Restaurer les bétons/ Conserving concrete

July 1, 2022

Faculty of Architecture of the University Porto, Portugal

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CONTENTS

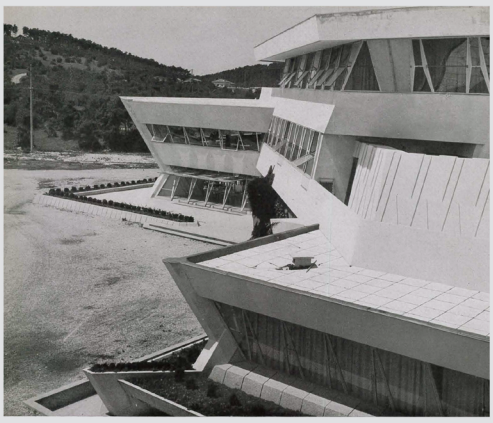
IL DIRITTO ALLA TUTELA

ARCHITETTURA D'AUTORE DEL SECONDO NOVECENTO

a cura di
Gentucca Canella e **Paolo Mellano**

Architetti italiani del Novecento
FRANCOANGELI

Guido Canella, Michele Achilli, Daniele Brigidini, Laura Lazzari, Centro civico di Segrate, Milano, 1963-66



Marcello d'Olivo, Villaggio del fanciullo a Opicina, Trieste, 1950-57

Vittoriano Viganò, Istituto minorile a Baggio, Milano, 1953-57

Preservation of the “Maestri” lesson. Some political issues for the 1950-1990 Italian architecture

Gentucca Canella
Dipartimento di Architettura e Design (DAD), Politecnico di Torino

The focus of our contribution is a reflection on some selected, emblematic, episodes of the Italian architecture, from the Second half of the XX century. We believe in fact that the built production of this particular period – post-war architecture till the end of the century – is today increasingly submitted to various and complex types of intervention, basically aiming to their regeneration and re-functionalisation, but, in many cases, deeply compromising in the end their formal language and thus their perception. In a few words, their architectural intergrity.

As Bruno Reichlin states: «*The preservation of the modern and contemporary architectural heritage [...] is perhaps one of the great opportunities currently offered to the architects in order to rethink their profession*». This *“architect of the safeguard”* should be in the position to directly operate in the field, having a deep knowledge of the genesis of the architectural work, its materials and construction techniques, the state of its conservation or alteration, as well as the procedural and operational issues necessary for its future spatial layout and functional destination: project, call for tenders, works management, construction site. This body of knowledge obviously needs to deal with the current legislation, which unfortunately in Italy still lacking a significant consolidated jurisprudence.

Against the prevailing common trend in attributing those works to the so-called “fragile century” of architecture – which would imply “standard” criteria of intervention, and which seems to deny a more specific “case by case” approach (as well as the original intentions of the architect-author) – our intention is to demonstrate how, especially while the authorial choices are interwining with an enlightened client needs, as in the cases here illustatred, all the techiques and material involved in the construction are much more than formal expressions. They are in fact crucial factors to transmit the programmatic intentions of their authors as well as their civic commitment (we think, among others, to architects like Vittoriano Viganò, Bruno Zevi, Guido Canella, Carlo Aymonino, Marcello D’Olivo, Luciano Semerani).

We consider a meaningful example in this sense the restoration of exposed concrete facades and elements, widely present and peculiar of many fundamental architecture works from the 1950s to the 1970s. The difficulties, and even big mistakes, resulted from many recent attempts of preservation are evidence of the relevance of this specific problem. The same problem can be referred to the “frames” structures – in their multiple variations of u-glass, “ferro-finestra”, glass blocks, curtain wall –, as well as to structural processes and assembly phases.

When intervening on the work of these “Maestri”, first of all formal issues are to be preserved in their integrity. It is crucial that the “figurative and perceptive invariants” can be read and re-transmitted, making use, when necessary, of different types of restoration techniques and materials.

«*This is the reason why, today, remembering and talking about them can be a way not to forget that – in a more rigorous manner than any other man – the intellectuals are accountable for the civilisation they are shaping, which in turn will express them. Among these intellectuals, willing or not, aware or unawere, the architects, along with the writers, are the most directly committed*» (Giulia Veronesi, *Difficoltà politiche dell’architettura in Italia 1920-1940*, Milano 1953).

Maisons La Roche et Jeanneret, after restoration – 2015 ©Fondation Le Corbusier /ph. Cemal Emden

Unité d'habitation de Marseille, 2022 ©Fondation Le Corbusier /ph. B. Gandini

About the Concrete Restoration of Le Corbusier's Work

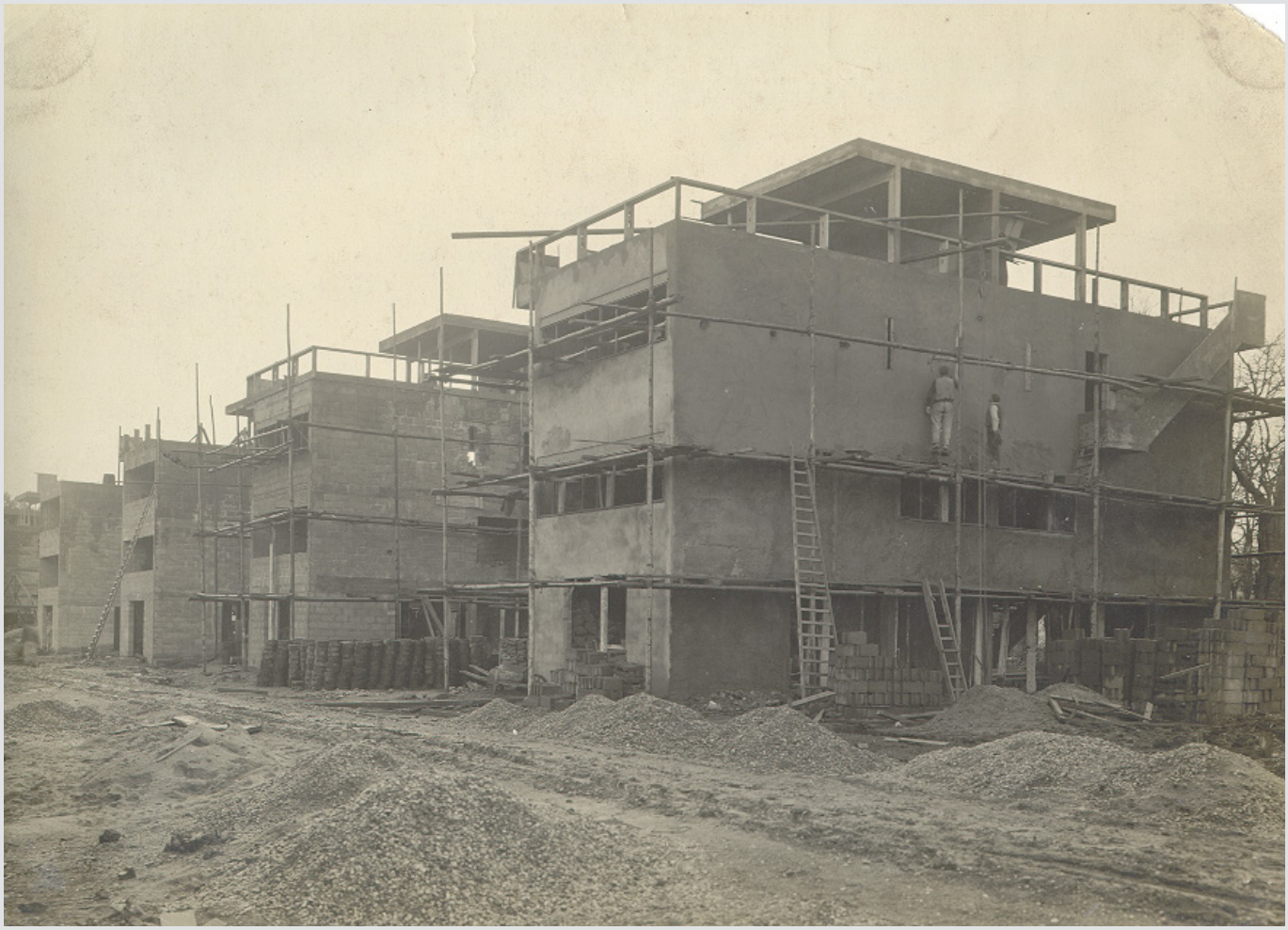
Bénédicte Gandini
Fondation Le Corbusier

In recent years, many of Le Corbusier's works have been restored, throughout the nomination of his work on the World Heritage List. Since then, many other projects have been developed on Le Corbusier's work not only in France, but also in India, for example.

These studies and restoration projects concern works from the Purist years in Paris, but also from the Brutalist period. In fact, the question of the restoration of concrete is a thread that runs through all of Le Corbusier's work, starting with the examples we will present from the 1920s, even if the problematic is not the same and requires a different approach. Indeed, not being visible, but covered in some cases also with paint, the subject is not always taken into consideration. The example of the La Roche and Jeanneret houses or the apartment-studio of Le Corbusier in the Molitor building show the interest of making a diagnosis and intervening on the structural materials.

Concerning the Brutalist period with the presence of apparent rough concrete, as for the Unités d'habitation and the Couvent de la Tourette for example, the need to carry out appropriate studies seems more obvious. However, in some cases, there is no diagnosis carried out before the restoration project. This complicates the intervention at the time of the restoration site and mistakes can be made leading to an unsustainable intervention and the loss of authentic material of the building. The knowledge of the material, its implementation and its pathologies should nowadays be systematically the subject of precise diagnosis carried out by specialized research departments. But the historical study must also accompany these more technical studies, to identify the aesthetic will of the author and the knowledge of successive interventions. The technical solutions can be the subject of important exchanges also because the level of knowledge of the possibilities and the return of experience in this respect is not always known. This knowledge is necessary to propose a sustainable intervention adapted to each structure, taking into account the specificities of each one.

An overview of the latest restorations and ongoing projects will provide a vision of the state of conservation of Le Corbusier's work today and the different approaches that are being developed. This should allow the establishment of an adequate methodology for any restoration project. Moreover, this approach should take into account the entire work, and be applied to all materials (wood, metal, painting, …). This requirement, which seems to be applied to so-called major works, should be commonplace and spread to the whole of the 20th century work.



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The Cité Frugès in Pessac: understanding to preserve. Historical study of the concrete construction

Paola Scaramuzza
LéaV - ENSAV École nationale supérieure architecture de Versailles

The Cité Frugès is a residential district built in Pessac, near Bordeaux, between 1924 and 1928 by Le Corbusier and Pierre Jeanneret. This neighborhood is conceived by its authors as an experimental laboratory for the low-cost housing construction using the principle of standardization of construction.

Reinforced concrete and “cement-gun” techniques allowing the rapid application of structural or non-structural cement are chosen for the module construction, the constructive and compositional principle of 5x5 m. The combination this module and his sub-module 5x2.5 m gives rise to different types of two and three-stories dwellings.

The neighborhood, inhabited continuously since the early 1930s, has been protected by different heritage instruments since the mid-1980s, and since 2016 it has been inscribed together with sixteen other sites or architectural works on the world heritage list.

This presentation shows the construction site history and details the events related to the reinforced concrete works. This case study is an example of how historical research allows to refine the knowledge and operationally in order to orient the diagnostic investigation phase for the purposes of evaluation and as a support for the conservation project.

Through archives investigations it is possible to retrace the difficulties and compromises encountered by the builders in the attempt, which proved to be premature, to apply the standardization procedure.

It will be an opportunity to take a close look at the operational difficulties and at the same time on the state of theoretical knowledge in the use of reinforced concrete also through comparison with the current legislation at that time.

This case intends to encourage reflection on the role of historical concrete structures knowledge, and on the effects on their conservation.

Figure 1: Cité Frugès, rue Le Corbusier, housings type gratte-ciel (skyscraper). The house located at n°4 belongs to the municipality, the other houses are private properties. 2016 © FLC/ADAGP

Figure 2: Cité Frugès, free-standing housing called « Maison Vrinat », 4 rue des Arcades, Pessac. Cracks and biological coverings are present on the facades. 2022 © FLC/ADAGP

The Cité Frugès: understand for better restoration: diagnosis

Myriam Bouichou

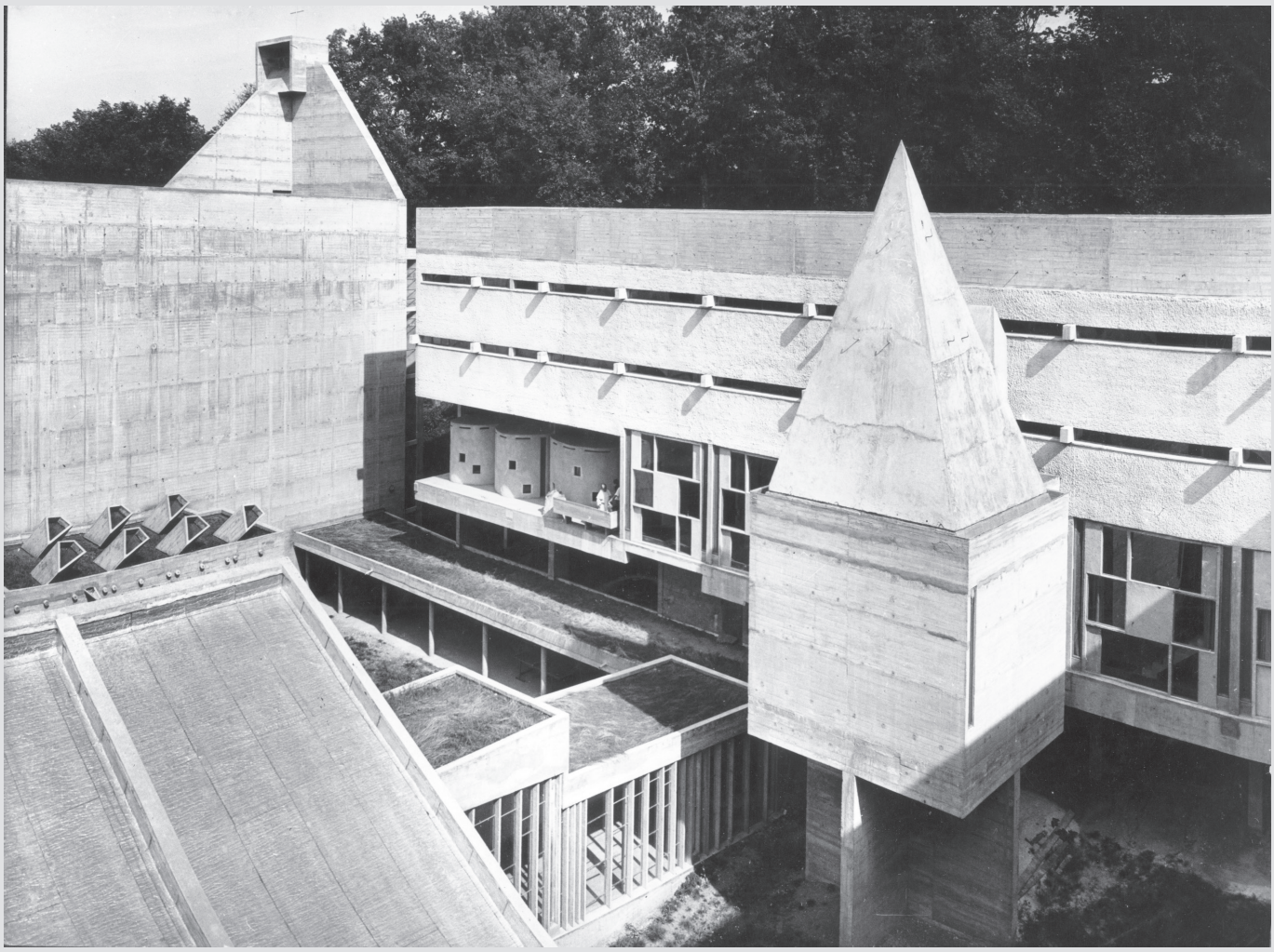
Laboratoire de Recherche des Monuments Historiques, Ministère de la culture, Centre de Recherche sur la Conservation (CRC-UAR 3224), Muséum national d'Histoire naturelle, CNRS, Sorbonne Universités

The Cité Frugès, located in Pessac near Bordeaux and built by Le Corbusier in 1925, was listed as UNESCO World Heritage Site in 2016. It gathers 51 houses, some of which have been also listed as French historical monuments since 2009. The amount and diversity of the residents (private owners, municipalities, social housing…) make complex, but also interesting, the mission of scientific and technical control of the State for the conservation of this unique set (Fig.1).

The historical study initiated by the French ministry of culture (DRAC Nouvelle-Aquitaine), the city of Pessac and the Le Corbusier Foundation, and conducted by the company A-BIME, allows major discoveries on the site, structures and materials of the houses. The information collected are essential to understand the phenomena of alteration found in Pessac. Cracks, spalling, scaling, biological coverings, the pathologies observed are numerous and can be found on all the houses (Fig.2). The diagnostic protocol suggested by the LRMH's concrete team has to be able to answer a double problematic. The first one is archaeometric and deals with the identification of the nature (type of cement…) and the properties (porosity…) of the different materials used by Le Corbusier: concrete, blocks, renders and paints. The location of the rebars and the concrete covers, the thickness of the blocks are also considered. The second problematic, closely related to the first one, concerns the alteration phenomena. To investigate the origins and state of decay of the materials identified, after a detailed visual examination, carbonation depth, sulfate and chloride profiles, presence of salts or pathogenic compounds, and rebars corrosion are explored. The tests consist in a series of non-destructive in situ measurements (electrochemical…), sampling (coring, powder…) and cracking monitoring. A quite precise diagnosis protocol is designed to fit with the different types of houses, and to the alteration origin hypothesis, derived from the preliminary visual observations.

Following the results of the diagnosis, restoration solutions will be suggested. However, it is already clear that a global approach taking into account all the pathologies is essential. For example, the corrosion of the reinforcements and the cracking phenomena linked to differential dilatation must not be treated separately. The compatibility between materials (restoration and substrate) is also a key parameter affecting the durability of the restoration. To evaluate some of the selected solutions such as the type of cleaning or stripping, the repair materials (mortar or concrete…), the crack injection products or the coatings; preliminary trials, which are more and more frequent for patrimonial concrete, will be implemented.

Listing the Cité Frugès on both a national and world level attests the importance of this concrete heritage. One of the greatest challenges of the restoration of this iconic series of houses is probably to take into account the inventiveness of Le Corbusier in their conception both in terms of materials and of shapes, which clearly justifies the need for preliminary diagnosis and trials.



The Couvent de La Tourette: béton brut construction and restorations (1954-2013)

Roberta Grignolo
Università della Svizera italiana

The exposed concrete of Le Corbusier's La Tourette Convent (1954-60) was executed by a group of local contractors created ad hoc to build the Dominican premises, using workmen who were specialised in the construction of mountain roads and dams.

The Convent's concrete surfaces bear clear "traces of the hand of man", as Le Corbusier called them: repairs, cracks, honeycomb, etc.

Although these were accepted by the architect during the construction, they subsequently posed several problems.

Since 1958, two years before the inauguration, seepage through the roof terrace led to interventions on the acrotères-parapets and on the exposed concrete parts (pyramidon, organ, crypt). From then on, the main actors - initially the Dominicans on one side, the Atelier Le Corbusier on the other the other; then the Architectes en Chef des Monuments Historiques - questioned the impact of these repairs on the master's project. At each restoration campaign, new repairs proved to be necessary, adding scars to the fragile skin of the Convent.

This observation initiated a research project, carried out with the students of the Accademia di architettura in Mendrisio (Università della Svizzera italiana) at the request of the Fondation Le Corbusier. By intersecting the documents of several archives - for the original project: the Fondation Le Corbusier and the Iannis Xenakis Archives; for the life of the Convent and the subsequent transformations: the Convent Archives, the DRAC in Lyon, the Médiathèque du Patrimoine in Paris - the history of the transformations carried out on the Convent's concrete surfaces has been retraced: from the first interventions under the guidance of the Atelier Le Corbusier, using synthetic products that proved inadequate if not counterproductive; to the patchwork of the years before the listing (1965-1979); to the two main restoration campaigns (1980s and 2006-2013), each adopting the theoretical aims and concrete treatment techniques specific to its time.

The work undertaken has made it possible to to identify the repairs carried out during the various intervention campaigns. The resulting history is a contribution to the history of the techniques adopted for the conservation of recent heritage.

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The Difficulty of Restoration

Álvaro Siza

1. The greatest difficulties when preserving a building do not reside so much in the degradation of the structure or the finishing materials. They instead rather concern the alterations that extend beyond the scope of its architecture or the correctness of the repairs to be carried out, especially when dealing with a modern building with little or no consideration of the care required for heritage conservation (as if the "heritage" condition had somehow ended).

This becomes especially true when built in exposed concrete as is the case of the Swimming Pool in Leça da Palmeira and even when listed as a National Monument in the meantime.

2. The architect Teresa Ferreira, who was aware of my concern regarding the carelessness over maintenance extending over years, told me she had asked the Le Corbusier Foundation for access to information regarding the recent restoration of the exposed concrete Convent of La Tourette: she was told that the results had not been satisfactory.

3. The poor interventions in the Leça swimming pool, extending over half a century, mainly concern some cracks in the concrete walls, which are not structurally worrisome or the use of inappropriate wood coatings (riga recovered from demolitions and so probably in use for more than two centuries and still in a perfect state of conservation). This intervention resulted in a layer of successive coatings in burnt oil about 0.5 cm thick.

Removing this greasy paste without affecting the grooves that time had inscribed in the wood was one of the most time-consuming and difficult tasks in this project.

4. Other interventions, wrong but easier to correct, related to the exterior space, the enclosures defined by the rocks and some concrete walls necessary for their organization: the surgical encounter between architectural geometry and natural organicity.

5. Project team:

Design

Lead Architect – Álvaro Siza

Architect Rita Amaral

Architect Paulo Silva

Engineering

Structural Engineering – Engineer Jorge Silva

Electrical Installations – Engineer Alexandre Martins

Hydraulic Installations – Engineer Raquel Fernandes

6. The experience and support of three teams was invaluable:

- from the University of Minho (Engineers Paulo Lourenço and Nuno Mendes) for the inspection and diagnosis of the concrete and wood
- from the Instituto Superior Técnico (Engineers Judite Miranda, Jónatas Valença, Hugo Costa, Eduardo Júlio) for the localized repair of the concrete
- from Cinábrio Restauro (Dr. Pedro Antunes) for the localized repair of the concrete and

made possible by the *Keeping It Modern* project funded by the Getty Foundation under the coordination of Teresa Ferreira.

7. Main contractor – Edilages, SA

8. Institutional and technical support from Matosinhos Municipal Council.

Text published in FERREIRA, Teresa Cunha & URBANO, Luís, *No place is deserted. Álvaro Siza: Ocean Swimming Pool* (1960-2021). Porto: FAUP/ Afrontamento, 2022.

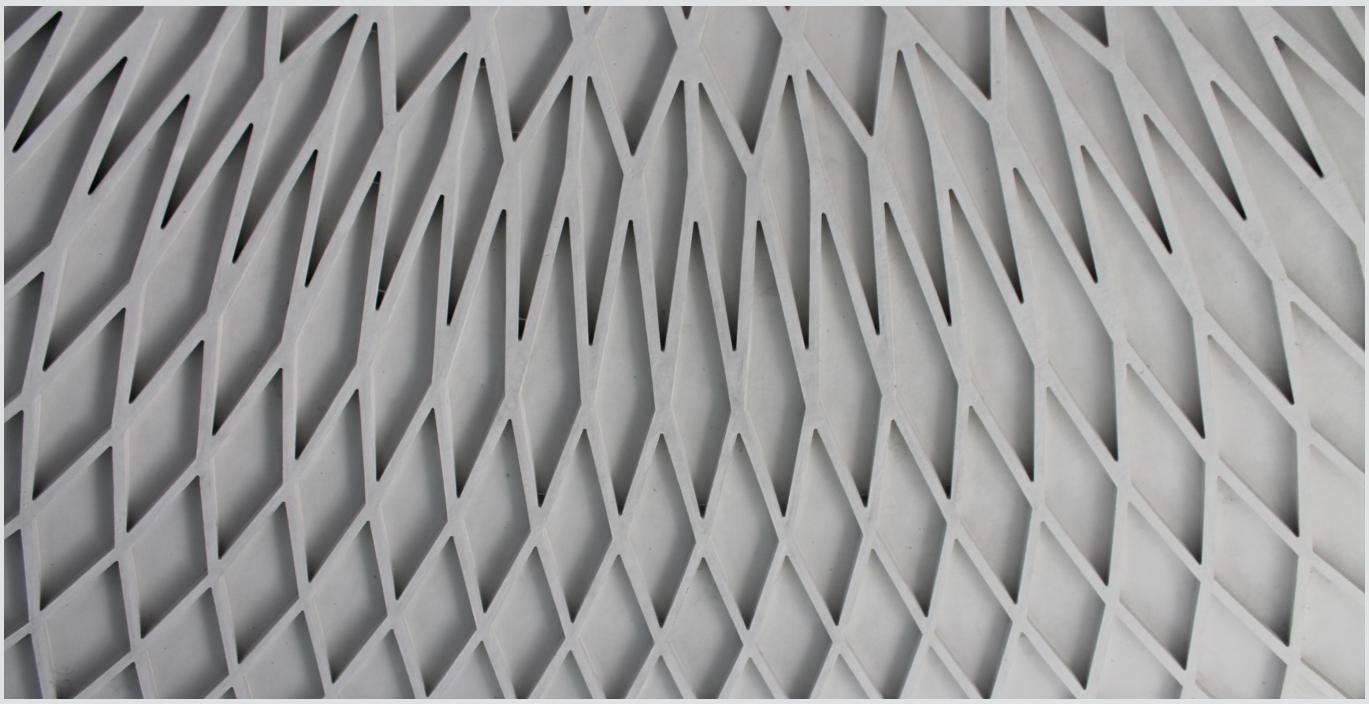

Fig. 1: Prefabricated elements of the half dome, Hall B (F. Pasqual, 28/01/2020)

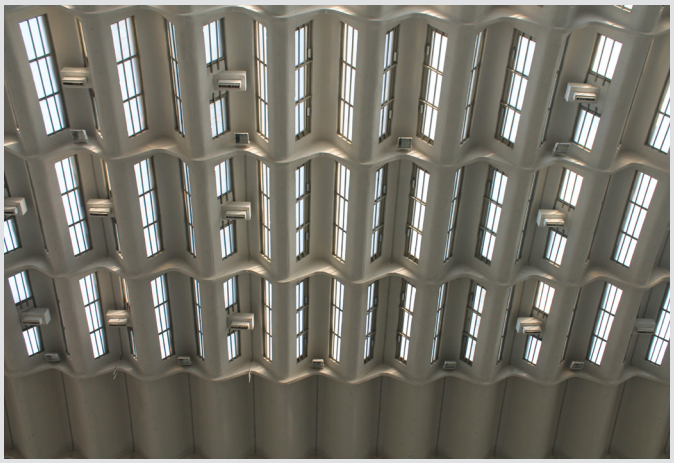

Fig. 2: Particular of the prefabricated elements of the half dome, Hall B (F. Pasqual, 28/01/2020)

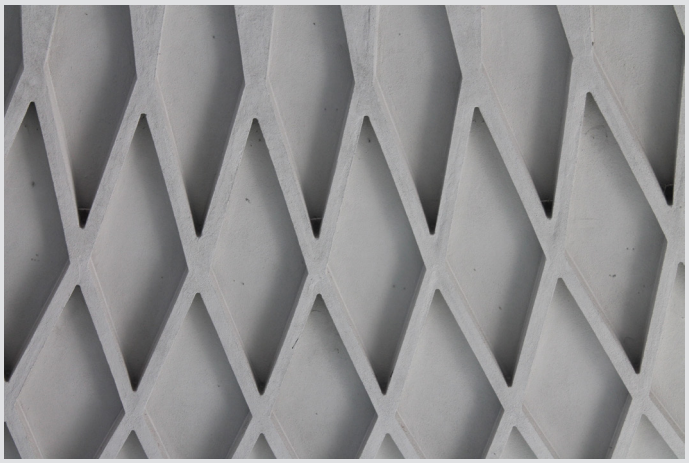

Fig. 3: Vault of the Hall B (F. Pasqual, 28/01/2020)

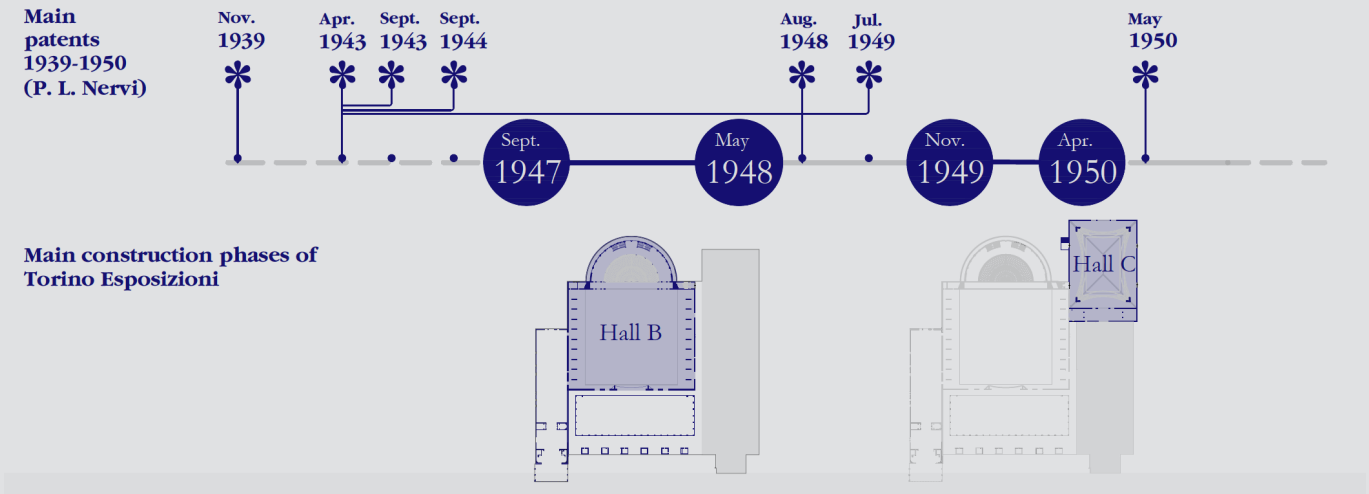

Fig. 4: Main patents and main construction phases of Halls B and C between 1939 and 1950

Pier Luigi Nervi's halls at Torino Esposizioni. The archival research as a tool for diagnostic investigations

Francesca Pasqual
IUAV of Venice, PhD student

The conservation of 20th century architectures involves a debate on investigation methods and intervention strategies. The debate is related to the complicated execution method of new materials, in particular in the case of innovative or experimental solutions. Often linked to the registration of specific patents, experimental construction solutions of cementitious materials are assumed to be more connected to empirical practice and were hardly subject to technical construction regulations between World War II and the early 1970s.

Therefore, the analysis of the regulations alone does not allow to know the executive details and the calculation methods used for the experimentations and in such cases, it is necessary to define an interdisciplinary knowledge path. In addition to this, many of the construction solutions are characterized by a strong formal component. During the conservation intervention, the need to consider the aesthetic issues (often regarded as the main witnesses of the passage of time) and the structural ones becomes clear and it constitutes a further challenge for the development of investigation methods and intervention strategies.

Prefabrication and ferrocement represent two of the main innovative solutions of the 20th century construction practice, which in Italy are closely linked to the figure of Pier Luigi Nervi, and of which halls B and C of Torino Esposizioni are the first important application. Although the halls were built in several phases of Italian history, the prefabricated solutions are maintained alongside traditional castings at every stage: they are the main topics of the patents registered by Nervi during the construction site.

The characteristics and problems of the halls can only be understood through the reconstruction of their transformative process, but the shortage of construction site technical documents and the impossibility of tracing these structures to calculation models of the time required a specific reflection linked to the site executive practices. The organization of the Nervi's construction site highlights the need for an interdisciplinary approach to the knowledge of his constructions, intertwining the regulations in force at the time with information from different sources. The reconstruction of the transformative phases is the guiding tool of the diagnostic campaign, which aims to verify the hypotheses advanced on the construction. Only if updated with the results of the on-site and laboratory tests, the model of the structure allows to identify guidelines for the conservation of non-ordinary buildings.

In the case of 20th century buildings characterized by the presence of technical experimentation, the need for an architectural project capable of guiding conservation right from the analysis of the sources and from the diagnostic campaign is increasingly concrete. In these cases, the development of a structural intervention cannot be separated from the architectural one.

This analysis was carried out within the Research Team 3 (Team Leaders: professor P. Faccio and PhD E. Lenticchia) of the international research group (led by the Politecnico di Torino and coordinated by professor R. Ceravolo) which received the grant 2019 of the Keeping It Modern initiative from the Getty Foundation for the conservation of the Torino Esposizioni halls.

Fig 1. Tomb Brion, Propylaea, detail of the concrete textures

Fig. 02. Hall C, stratigraphic test

From analysis to intervention issues: Carlo Scarpa’s exposed concrete and Nervi’s painted reinforced concrete

Greta Bruschi
Iuav University of Venice, Research Fellow (Rtda)

This paper aims to illustrate the problems of conservation and intervention with reference to two specific issues: the exposed reinforced concrete characterized by peculiar formal values and reinforced concrete characterized by surface painting.

- The first case study illustrates the methods of analysis and conservation of the exposed concrete surfaces into Carlo Scarpa’s work, where the concrete is characterized by different textures and construction techniques. The concrete processing techniques and the particular ways of treating the surfaces by Scarpa allow for a wide range of types, which represent the methods of use of this material.

In particular, the Tomba Brion’s case study is considered, where the original and complex system of survey, reading and interpretation of the constructive elements is applied, also proposing a specific methodology of analytical restitution - graphic, photographic and descriptive - able to represent technological characteristics, degradation phenomena, as well as operational indications like diagnostic investigations or conservative and maintenance intervention.

The applied methodology has also allowed to define the conservation interventions on the concrete through the development of specific analyses and experiments in relation to the application of protective material. The outcome of the investigation phase allowed the testing of the interventions on a portion of the artifact (2018) and then, once validated, to extend them to the entire complex. The restoration was completed in 2020.

- The second case study refers to Halls B and C of Pier Luigi Nervi in Torino Esposizioni, object of the Getty Grant Kim - Keeping It Modern, 2019, coordinated by Prof Ceravolo, DISEG Department, Torino Politecnic Torino.

Hidden by several layers of white paint, the almost forgotten polychromy of the Nervi Halls emerges from historical images, not necessarily intended to document the complex, but rather as a setting for exhibitions, fairs or film and advertising sets. The first stratigraphic investigations compared with the historical documentation reveal fragments of stories about the presence of Nervi in the construction site and the desire to control the finishing phases, as well as related to the subsequent transformations of use.

Therefore, specific theoretical and technical critical issues regarding the conservation of the pictorial layers in relation to that of reinforced concrete elements and the application of cortical protective material are outlined. For this reason, the KIM ferrocement trial project, has provided a specific series of painted samples, in order to evaluate the effectiveness of protective products and monitor the progress of corrosion status.

Fig. 1. General view of the Villa E-1027, facing the sea

Fig. 2. Temperature, relative humidity and corrosion sensors of the permanent monitoring

Fig. 3 and 4. ICCP installation and final appearance

Innovations in diagnostic and restoration treatment at Villa E1027

Elisabeth Marie-Victoire

Laboratoire de Recherche des Monuments Historiques, Centre de Recherche sur la Conservation (CRC-UAR 3224), Muséum national d'Histoire naturelle, CNRS, Sorbonne Universités, 29 Rue de Paris, 77420, Champs-sur-Marne, France

Built between 1926 and 1929 by Eileen Gray and Jean Badovici in Roquebrune-Cap-Martin near Nice, the villa E-1027 faces the Mediterranean sea (Fig.1). Its structural elements and floors were made of concrete, while the non-structural components were more heterogeneous (bricks…). It was initially partially rendered and totally covered with a lime wash.

After being abandoned for a long time, in 2000, the villa was decayed in correlation with water infiltration, ground movement and rebar corrosion. After a first diagnosis, a deep restoration operation was conducted between 2000 and 2006, including the use of a mineral migrating corrosion inhibitor for the concrete reinforcement and foundation treatments. Nevertheless, eleven years after this restoration and despite periodic maintenance, the concrete was again decaying due to rebar corrosion.

Therefore, in 2016 a second complementary diagnosis was carried out in 2016, showing significant chloride (0.05 up to 2.14% by weight of cement) and alkali pollutions (1.19 up to 22.5 eqNa2O kg/m3) on both the patio and the balconies of the villa, and a moderate sulfate pollution (1.18% up to 5.36% by weight of cement). Carbonation had also progressed (20 to 70mm), and corrosion was still active as confirmed by instant electrochemical measurements.

When considering the data both from the first and second steps of diagnosis (2000 and 2016), the restoration options seemed very limited. The durability of a standard patching operation, combined with a migrating corrosion inhibitor had shown its limits (lower than 10 years). As the chloride pollution was inevitably active, the villa facing the sea, electrochemical chloride extraction could only be a temporary solution. Finally a waterproof paint couldn't be envisaged due to recurrent infiltration problematic in a context of a concrete loaded with different salts (sulfates, chlorides, alkali). The last durable option was cathodic protection. But its invasiveness represented an issue for an historic concrete which has to be as preserved as possible.

In this context, prior to the final choice of restoration strategy and taking into account that complementary maintenance work had just been performed to eradicate some infiltration problems on the balconies that had also an impact on the concrete of the patio, a last phase of diagnosis was scheduled with the aim of evaluating the residual corrosion activity on the balconies and the patio after this maintenance. Two types of analysis were considered: standard instant electrochemical measurements and an innovative permanent monitoring over 18 months (Fig. 2). The results of this last diagnosis evidenced an active corrosion induced by combined carbonation and chloride pollution, despite a low yearly average relative humidity in the concrete. As a consequence, the possible durable restoration strategies were limited to one option: cathodic protection. But as this technique can be quite invasive and in addition difficult to implement in historic concrete due to an erratic and non-connected rebar network, a pilot impressed current cathodic protection (ICCP) was installed on a beam, a pillar and 1m² of the southern balcony underside (Fig. 3-4). The purpose was to try to limit the cuts and holes to respect the conservation principle of historic monuments and to follow-up the efficiency of such a treatment during 6 months. After this conclusive trial, the scientific committee of the Villa opted for an impressed current cathodic protection on the structural elements of the patio.

Restauration des Maisons Jaoul de Le Corbusier à Neuilly-sur-Seine

Claudia Devaux
Architecte du Patrimoine

The Maisons Jaoul, built between 1953 and 1955, are major examples of Le Corbusier's so-called brutalist architecture. This pair of two houses, located in Neuilly-sur-Seine, a wealthy suburb in the West of Paris, were intended to two parts of a same family : one for André's, the father, and the other for his son's, Michel Jaoul. In recognition of their importance in the work of Le Corbusier and in the history of domestic architecture, the Maisons Jaoul have been protected as Historical Monuments in 1966 by the French government.

Arranged perpendicular to each other, the two houses, almost twins, form two separate buildings erected on a common basement. Their construction, typical of the post-war brutalist style, consists of raw concrete beams and coarse brick infill walls, all clearly noticeable on the facades. Inside, Catalan vaults (thin lowered vaults covered with flat bricks) form the ceilings while the partitions are painted in Le Corbusier's characteristic colors. At last, complex bay windows finalize the composition. They are filled with «fitted glass panes», complex joinery combining bay windows with wood or metal joinery, opaque panels of assembled plywood, interior shutters and aerators.

Till today, nearly seventy years after their completion, only three owners have successively lived in the Maisons Jaoul. More important fact : during these three occupations of the houses, just a single campaign of restoration was officially conducted. It was led in 1991 by architect Jacques Michel, former collaborator of Le Corbusier and head of the Maisons Jaoul project during the construction site. Among the restoration works carried out by Jacques Michel, the main attention was paid to the concrete on the facades, the water tightness on the roofs, the downspouts into the walls and the the panels carpentry.

The survey and diagnosis carried out during the study made it possible to determine the construction method of the houses, the modifications made over the years and the state of preservation of construction elements. The Maisons Jaoul have reached us in a state similar to their original state, without major pathology. However, they required a new restoration campaign focused on the exterior facades. Therefore, the restoration project drew attention to three major points : deterioration of concrete, alterations of the glass panels due to climate (sun, rain) and aging of the water tighness causing interior infiltrations. The restoration project aimed to save as much original material as possible to guarantee authenticity of the buildings.

Image Vue des Maisons Jaoul avant restauration (2017). Source : Claudia Devaux. ©FLC/ADAGP

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Siza preserves Siza: Concrete conservation on the Ocean Swimming Pool (2018-2021)[1]

Teresa Cunha Ferreira
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Interventions in modern architecture raise complex issues, especially on the scale and quantity of buildings to be safeguarded, the greater vulnerability of materials and constructive solutions, or even the conflict between the 'novelty value' intrinsic to modern works and the 'antiquity value'[2] resulting from their inevitable ageing.

An additional challenge arises with authors intervening in their own works, something that has represented an important dimension of Álvaro Siza's recent work. Unlike other authors, open to the profound transformation of their previous works, Siza says that he realized, ever since his first intervention for the Boa Nova Tea House and Restaurant (1992), this path would lead to the complete destruction of the building. Recognizing the coherence of the work of the 'other architect'[3], Siza resists the temptation to correct his previous works, defending the respect for their architectural integrity by preserving its attributes and knowing how to read the opportunities for change in response to new design or programmatic requirements.

One of the greatest challenges in the recent intervention on the Ocean Swimming Pool was, according to Siza, the conservation of the exposed concrete in view of the numerous anomalies it presented, taking into account that any localized repairs (preferable to a full replacement in his opinion) would necessarily be visible[4]. Thus, by assuming the impossibility of disguising 'patches' in the concrete – that is, "not pretending or being able to hide what the passage of time determines"[5] – Siza chose to preserve several cracks as 'scars of time' that testify to the material history of the building. This is also, in his words, the "most brutalist"[6] attitude and therefore coherent with the option of truth advocated by the use of raw materials in the original project.

Under the Keeping It Modern awarded by the Getty Foundation[7], inspection and diagnosis were carried during the building site, through a set of in-situ and laboratory tests of samples (concrete, cement paste, steel rebars and timber). These tests have contributed for the localized repair of the concrete spalling due to steel corrosion – under the coordination of Siza - applying innovative techniques of integration between the existing and the new repair mortars (colour and texture tuning, formworks).

Understanding the work 'of the other' (the young Siza), Siza's recent intervention in the Ocean Swimming Pool (2018-2021) thus represents an exceptional case of an architect intervening in his own work. By preserving the architectural integrity of the ensemble and accepting the marks of time as a densifying aspect of architecture, Siza definitively finishes the work to the north – where he had foreseen the unbuilt restaurant- and reinforces its integration into the landscape requalification of the Leça da Palmeira seafront.

1 Text adapted from FERREIRA, Teresa Cunha, "Life between Tides"In Teresa Cunha Ferreira and Luis Urbano. *No place is deserted. Álvaro Siza: Ocean Swimming Pool (1960-2021)*. Porto: FAUP/ Afrontamento, 2022.
2 RIEGL. Alois, *Moderne Denkmalkultus : sein Wesen und seine Entstehung*, (Wien: K. K. Zentral-Kommission für Kunst- und Historische Denkmale : Braumüller, 1903). Kurt W. Forster and Diane Ghirardo, in *Oppositions*, n. 25 (Fall 1982), 21-51.
3 Free translation of SIZA, Álvaro, "Conferencia para el CAH20thC". In HERNANDEZ LEON, J. M. e ESPINOSA DE LOS MONTEROS, F. (Eds.), *Criterios de Intervención en el Patrimonio Arquitectónico del Siglo XX*. Madrid: Ministerio de Cultura/ISC20C, 2011, p.187-189.
4 SIZA, Álvaro, Interview by Teresa Cunha Ferreira, In *Construção Magazine*, no. 83, February. Porto: Engenho e Média, 2018, p. 7.
5 Ibidem.
6 SIZA, Álvaro, Interview by Magda Seifert and Pedro Baía. In SEIFERT Magda and BAÍA, Pedro (Eds.), *Porto Brutalista*. Porto: Circo de Ideias, 2019.
7 Inspection and diagnosis was conducted by Paulo Lourenço and Nuno Mendes, from the University of Minho. Localized repairs were executed by Instituto Superior Técnico (Judite Mendes, Jónatas Valença, Hugo Costa and Eduardo Júlio) and Cinábrio Restauro (Pedro Antunes). 'Keeping It Modern' Senior Consultants: Rui Fernandes Póvoas, Paulo B. Lourenço and Ana Tostões.


LES BÉTONS
DU PATRIMOINE
HISTOIRE – DIAGNOSTIC - RESTAURATION
Guide technique à destination des acteurs du patrimoine bâti
Collection Recherche Développement Métier
FFB
FEDERATION FRANÇAISE DU BATIMENT

«Les Bétons du patrimoine / Histoire – Diagnostic – Restauration» a Technical guide for those involved in the built heritage

Elisabeth Marie-Victoire & Myriam Bouichou

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The freedom of forms and creations that concrete allows, combined with its massive use in construction over 200 years, lead to the protection of more than 950 concrete buildings as historical monuments in 2021 in France. At the same time, the recurring maintenance or restoration needs exist for this still recent material, as well as a lack of standards and consensus on the techniques and products to be implemented. In this context, an association gathering companies in charge of built heritage restauration (GMH) decided to ask a group of art historian, architects, scientists and restoration companies, to produce a guide on restoration of historic concrete. This guide, richly illustrated, gathers information on the history of concrete, its pathologies, diagnostic methods and restoration techniques. It includes pros and cons of the latest and ends with a detailed glossary.

Elogio del Horizonte (In Praise of the Horizon), Gijon, Spain

Centennial Hall, Wroclaw, Poland

The InnovaConcrete Project – An investigation Into the Use of Nanotechnologies for the Conservation of 20th Century Concrete Heritage

Gunny Harboe
Harboe Architects, PC

Concrete was perhaps the most widely used construction material of the 20th Century. It was deployed as both a structural material and as a way to give architectural expression to buildings of all kinds. No matter what its form, concrete, when left exposed directly to the elements, is susceptible to significant deterioration that can have a detrimental effect on its aesthetic and structural integrity. Many significant buildings of the 20th century are now being recognized for their heritage values and their state of conservation has become matter of high importance. The materials and methods used in concrete construction were often experimental and many buildings and structures have not performed well over time. Current common conservation methods for concrete have many challenges in accomplishing repairs that do not negatively impact the aesthetic values of the heritage resource and are done in a manner that is cost effective and long lasting.

The InnovaConcrete research project (InnovaConcrete| Conservation of Concrete Cultural Heritage|H2020) was begun in January 2018 to investigate new methodologies utilizing nanotechnology that can help solve these problems. The three year project (extended to four years due to the Covid epidemic) was funded through the European Union's Horizon 2020 program, and lead by the University of Cadiz. A consortium of 29 partners in eleven countries was formed to try and solve the problem. The approach focused on the investigation of producing Calcium-Silicate-Hydrate (C-S-H) gel in situ to repair cracks in the cement paste combined with materials that provide super hydrophobicity and corrosion inhibiting properties. Other approaches such as enzyme-assisted self-healing of damaged surfaces, inorganic nanotubes and atmospheric plasma for product application were also explored.

A key component of the InnovaConcrete project was "to better understand, define, interpret and manage 20th Century Cultural Heritage for future generations". The role of the ICOMOS International Scientific Committee on 20th Century Heritage (ISC20C) was to help lead the consortium's efforts related to the tasks of identification and awareness of the importance of 20th Century cultural heritage made of concrete. This was accomplished through three key work products; the selection of eight case studies where the new methodologies were tested in situ; identification of the most significant cultural heritage assets made of concrete with representation across the EU which resulted in "The 100 from the 20th" Innova Concrete; a development of a "benchmarking document" to help guide the process for the conservation of concrete heritage, *"The Cádiz Document"* The_Cádiz_Document_Web_low_edited.pdf (innovaconcrete.eu) .

The Cádiz Document

Fernando Espinosa de los Monteros
Expert Member Of ISC20C-Icomos

Concrete heritage in Europe is at risk. It is poorly understood and poorly maintained. As a result, it is often left to deteriorate until it is seen as expendable and is demolished.

The InnovaConcrete project is a research Initiative funded by the European Union (EU) Horizon 2020 program that aims to change this situation by finding new ways to help preserve concrete-based monuments from the twentieth century. To achieve this goal, the project has brought together an interdisciplinary team of twenty-nine partners with strong scientific and heritage backgrounds from across the EU. While the primary emphasis of the project has been the development of new nano technologies that can combat the deterioration mechanisms in concrete, there is also a very important effort to raise awareness about the significance and cultural values of heritage concrete. This is being done through series of initiatives including a dynamic and interactive website that explains the project to the public. It has one special webpage that features concrete heritage from all the countries of the European Union called, "100 from the 20th". There has also been and a series of eight public workshops held at the case study sites throughout Europe. One of the most important components of the efforts to celebrate concrete heritage is the development of these guidelines for the conservation of heritage concrete structures.

The Cadiz Document provides guidance for the conservation of concrete heritage with respect to its cultural, historical, aesthetic, social and technological values that define its significance. It is an aid to conservation and restoration practitioners and other professionals, including architects, engineers, conservators, contractors, craftsmen, public officials, and private owners who may be faced with making important decisions about the treatment of a heritage concrete structure.

As part of the InnovaConcrete partnership, the ICOMOS International Scientific Committee on Twentieth Century Heritage (ISC20C) was tasked with assisting in the awareness raising efforts. The ISC20C was given primary responsibility to create these *"Guidelines"* that were to be based the same concepts as expressed in the *Approaches to the Conservation of Cultural Heritage of the Twentieth Century* (also known as the Madrid - New Delhi Document), which the ISC20C published in 2017. To support these efforts, a working group of volunteers from the ICOMOS ISC20C was formed.

ANA TOSTÕES (ed.)

MODERN HERITAGE

REUSE
RENOVATION
RESTORATION

Preserve Modern Heritage Matters!

Ana Tostões
Técnico - University of Lisbon

Modernism is the most defining architectural expression of the 20th century – a movement that transformed built environments around the world in an unprecedented way. Many of these buildings are in need of repair now or their original function is no longer needed. This presentation explores strategies of preservation works of this era. The aim is to discuss approaches of intervening in Modern heritage revealing exemplar processes that go from restoration and renovation to deeper reuse transformations. Architects and art historians discuss challenges in the preservation of Modernist buildings. Dealing with an astonishing universe of buildings it is amazing to realize the worldwide diversity of circumstances, solutions, geographies, budgets and the impact of their reutilization. 24 best-practice examples are highlighted, illustrating various approaches to restoration.

By the moment that the first pioneering architects started to explore the symbiosis between the new way of living and the new constructive possibilities, the path was firmly paved for the architecture of the contemporary man envisioned as a concept that deals with forms, spaces, techniques and social responsibility. Modern Movement architecture meant contemporary technology, form, expression, and above all, the belief in the architect's social mission towards creating a new and better world. Today, more than 100 years have passed since the first built manifestations of the Modern Movement. In the meantime, some values were readdressed, adapted, or even rejected. Nevertheless, its founding spirit, related with the foundation of our contemporary society, continues valid, up to date, and one dare even say, still in progress. After a period of great unpopularity increasing the values of the Modern Movement have been rediscovered and replaced into practice when a new generation of architects have reopened the path to learn from modern architecture and created something new from it, in continuation with the modern tradition evoked by Otavio Paz.

Relating the architectural historians research within the architectural based practice, the conservation of the modern heritage emerged with potential and vitality, refreshing the way architectural culture was addressed.

During this time, modernity has come to be seen as world heritage, and is now perceived "as a sustainable design tool, a project method, and finally, as being crucial to the future of architectural production and cultural debates." Matters as materials and technology reuse, spatial and functional transformations as well as updating legislation, are more and more part of the contemporary agenda. Knowing that many modern architects sought new heights of functionality and changeability, the nowadays challenge is how to deal with the heritage in relation to its continuously changing context, physical, economic, and functional, as well as socio-cultural, political and scientific. Along restoration and conservation, renovation and adaptative reuse are staring to "make history," pursuing the idea that "heritage transforms itself with us."

Biographies

Álvaro Siza. Álvaro Joaquim Melo Siza Vieira was born in Matosinhos (near Porto), in 1933. From 1949-55 he studied at the School of Architecture, University of Porto. He taught at the School of Architecture (ESBAP) from 1966-69 and was appointed Professor of "Construction" in 1976; he taught at the School of Architecture of Porto. He is a member of the American Academy of Arts and Science, "Honorary Fellow" of the Royal Institute of British Architects, AIA/American Institute of Architects, Académie d'Architecture de France and European Academy of Sciences and Arts and American Academy of Arts and Letters; Honorary Professor of Southeast University China and China Academy of Art and honorary partner of the Academy of Schools of Architecture and urbanism of Portuguese language.

Ana Tostões is Full Professor at Técnico - University of Lisbon, where she is in charge of the PhD Programme in Architecture. She is architect, architectural critic and historian, Chair of docomomo International and co-editor of docomomo Journal. She has been invited professor at FAUP, EPFL, ETHZ, UTSOA, RSA, ETSAB, ETSAUN. Her research field is the theory and history of architecture and city of the 20th century, focusing on the worldwide cultural transfers. On these topics she has published books and scientific articles, curate exhibitions, organised scientific events, taken part in juries and acted as peer referee of Scientific Journals, supervised PhD and MSc thesis and given lectures worldwide. She was awarded with the title of Commander of the Order of Infante Dom Henrique (2006), with the Gulbenkian Prize (2014, for the publication Ana Tostões (ed.), Modern Architecture in Africa: Angola and Mozambique, Casal de Cambra, Caleidoscópio, 2014) and with the X Bienal Ibero-Americana de Arquitectra y Urbanismo BIAU Prize (2016, for the publication Ana Tostões, Idade Maior. Cultura e Tecnologia da Arquitectura Moderna Portuguesa, Porto, FAUP Edições, 2015).

Bénédicte Gandini (1972) has a conservation architect degree from the Politecnico di Milano, with a specialization in Theory of the restoration, Preservation of the historic - architectural heritage, in 1999; she holds a Master 2 degree in History of art from La Sorbonne University (Paris 4, France), on History of restoration in France, in 2004. Between 1997 and 2010, she has been working at the studio of Pierre-Antoine Gatier, Architecte en chef des monuments historiques. Since 2005, as a conservation architect at the Fondation Le Corbusier in Paris, she is in charge of the conservation of Le Corbusier's works and responsible for the network of Le Corbusier's property owners and of the experts committee of the FLC. Since the inscription on the WHL of the *Le Corbusier's architectural work, an outstanding contribution to the Modern Movement*, she is in charge of the Secretariat of the International Standing Conference. She is involved in the ISC20C and in the bord of Icomos France.

Cédric Avenier is a doctor in the history of art / architecture, researcher at the Constructive Cultures laboratory, Labex AE&CC of ENSA Grenoble and works as a freelancer. His research focuses on concrete, from the natural cement of the 19th century to the rough concrete of the 20th century, and on the intervention in the existing, heritage and cultural projects, and more than 80 rehabilitation projects in condominiums. He has participated in several study, assistance and training programs with public agencies. Member of the "Architecture of the 20th century" Committee of ICOMOS-France; Member of the scientific council of

the Auguste Perret Foundation – Academy of Fine Arts; Member of the scientific committee for the restoration project of the Tour Perret, Grenoble; Member of the board of directors of the Maison de l'architecture de l'Isère; Member of the board of directors of the CAB (contemporary art center of the Bastille-Grenoble); Prize of the 24 Hours of Architecture; Prize for the Golden Gesture.

Claudia Devaux. In 1998, Claudia Devaux graduated in architecture from the Ecole Polytechnique Fédérale de Lausanne (EPFL). Then, she entered the architecture office of Winfried Brenne in Berlin, specialized in the restoration of the heritage of the 1920s. There, she was confronted with the architecture of the Bauhaus sites in Dessau and the garden cities of Bruno Taut in Berlin. Arrived in Paris in 2003, Claudia Devaux worked as a freelancer with several Chief Architects of Historical Monuments. She teached at the ENSA Paris-Malaquais, a parisian architecture school, and was part of the jury for end-of-study projects. In 2008, Claudia Devaux joined the DDA Architects agency founded in Paris in 1998 by David Devaux, a graduate from the Versailles School of Architecture. In 2011, she obtained the title of Heritage Architect from the Chaillot School. Together they created the DDA Devaux & Devaux Architects agency in 2016. Inside of it, a unit specialized in heritage managed by Claudia Devaux deals with projects related to monuments.

Elisabeth Marie-Victoire research Engineer and conservation scientist, Laboratory of research on historical monuments, Concrete department, Champs-sur-Marne, France Elisabeth Marie-Victoire achieved materials sciences engineer and materials chemistry PhD degrees from Orsay and Jussieu French Universities. After 3 years working for Cercle des Partenaires du Patrimoine (CPP) as research engineer, she joined in 1997 the Laboratory of Research on historical monuments (LRMH), a national public service linked to the Architecture and Heritage department of the French Ministry of Culture (MC). She first integrated the metal department and she created in 2004 the concrete department that she is now heading for 18 years. Her fields of expertise are identification, diagnosis, conservation and restoration of historic concretes. She is providing field diagnosis and conservation advice for French listed concrete buildings and she is developing with her team research on 3 main topics: ancient cement identification, corrosion and moisture diagnosis tools, and conservation treatments. She is member of the French CNRS UAR-3224 since 2012. She teaches art historians, conservators and material science masters, but also architects. She is vice-president of the committee C22 of the French National Agency for Research (ANR), she is member of the CAB's commission of the French CEFRACOR and she is expert member of the ICOMOS International Scientific Committee on Twentieth Century Heritage.

Fernando Espinosa de los Monteros established his own practice office in 1983, EM&A Partner Architects, and managed a high talent's international team working for more dan 200 clients with a high-profile project. His work has been done in all areas, from the architectural concept to the interior design, landscape, and urban design. He has run lots of competitions and won first prize in more 15th of them. EM&A has taken part in highly important interventions concerning the Spanish heritage. Fernando has participated in many cultural and academic events and is authored of numerous articles regarding architectural heritage and housing development. He has been vice-president of the ISC20C - International Scientific Committee for the 20Th Century Heritage of ICOMOS for 9 years, and

President of the AEPPAS20- Spanish Association for the Preservation of the 20Th Century Architectural Heritage.

Gentucca Canella, architect, is Associate Professor of Architectural and Urban Design at the Politecnico di Torino. After her degree she conducted teaching and research activity at the "Scuola di Architettura Civile" of the Politecnico di Milano and in 2003 she obtained the Ph.D. at "La Sapienza" University in Rome. She is part of the Ph.D. Board, Architectural and landscape heritage, Politecnico di Torino. She was invited as a speaker to numerous national conferences and seminars. She conceived and curated national and international conferences and exhibitions on 20th-century masters of architecture and on the preservation, enhancement and reuse of the Italian architectural heritage of the Second half of the 20th century. Among her most recent publications: *Il diritto alla Tutela. Architettura d'autore del secondo Novecento*, Milano 2019; *Giorgio Raineri 1927-2012*, Milano 2020; *Roberto Gabetti, 1925-2000*, Milano 2017; *Guido Canella 1931-2009*, Milano 2014.

Greta Bruschi is an architect, and graduated in "History and Conservation of Architectural and Environmental Heritage" in 2002 and in "Architecture for Conservation" in 2005 from IUAV University of Venice. She obtained a Phd in "History of Architecture and Town Planning - Restoration and Conservation curriculum" in 2016 at Iuav. At present she is Research Fellow (RdtA) in Restoration and Tutor at the Iuav School of Specialization in Architectural Heritage and Landscape (SSIBAP). She is also Adjunct Professor in Restoration at the University of Udine, A.A. 2021-22. She deals with issues related to the conservation of materials and architecture of the twentieth century as well as vulnerability in relation to seismic risk and resulting from climate change to the existing built.

Gunny Harboe, FAIA, Fellow US/ICOMOS, is an award winning internationally recognized architect dedicated to the conservation of the world's cultural heritage. He has over 30 years of experience and currently runs his own small architecture firm in Chicago with a focus on heritage conservation and sustainable design. His projects include many iconic modern masterpieces including numerous works by Mies van der Rohe, Frank Lloyd Wright and Louis Sullivan. Gunny received his M.Arch from the Massachusetts Institute of Technology (including study in Copenhagen, Denmark); a M.Sc. in Historic Preservation from Columbia University, NY; and a B.A in History from Brown University. He also completed the ICCROM Architectural Conservation Course in Rome, Italy. He was founding member and is a current board member of Docomomo US and a founding member and immediate past President of the ICOMOS ISC20C. He is also an Adjunct Professor at the Illinois Institute of Technology.

Francesca Pasqual, architect, is a specialist in Architectural and Landscape Heritage graduated at Ssibap (Specialisation School - Iuav University of Venice) and currently is a PhD student in Architecture, City and Design, curriculum Innovation for building and cultural heritage at the School of Doctoral Studies of the same University.

Myriam Bouichou has an engineer degree in materials science (2006) (email: myriam.@culture.gouv.fr). From 2007 to 2011, she has been working for the Cercle des partenaires du patrimoine, an association linked to the French Ministry of

Culture, where she was responsible for several studies on natural cements (identification and repair) and cleaning concrete. Since 2011, she has been a research engineer in the concrete department of the Research Laboratory for Historical Monuments (LRMH). As part of her activities, she provides scientific and technical assistance to the Regional Conservations of Historic Monuments and Heritage Architects, on monuments listed in concrete, and may intervene during the various stages of the restoration project (preliminary study, diagnosis, preliminary tests, site monitoring, etc.). She carries out in parallel research projects on the identification and characterization of ancient concrete, and in particular on natural cements of the 19th century in France and Europe, as well as on conservation and restoration techniques (cleaning, water repellents, repair mortar, etc.) and methods for evaluating corrosion and conditions conducive to its spread in reinforced concretes. Currently, she is a member of the scientific and technical committees of the Notre-Dame-du-Haut chapel in Ronchamp and the Cité Frugès (Le Corbusier), and follows the diagnosis and restoration works of the churches Notre-Dame-du-Raincy (Perret) and Saint-Jean-de-Montmartre (Anatole de Baudot) in Paris.

Paola Scaramuzza is an architect. She graduated from the IUAV University of Venice in “History and conservation of architectural and environmental heritage” and then in “Architecture”, with studies related to the conservation of the architecture of Carlo Scarpa. She obtained her PhD in “Preservation of architectural heritage” in 2016 at the Politecnico of Milan with a study on structural concrete in twentieth-century architecture. She taught architectural restoration at the IUAV University of Venice and now she teaches at the ENSAV Ecole Nationale Superieur d’Architecture in Versailles. She is also working in the research and development department of A-BIME, a technical office based in Paris employing digital technologies such as H-BIM for the knowledge organization and sharing and as a tool for maintenance practice and preservation.

Roberta Grignolo teaches conservation of 20th-century heritage at the Accademia di architettura in Mendrisio, Università della Svizzera italiana, since 2009. She received her degree in Architecture in 2000 from the Politecnico di Torino, Italy; in 2003 she completed a DEA in “Sauvegarde du patrimoine bâti moderne et contemporain” at the Institut d’Architecture, Université de Genève. In 2006 she gained a joint PhD from the Politecnico di Milano and the Institut d’architecture in Geneva. She was co-leader (2009-2013) of the research project “Critical Encyclopaedia for restoration and reuse of 20th century architecture”, a partnership between USI, EPFL, ETHZ and SUPSI.

Rui Fernandes Póvoas. Full Professor at the Faculty of Architecture of the University of Porto (FAUP), he has been a faculty member of FAUP since 1986. Between 1978 and 1986 he was a lecturer in the 2nd Section (Architecture) of the Porto School of Fine Arts. His teaching activity also extended to other Institutions of Public Higher Education, through occasional collaborations, mainly within post-graduate courses. At present, and among other management positions, he is director of the advanced studies course on Architectural Heritage (3rd study cycle). Currently, research interests lie mainly in the area of Conservation and Rehabilitation of 19th and 20th century buildings - aiming at establishing intervention methodologies for their rehabilitation -, as well as in themes that fall within the domain of the History of Construction. In this context, he has been responsible for the scientific supervision of MSc dissertations, PhD theses and post-doctoral studies. Invited speaker in several scientific events and member of different organizations and scientific committees, namely, ICOMOS - Portugal (member of the National Advisory Board), ICOMOS International Scientific Committee on Shared Built Heritage (ICOMOS ISC-SBH) and DOCOMOMO - International Specialist Committee on Technology (ISC/T), among others.

Susan Macdonald is the current Head, Buildings and Sites, at the Getty Conservation Institute where she oversees projects that aim to advance conservation practice internationally involving research, field projects, training and dissemination. Susan has a BSc (Architecture) and a Bachelor

of Architecture from the University of Sydney, and a Masters in Conservation Studies (University of York/ICCROM) and is a certified practicing planner. Susan has worked as a conservation architect in private practice in Australia and in England. She has also worked in the public sector where she was involved in a wide range of conservation issues at the strategic and bottom-up level, involving urban planning, development, economics, policy, technical matters and world heritage issues. Susan has as an interest in 20th century heritage, has written widely on the topic and is a member of the DOCOMOMO International Specialist Technical Committee and a Vice President of the ICOMOS 20th Century Committee.

Teresa Cunha Ferreira holds a degree in Architecture at the Faculdade de Arquitectura da Universidade do Porto (FAUP), an European PhD at the Polytechnic of Milan and has developed post-doctoral research at FAUP (2010-2015). She has professional experience in the Regional Directorate for Buildings and Monuments of the North (DREMN-DGEMN) and in the Soprintendenza di Milano, among other consultancy, collaborations and works (2003-present). Since 2007, she has been teaching in the Polytechnic of Milan on architectural design, conservation and management. University of Minho (2009-2017) and FAUP (since 2012-present). Since 2009, she joined the Centre for Studies in Architecture and Urbanism (CEAU-FAUP), Group PACT, where she coordinates several funded projects at a national and international level. Since 2019, she is the Chair Holder of the UNESCO Chair Heritage, Cities and Landscapes. Sustainable Management, Conservation, Planning and Design. She is also member of several scientific and professional organizations, such as ICOMOS-Portugal (Board since 2011, Expert Member of ISC20C and CIF Scientific Committees), DOCOMOMO, among others.

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