalization, must work on the identity and specificity of the places, paying close attention to the context relationships [2]. These concepts are dynamic and change with the evolution of the stratified city. The cultural heritage scientists are asked to develop feasible, sustainable, and durable design proposals which are capable of anticipating new needs [3,4] in relation to the potential of the place; these are to be identified in the intrinsic value of the building, of the cultural, architectural, and landscaped type, and in the value relationships that the building holds with the surroundings of the social and economic but, above all, cultural and identity type.

It is therefore the recognition of the “value” of the focal point of any recovery intervention that, in the methodological approach defined by the ICOMOS Document of Madrid–New Delhi (M–ND), is clearly identified as a fundamental step for the promotion of 20th-century heritage “*living and evolving, which is essential to understand, preserve, interpret and manage properly for future generations*” [5].

The identification of the potential value of a building conversion uses the three types of inference that allow the analysis of the design process according to the logic of the research

project [6]. Applying the deductive approach, in the specific case indicated by the ICOMOS methodology, it is possible to determine the elements and tools of design, which include: the cultural significance of the analyzed heritage; the methodology of the conservation planning and management; the analysis of the technical and design aspects; and the change management strategies aimed at preserving the cultural significance of the building. The recognition of the “value” of the object of intervention, understood as the “*physical testimony of its time, place and use.... of the creative genius of the author and/or its intangible values*” [5], uses the comparative procedure typical of inductive inference. By comparing the homogeneous parameters that express the documentary meaning of architecture (historical, cultural, artistic, and technological), general intervention strategies can be determined that are aimed at the preservation and promotion of the identified value. In the field of historic heritage intervention, the value is closely related to the layering and the relationships that the building has generated with the site in its historicized image. This configuration, even when it results from unfinished interventions or abandoned conditions, can highlight the peculiar elements of the architectural organism that take on renewed significance in the “reading” of the building as a historical document. Alterations, partial demolitions, or collapses make it possible to reconstruct, by applying abductive inferences, the signs of the transformation and to identify new meanings to be preserved and enhanced: “*abduction is not limited only to unveiling what has been; it allows us to represent what can be, interpreting a future meaning*” [6]. The application of the inference logics in the constructing of the design process supports the elaboration of strategies for the rehabilitation of buildings that, in terms of type and architectural style and artistic and cultural significance, as well as age of construction, are not included in traditional case histories. Belonging to this category are many of the 20th-century buildings that, even in the absence of an obvious recognition of historic and artistic interest (i.e., when they are not specifically subject to a cultural constraint), play such a decisive role in the historicized relationships with the context that, sometimes, they prevail over the logic of formal preservation [7]. In some cases, the documentary value of this modern heritage consists in the testimony of a period of social and cultural transformation, of evolution and experimentation with materials and construction techniques, futuristic for the time, to be preserved and promoted even at the expense of reconfiguring the original volume [8].

Talking about the recovery of 20th-century heritage almost always means talking about built heritage in reinforced concrete, made with such futuristic confidence in the new fluid material capable of hardening and assuming any desired shape, which has shown signs of sudden deterioration before any other traditional building system (8). This circumstance opens the field to the broad research strand of the existing built heritage recovery, aimed not only at the efficiency of reinforced concrete structures but also at understanding the causes of the degradation of the material, to be sought in the analysis of its evolution and use over time. The theme of the recovery of the modern, therefore, requires the defining of new formulations of the knowledge of architecture and technology: “*the basic assumption is that these buildings should be known, respected and safeguarded with a precise design perspective, recognizing them equal dignity with respect to ancient buildings*” [9].

Two topics long discussed in the international debate on the preservation of cultural heritage seem fundamental to the deepening of the research on modern heritage. The first one refers to the necessity to analyze the statement of significance of a property as being flexible over time, capable of being open to a continuous evolving process about its own meanings and those in relation to its surroundings [10,11]. The second one, strictly linked to the previous, refers to the definition of outstanding universal value (OUV) represented by the entire system of attributes and features that constitute a property’s “authenticity”, as declared by the UNESCO Operational Guidelines [12]. Recognizing these features and reporting them with a methodological approach is necessary in order to justify the inscription of a modern property on the World Heritage List. Many studies have dealt with the issue of restoration and the reuse of the modern, focusing on the concept of “authenticity” [13–17] as well as on the concept of “continuity” [18,19] as instruments to

evaluate the OUV. Other researchers apply ICOMOS methodologies to find OUV through answering the questions: what are the features that represent a masterpiece of human creative genius? What exhibits an important interchange of values within the referring cultural and landscape area? What bears an exceptional testimony to a cultural construction tradition? What are the outstanding elements to preserve in order to represent an outstanding example of a building type? [7,15,20]. The studies combine scientific and cultural knowledge with experience to understand and safeguard the cultural and historical value of the building as a whole, and they also include the analysis of structural behavior, constructional techniques, the processes of decay and damage, and the changes that led to the present state, looking for holistic approaches for design choices [21–25]. These studies are basically based on the recommendations developed by the international organizations and intergovernmental structures that support UNESCO on these topics, such as ICOMOS, ICCROM, IUCN [26], DOCOMOMO [27], or the Getty Conservation Institute (GCI) [28]. The international indications are absorbed by the national regulations for the preservation and enhancement of cultural heritage. The Italian instrument ruling the management of cultural heritage is the Cultural Heritage Code (Legislative Decree no. 42/04 as amended or added). Following the international debate results, the Code gives definitions about what to consider as “cultural heritage”. Referring to modern heritage, in Article 12 it automatically creates a constraint: “every immovable property that goes back to over seventy years, whose author is no longer living”. This definition introduces a specific case in which the constraint is attributed due to the age of the building, failing in the necessity to recognize the attributes that the Operational Guidelines require to justify the inscription of a property on the World Heritage List (WHL) [29]. Two thoughts follow: which transformations are “allowed” when the property is listed without a clear recognition of its OUV? Which transformations are allowed for properties, those not formally listed, whose OUV is clearly identifiable for roles and relationships that have tightened with the urban context and for being documentary evidence of constructive evolution? For properties eligible to be included in the WHL, it is necessary to verify that they meet the requirements given by ICOMOS and IUCN [30]; for those in the second condition, those which are not constrained, the logics of efficiency enhancement may prevail, also leading to important alterations affecting buildings and the image they consolidated within the stratified city. Both the questions find an answer in the recognition of value “as memory” and of “contemporary values”, which must also be preserved, protected, and promoted by acting in an important way on the other parameters of the recovery project, those of volumetric reconfiguration, adaptation, or functional destination [31].

The research activities currently engaged in in the recovery of the modern heritage bring into play very different approaches with regard to theoretical, methodological, technical, and strategic type [32]. The lack of a shared vision in the approach to 20th-century heritage conservation has led the Getty Conservation Institute GCI to create the Conserving Modern Architecture Initiative, which aims to find a scientific response to the challenges related to the recognition and protection of modern heritage, to the durability of the materials and construction techniques, and to the obsolescence of built heritage [33]. The preservation of 20th-century sites therefore focuses on the knowledge of the “new” materials introduced by the post-war “industrialized” construction [34]. A large part of the modern building is characterized by experimental solutions in reinforced concrete that, in a short time, showed important limits in terms of durability [35]. The most frequent answer to these deficiencies often consists of invasive structural and efficiency interventions, which are disrespectful of the value of the building and often highlight the convenience of preferring the logic of building replacement to those of conservation. Hence, there is the need to develop conservation strategies to be understood as “the honorable compromise” between the aims of recovery, reuse, and promotion of the value identified in the specific intervention, that is, the compromise that allows the design of interventions ensuring compliance with the rules of construction and safety without damaging, or enhancing, the elements that represent its OUV [36].

The act of conservation, which intrinsically contains that of reuse, cannot be the universal answer to the problems of valorization. In order to identify what to conserve and how to enhance, and offering suitable methodologies for the purpose, DOCOMOMO implemented a strategy for the census of modern built heritage, through the cataloguing of goods and the reporting of sites to be preserved and aiming at the study of methodologies and intervention criteria to safeguard their testimonial value [37].

Regarding the need to identify holistic methodologies, the Scientific Committee for the Heritage of the 20th Century (ISC20C, established by the advisory body of UNESCO) elaborated “Approaches for the Conservation of the Cultural Heritage of the 20th Century”, the ICOMOS Document of Madrid–New Delhi, aiming at being a “reference standard for the conservation and management” of modern heritage.

Based on the formulated thoughts, the contribution analyzes the design process developed by applying the ICOMOS methodological approach to a building complex realized in Pozzuoli in the first decades of the 20th century. The evolutionary history of the volumes, which is related to the succession of construction phases, and the different functions to which they were destined over time, but above all the transformations they underwent and the consolidated “modern ruin” configuration, gave rise to a series of complex perspective relations with the local reality that assume today an identity value stronger than that connected to the original project. The paper analyzes the recognition of OUV as a key stage in the developing of design choices; the results are different for each volume in relation to the emerged values to be preserved.

2. Methods

The ICOMOS Document of Madrid–New Delhi renews the ambitious mission already expressed in the first version of 2011: “to draft an international reference text to approach correctly the management and interpretation of sites and places of the twentieth century”. The text of Madrid [38] was received with great interest by the technical–scientific community. In later versions, it absorbed comments from scholars around the world, on the basis of which the object of study was expanded to include other types of heritage of the 20th century (cultural landscapes, industrial sites, and urban areas). At the 19th ICOMOS General Assembly, held in Delhi in December 2017, the third and current version of the Document, entitled “Approaches to the Conservation of 20th Century Cultural Heritage” was presented. Among the stated missions, the Document clarifies that “the duty to conserve and manage the places and sites of the 20th century Heritage is just as important as that of preserving the significant cultural heritage of previous eras”. The specific approaches identified for the built heritage are divided into:

- “To identify and evaluate the cultural significance” (Art. 1), defined as “the aesthetic, historical, scientific, social and/or spiritual value for past, present or future generations”.

This evaluation, as widely discussed, makes use of the different methodological approaches aimed at recognizing the documentary role of the building, in its tangible (form, spatial relations, construction systems, structure, etc.) and intangible (use, historical, social, scientific, or spiritual connotations) attributes. Article 1 also deals with the issues of structural solutions, techniques, and building materials “*which should be identified and evaluated in their cultural significance*”. With this meaning, the Document inserts the materials and construction techniques among the elements to be enhanced in the recovery because they are a testimony of the experimental research carried out in the field of construction.

- “To apply an appropriate methodology for the planning and management of conservation” (Art. 2), aimed at preserving the integrity of the good and its significance.

The Document bases the methodology for the planning of conservation on the correct interpretation of the cultural significance of the object of intervention and is aimed at preliminarily assessing the impacts that the planned interventions can determine in the short and long term. This analysis process requires the development of multidisciplinary and multi-scale approaches which are also capable of anticipating needs not yet known

according to the potential dynamics of the cultural, social, and economic development of the site. To be at one with the identification of the intervention strategies to be applied in the recovery project, the methodology must include a planning of the policies that ensure proper conservation and management over time. In this article, the Document also addresses the issue of the “*acceptable modifications*” to be established in relation to the significant elements of the place, the vulnerabilities that afflict it and its optimal use. This aspect impacts upon the concept of “constraint” which cannot be understood as a preventive and generically “integral” procedure but which must result from an in-depth process of recognition of the identified values. These latter must be explicitly documented within the constraint decree in order to identify the limits of acceptable modifications and, on the other hand, to open the field to operations rarely allowed in the context of architectural restoration: partial demolitions of elements for which the evaluation process has not revealed any significant value, that is, the reconstructions of parts and volumes with new materials and architectural languages, can enhance the value of the intervention as a whole.

- “To investigate the technical and design aspects of the cultural heritage of the twentieth century” (Art. 3), which recalls the need to “identify and understand” the construction materials and their state of conservation in relation to the aging process suffered.

In detail, the field of investigation related to the reinforced concrete built heritage requires a deep knowledge of each phase of experimentation with the constructive material and of the standards evolution. Knowing the technological requirements regarding the composition of the material, the constructive process, and the interaction with the steel elements is necessary for the correct evaluation of the degradation phenomena that occur in the material and technical elements after a relatively short time (50–70 years). Moreover, from the point of view of dimensional checks, it is necessary to take into account the regulations according to which certain structures have been designed: to date, as verified in accordance with the Italian Technical Standards for Construction (NTC 2008 and later 2018), much of the modern built heritage is obsolete and needs rather impactful improvement/adjustment.

- *To manage change with sensitivity, in order to preserve the cultural significance (Art. 6).*

At this point, the Document draws attention to the role of cultural heritage scientists in the preliminary assessment of the potential impacts of any transformation on the territory. In the “management of change”, in fact, the need to integrate the demands expressed by the beneficiaries is recalled in order to promote land-use measures which are compatible with local policies or sufficiently strong to motivate the updating of such policies and town-planning forecasts [3]. This approach requires “flexible interpretations” of the standards aimed at ensuring adequate solutions for the preservation of heritage while preserving its cultural significance.

3. Results and Discussion: The Application of M–ND Methodology to ex S.M.O.M.

As a result of the studies that have deepened the restoration of modern heritage and concerning the principles elaborated in the Madrid–New Delhi Document, the paper proposes “to stress” the ICOMOS methodology and apply it to a very peculiar complex of buildings. The paper shows, as a major novel contribution to the literature review, the application of the ICOMOS methodological approach as an instrument to contrast the common practice of affixing “constraints” without the recognition of specific values constituting the properties of OUV; it is a critical reflection on the concept of “honorable compromise” as an instrument to identify strategic solutions aimed at strengthening the tangible and intangible values that characterize the property and its relationship with the surroundings.

The application of the Madrid–New Delhi methodology is based on the evidence that, in recent years, the Italian Ministry for Cultural Heritage and Activities and Tourism (MiBACT) has declared the “full constraint” for the complex that the paper selects as a case-study (ex. S.M.O.M. in Pozzuoli), as a timely tool to contrast the demolition proposals

that were formulated. Due to the reasons that motivated the inscription of the property in the WHL and the short time for the application of the constraint, the decree lacks the identification of criteria required by the standard format of Statements of Outstanding Universal Value SOUV [15]. Therefore, prior to any building regeneration and conversion projects, it appears necessary to highlight the significant values to be preserved.

The research approach aims at suggesting a proposal for the conversion of the building complex ex S.M.O.M. in terms of defining a compatible transformation scenario. Starting from a critical interpretation of the Madrid–New Delhi Document, the design process was based on an in-depth knowledge of the volumes and aimed at identifying the tangible and intangible values to be promoted in the intervention. The methodological process, developed according to the ICOMOS indications, was divided into three phases:

1. The development of “*an appropriate methodology for the planning and management of conservation*” (Art. 2). This phase has been carried out through the preliminary evaluation of the elements that contribute to defining the cultural significance of the object of study and the definition of the limits of acceptable modifications in relation to the cultural significance identified.
2. The analysis of the technical and design aspects (Art. 3), carried out through the study of the materials used and the building elements, outlined into classes of technological units according to UNI 8290; the process of material aging; and the degradation phenomena, interpreted in relation to the standards in force at the time of the construction of the building.
3. The design of the appropriate change management strategies (Art. 6), through flexible interpretation of the existing law and the identification of an appropriate use.

To apply M–ND methodology, the process suggested by international recommendations has been followed [35,39,40], developing:

- The historical and bibliographical analysis of the building: the phases of knowledge were developed by analyzing graphic and informative materials available at the archives of the municipality of Pozzuoli and by designers who, in recent times, had developed some project proposals for the reconversion of the site. Most of the historical data on the building appear to be sensitive documentation in the possession of the Military Order archives, which remained inaccessible to the present research. For the same reason, the planimetric and functional distribution of the original plant did not emerge, as it was probably designed by a group of technicians within the military administration.
- The inspections and photographic surveys: archival and documentary research was integrated with on-site inspections, which allowed the study of interesting details related to the current conformation of the pavilions. The actual state of preservation of the lot did not allow safe viewing of all the volumes; for this reason, Pavilion C was excluded from the application of the ICOMOS methodology. Significant values and peculiarities emerged from the direct photographic investigation and became the basis for the subsequent deepening of the knowledge of buildings, construction materials, and technical solutions adopted in the original project.
- The identification of OUV related both to the buildings and their relationship with their surroundings: this phase was implemented through the study and editing of construction details and the elements that express the features that represent a masterpiece of human creative genius, the interchange of values within the referring landscape area, and the exceptional testimony to a cultural construction tradition.
- The identification of the limits of transformability, which are explicated through the boundaries of acceptable modifications for each individual building, depending on the peculiarity of each volume, the role they play in the lot, and the available modifications due to construction types.
- The analysis of the state of preservation of the materials and technical elements: this phase was performed through the consultation of the technical regulations in force at the time of construction (Royal Ministerial Decree of 1907), in order to interpret the

original performances required of the structures, and the subsequent determination of the residual mechanical characteristics of the materials, achieved by the application of an experimental methodology.

- The development of a proposal for the reconversion of the ex S.M.O.M. complex: this phase has been carried out through the definition of a transformation scenario involving principles of the compatibility, continuity, and authenticity of the buildings and their surroundings. This approach led to the design of one proposal for the complex functionalization that includes very different interventions for each pavilion.

3.1. *The ex S.M.O.M. in Pozzuoli: Historical and Bibliographical Analysis*

The ex S.M.O.M. complex in Pozzuoli consists of several volumes built in different eras. The first plant was built in 1917 on a plot confiscated from some private owners by the military administrations, with the aim of building a sanatorium for tuberculosis patients [41]. The healthy and sunny position of the lot, adjacent to the Via San Gennaro Agnano (ancient Via Domitiana), on the western slopes of the hill near the Solfatara Volcano, dominating the entire gulf of Pozzuoli, presented favorable climatic conditions for cures (Figure 1).



Figure 1. Historical photo of the ex S.M.O.M. complex—© Archives of the Municipality of Pozzuoli.

The original layout included two pavilions perpendicular to each other (A and B), placed in the upper part of the lot, and a third positioned lower (C), all designed for hospital use. The original design mirrors the application of the principles of modern architecture to the trend of sanatoria constructions emerging in the same period, using flat roofs, terraces, and extra outdoor spaces to cure physical and moral diseases through heliotherapy and other healthful activities [42,43]. The location of the lot and its size allowed the achievement of both the requirements for the treatments: to isolate the patients with TBC in dedicated facilities and to organize building volumes for multiple specialties for diagnosis and treatment [44]. The proximity to the Solfatara Volcano was also certainly considered in selecting this site for the construction of the sanatorium, given the beneficial action of sulfur inhalation on the treatment of TBC [45,46].

Over the years, the complex was completed with smaller volumes, variously placed on the lot to perform religious and service functions. At the end of the Second World War, the management of the complex was entrusted to the “Ordine religioso cavalleresco del Sovrano Militare Ordine di Malta” (S.M.O.M.) which, around the early 1970s, handed it back to the Ministry of Defence. In these same years, an improper new building volume (A') was added, which served as a link between buildings A and B when the complex was converted into a medical examination center for compulsory conscription (Figure 2).



Figure 2. Top view of the ex S.M.O.M. complex. In the figure, volume A is green, volume A' is pink, volume B is violet while volume C is red —Image processing © Silvia Trampetti.

At the end of the 1980s, the State Property Agency acquired the S.M.O.M.'s area, by then completely abandoned, as a “public asset being sold off”. A series of reconversion proposals have been made, but these have never been followed up. The design forecast developed at the beginning of the 1990s, for the conversion of the bodies A and A' to a school structure, promoted important transformations, which included the partial demolition of the envelope and roofing. The “altered” configuration, as a result of the intervention, which was never completed, has consolidated over time, connoting the spatial and prospective relationships between the two pavilions and the context. In 2013, following a period of complete abandonment, MiBACT declared the historical–architectural interest of the complex, submitting it to the protection provisions contained in Legislative Decree no. 42/04. The full constraint was placed as a timely tool to deal with a series of rash demolition proposals that were advancing in those years. In more recent times, the administration of the municipality of Pozzuoli has re-evaluated the potential of the lot by approving, in 2017, a “Project-standard variant to the General urban development Plan (P.R.G.)”, which establishes the functional destinations and eligible interventions for the area. In the same year, the ownership of the complex was transferred to the “Fondo Investimenti per la Valorizzazione-Comparto Extra di Cassa Depositi e Prestiti”, which currently holds the property. Even today, after years of complete abandonment, the complex is in a state of ruin.

Pavilion A, originally from the first twentieth-century plant, is presented as a slatted volume with a “historic” reinforced concrete frame. The building consists of three floors and, as a result of the interventions carried out in the 1990s, it is now devoid of the original pitched roof. Pavilion B, coeval with the previous one, has a bearing structure with masonries made by Neapolitan yellow tuff and is developed with three floors; following collapses, the pitched roof is now partially visible. Pavilion C, also belonging to the original plant, has a bearing structure with masonries made by Neapolitan yellow tuff which are similar to those of Pavilion B. Compared to the other buildings, it has two floors and a partially preserved flat cover. Pavilion A', built in the 1970s for the connection of bodies A and B, has a framed structure in reinforced concrete, with formal and typological characteristics which are completely different from those of the first pavilion. The volume, composed of three floors, is covered by a flat attic.

The heterogeneity of the materials used, the construction techniques adopted, and the proposed technological solutions offer the possibility of applying the same critical approach to a range of buildings very different from each other. This application results in the elaboration of different design proposals in relation to the specific values recognized in each pavilion.

3.2. Identification of OUV and Limits of Acceptable Modifications

The assessment of significant elements has been carried out referring to the recognition of the “integrity” of the complex, identifying elements that express its OUV today in the image that the property consolidated in the surroundings [18]. The first valuable element considered to elaborate the design strategies consists in the great landscape value of the site overlooking the gulf of Pozzuoli, with an optical cone that goes from Baia to Capo Miseno, including the islands of Procida and Ischia (Figure 3).

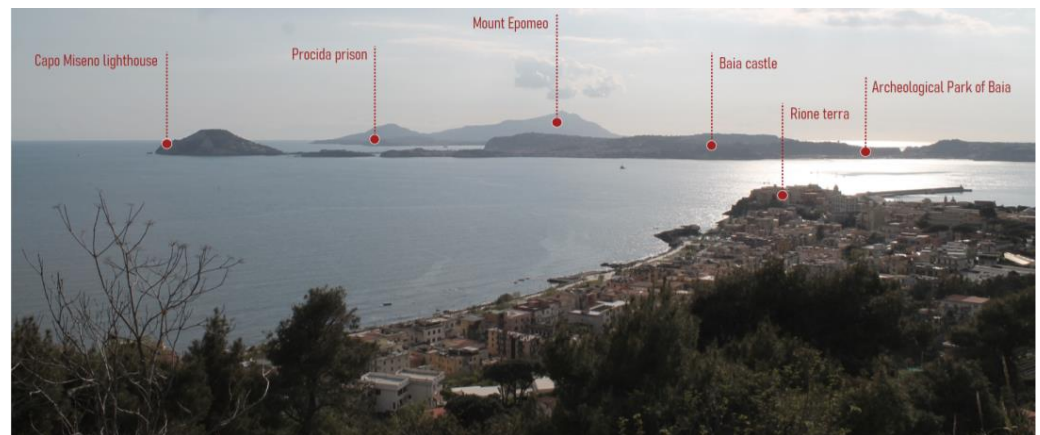


Figure 3. The gulf of Pozzuoli seen from the Ex S.M.O.M.—Image processing © Silvia Trampetti.

Only one third of the lot is covered by the building, while the other part is arranged in green, with a large flat area in front of the main pavilions and a land terraced on the slope towards the sea. The state of conservation of the buildings has a great impact for the protection of the cultural and documentary value of the complex that, in its configuration altered by the interventions of the 1990s, has interwoven peculiar perspective relations with the context. For its size and impact on Via San Gennaro and due to its condition of reinforced concrete ruin, Pavilion A assumes the role of attractor for the entire complex: a linear building about 70 m long by 20 m deep with a total elevation of about 15 m. The main façade, with its “bare” frame, is now completely permeable to the view. This configuration has been consolidated in the local collective imagination; openings in the sequence become frames for the landscape behind, framing from time to time different landmarks of the gulf view (Figure 4).



Figure 4. Pavilion A seen from the street—Image processing © Silvia Trampetti.

The direct survey on the pavilion highlighted a supporting structure made of “semi-spatial” reinforced concrete frames, with beams arranged both in the main longitudinal and transversal directions in order to respond to both vertical and horizontal stresses. This technology adopted in 1917 was very avant-garde for its era as at that time the common

rules for construction provided for the realization of concrete structures responding only to vertical stresses with parallel frames. The floors have been realized as plates with a bidirectional grid; the technological characteristic of these constructive elements consists in using reinforcement bars with constant diameter, probably related to the operational needs to standardize the types of steel elements on the construction site.

The partial demolition of the original envelope revealed the slender sections of the pillars, which were clearly designed for vertical loads, leaving to both the slabs and the Neapolitan yellow tuff walls the horizontal stresses (Figure 5).

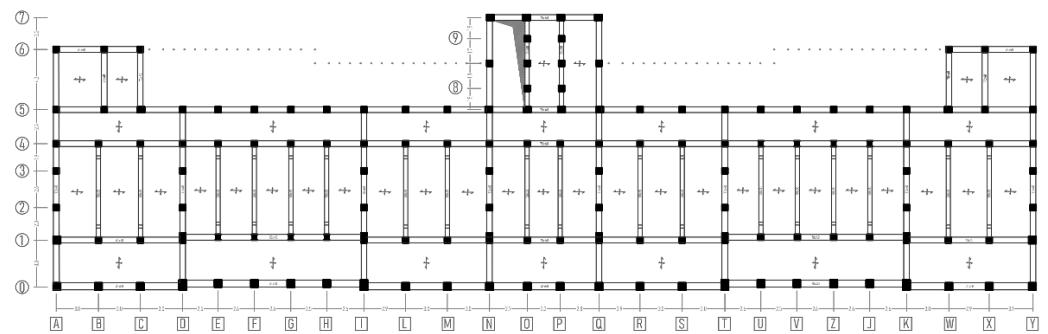


Figure 5. First deck carpentry of Pavilion A—© Silvia Trampetti.

The structural solution adopted denounces a design attention to the seismic component even in the absence of specific regulatory requirements. It can be addressed to the “local seismic culture” [47], which is the awareness of local communities of the seismic events’ recurrency: frequent seismic events allow people to talk about them to the following generations, while occasional seismic events tend to be forgotten in time. In the Phlegrean territory, the local seismic culture is closely linked to the slow and continuous stresses of Bradysism. This peculiar feature becomes a cultural value to be preserved during the recovery project.

The representation of technological details, based on direct survey phases, highlighted how the “new material” was used, following the typical experimentations of the early 1900s, as a fluid stone capable of taking any shape. The beam-pillar nodes are made by connections with “pulvini”, which fulfill the roles of decorative elements, icons of classic architecture, and of reinforcement for constraint (Figure 6).

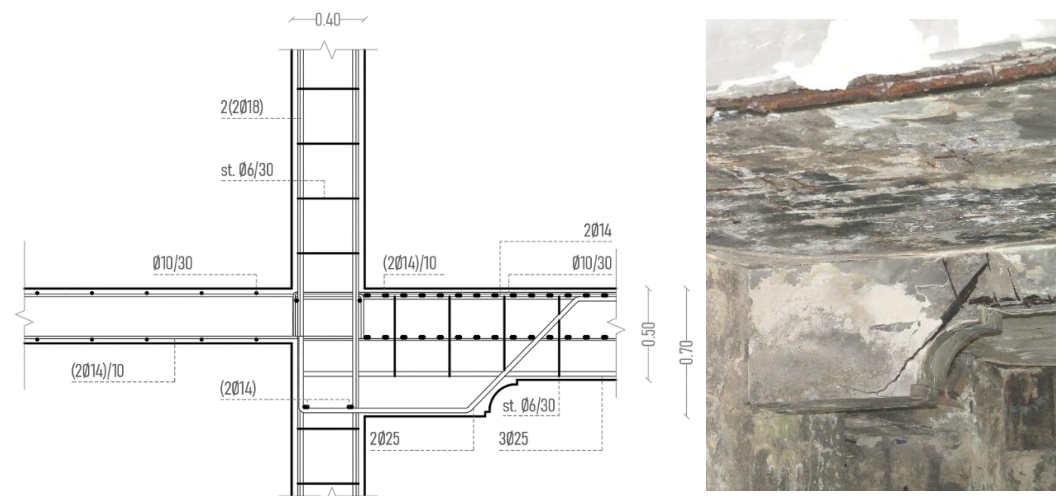


Figure 6. Confined beam-pillar node of first deck—© Silvia Trampetti.

The analysis developed showed that the elements of value to be considered for the reconversion proposal of Pavilion A consist of:

- The relationship between architecture and landscape.

- The technical solutions that exhibit the local seismic culture.
- The building details as historical evidence of the evolution of reinforced concrete technology.

With the exception of the relation with the landscape, which was still the basis of the sanatorium design, the other elements highlighted do not belong to the original concept but were acquired over time, and in the altered configuration of the building, had a strong connotation. In this sense, the application of the ICOMOS methodology also leads to the attribution of an iconic significance to those forms of anthropogenic degradation that resulted in the partial demolition of the building. As a result, the study of the OUV related to Pavilion A has shown the definition of the limits of acceptable alterations, which, in relation to the identified values, aim to preserve:

- The configuration of the pavilion as altered over time, enhancing the symbol of the exposed frame and its relationship with the landscape;
- The technological details and geometries of the building elements.

To ensure that these limits of transformability will be respected, the study analyzed the residual strengths of the materials in order to make design proposals capable of valorizing the technological aspects that characterize the pavilion.

3.3. The Analysis of Building Materials and Their Aging Process

The original design of the reinforced concrete structures in Pavilion A was carried out in accordance with the Royal Ministerial Decree of 1907. The analysis of the regulations allows the defining of the physical and mechanical properties of the structures at the time when they were realized. To evaluate the current residual performances, a reduction in strengths suggested by the standard is necessary, in order to take into account the chemical degradation phenomena of the material, which are related to the constant exposure to sulfides from the Solfatara, the chlorides contained in marine aerosol [48], and the material's natural aging. Considering the inability to carry out laboratory tests on the materials, the residual strengths were evaluated by applying an experimental methodology [49] that, based on the comparison between the resistances directly measured in several historical reinforced concrete buildings in Campania and those of the design in accordance with the legal standards at the time of their construction, gives a theoretical law to estimate the decrease in mechanical resistances over the time. Applying the results of the methodology, it was possible to estimate that the mechanical strengths decreased by about 50%.

3.4. The Change Management and the Identification of Intended Use (Art. 6 M–ND)

The identification of the intended uses has been carried out according to the principles of “integrity”, as defined by the Madrid–New Delhi Document, in order to design interventions that can host functions that are compatible, harmonious, and sympathetic with the surrounding context [5]. The values highlighted in the previous steps must be related to a critical interpretation of the standards and urban planning requirements identified on the project area. The variant to the P.R.G. approved in 2017 included the S.M.O.M. complex in the “homogeneous zone G-Hospitality and tourist complexes”, dividing the project lot into three sub-areas intended for parking, S.M.O.M., and green spaces. Applying a rigid and integral approach, the zoning instrument identifies permissible uses and interventions that disregard the recognition of the context and the specific values of each volume. The Executive Technical Standards (N.T.A.) explicitly prescribe the exclusion of the residential and commercial functions for large and medium distribution for the S.M.O.M. sub-area, while for Pavilion A they allow the architectural restoration of the façades and the roof and building renovation for the interiors. On the other hand, the prescriptions provided by the Technical Standards for Construction (N.T.C. 2018) indicate the possibility to realize local or global interventions in cultural heritage but still within the limits of “seismic improvement”.

According to the ICOMOS methodology, to respect both the cultural values identified for Pavilion A and the enhancement and structural safety issues, the project intervenes in the accurate analysis of a potential transformation scenario. The starting point for

identifying a compatible use lies in the study of the spatial vocation of the area in which the S.M.O.M. is located, which must be compatible with the P.R.G. variant provisions. The lot is located about 3 km from the center of Pozzuoli, but it is more easily accessible from the neighboring area west of Naples, to which it is directly connected through the Via San Gennaro Agnano. An analysis of the activities located in the area revealed the presence of several facilities for accommodation.

A participatory approach was applied [50]. The direct discussion with the stakeholders involved (in the specific case, the municipal administration of Pozzuoli together with some members of Cassa Depositi e Prestiti) revealed the need to provide adequately profitable activities in order to allow the complex to be financially self-sufficient. In this specific case, taking into account the vocation of the analyzed area and the urban planning forecasts in force, the project suggests cultural–touristic destinations.

Pavilion A should be confirmed as the main attractor volume capable of hosting exhibition spaces, conference rooms, and laboratories, arranged with a compatible distribution of overloads. In this scenario, the permeable character of the reinforced concrete frame will acquire new meanings by “opening up” to public use. For this reason and according to the results of Sections 3.2 and 3.3, the improvement of the structural behavior should be achieved through solutions for the formal preservation of the technical elements by limiting the overloads on the original structures. The replacement of the resistance-to-gravity loads may be ensured through the application of FRP technologies and the reconstruction of the beam and column sections with fiber-reinforced cement mortar. For floor reinforcement, the project should include collaborating castings in fiber-reinforced cement mortar and plastic nets. To preserve the architectural organization of the building, seismic stress absorption should be entrusted to new, compatible, and recognizable seismic-resistant elements (septa or braces) in the existing frame.

3.5. The Application of the ICOMOS Methodology to Other Pavilions

The application of the ICOMOS methodology to Pavilions B and A', which are different in terms of materials and construction techniques, construction period, and state of preservation, leads to the identification of different elements of value and, consequently, induces the development of different design choices.

The evaluation of the significant elements of Pavilion B is strongly related to the value of the load-bearing masonry construction system as a document of traditional techniques; this allows for the application of intervention strategies which are typical for historic building recovery. This construction type strongly limits the acceptable alterations due to the strict masonry shell, which is made of Neapolitan yellow tuff and bricks listed as masonries; steel beams and tuff vault slabs; and wooden truss roofing. With this in mind, the project should preserve the value of witnessing traditional techniques by providing for the formal reconstitution of the building even in the collapsed parts (roofing). To support the new functions proposed for Pavilion A, in accordance with the values identified for Pavilion B, and due to its rigid planimetric distribution determined by the presence of load-bearing walls, which are typical for traditional masonry buildings, it should be used for hotel facilities with common areas and service rooms on the ground floor.

The application of the methodology to Pavilion A' revealed the absence of a strong cultural significance. The only valuable element is recognized in the function of connecting the bodies A and B. This consideration, together with the evaluation of the materials and construction techniques (load-bearing structure composed of parallel reinforced concrete frames and brick–concrete floors), as well as the obsolescent state of preservation, prompts for “extreme” design strategies which involve building replacement, even if contrasting the integral constraint. Here, the principle of “integrity” leads to the enhancement of the recognized attribute, the function, and the promoting of the regeneration of the original meaning of this volume through a modern design that should be distinguishable from the existent building according to honest and legible purposes [18]. The reconstruction of a connecting volume, with modern and recognizable materials, would offer the opportunity

to optimize both its functional value (by improving the connections as well as by the removal of the architectural barriers) and the architectural value of the adjacent bodies A and B.

4. Conclusions

The application of the ICOMOS methodology to the three 20th-century pavilions, which present completely different technological, technical, and architectural qualities from each other, provided entirely different but fully enhancing results, which are related to various recognized values. For Pavilion A, that today is a ruin in reinforced concrete, the identified cultural significance led to suggesting the consolidation of its exposed frame in order to enhance the constructive genius and the relationship with the landscape. The “honorable compromise” required the adaption of the intended use to the need to preserve the technological organism, including the geometries and building details. Therefore, the functions that do not significantly increase overloads should be preferred in order to limit the technical interventions for seismic improvement. The application of the M–ND methodology to Pavilion B, which can be considered comparable to a pre-twentieth-century construction, suggests that enhancing the original architectural distribution would be representative of the construction tradition of load-bearing masonry buildings. This feature should lead to the reconstruction of the original elements and general architecture. The application of the M–ND methodology to Pavilion C produced results totally different from previous ones. This volume, built more recently than the others, with poor architectural and technological quality, only serves the purpose of a connecting function between Pavilions A and B. For this reason, different future scenarios open up: one of these provides for its replacement with a new construction characterized by architectural and performance qualities which are appropriate to the surrounding context and capable, at the same time, of valorizing the authenticity of connected Pavilions A and B. The proposal for a reconversion project should find “the honorable compromise” between the aims of recovery, reuse, and conservation, defining an intended use that must be compatible and, above all, capable of strengthening the context relations linked to the cultural, social, and economic promotion of the territory.

The analyses carried out and the design outcomes show that the quality of a recovery project disregards the concept of “constraint” when it is affixed with rigid logics of freezing certain building or urban arrangements. However, the recognition of cultural value should follow accurate and characterized methodological processes for each specific case in order to deliver a complete knowledge framework to support the transformation design strategies. Such an approach is even more crucial when intervening in buildings belonging to 20th-century heritage, which are connoted by a great heterogeneity of meanings and signifiers necessary to transmit the cultural values of the modern building tradition.

Based on this idea, and recalling all the requirements in the international standards to justify the introduction of properties to the World Heritage List, the paper suggests a thorough review of the constraint decrees before developing any kind of design or intervention. This attitude should be applied specifically to the case of the ex. S.M.O.M. in Pozzuoli but also to all other cases where the SOUV is not clearly identified.

This last consideration introduces future research developments aimed at considering the “critical review” of the constraint decrees in the first phase of the ICOMOS design process, which belongs to the acquisition of data and information. Starting from the statement of outstanding universal values of properties, which is also to be realized through the application of a participatory approach and involving the expertise of several cultural heritage scientists, all the other phases of the design process can be characterized: the diagnosis and the in situ and laboratory investigations, as well as the definition of innovative interventions, the selection of materials and technologies, or the elaboration of enhancement and promotion strategies.

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