



Le Corbusier, *Unité d'Habitation*, Marseille, France, 1945–1952. Restoration project of the west façade. © Photo F. Botton/ssea, September 2007. FLC/2016, ProLitteris, Zurich.

The Marseille *Unité d'Habitation* after Le Corbusier: Or the Chronicle of a Permanent Construction Site

BY YVAN DELEMONTÉY

Now that Le Corbusier's architectural oeuvre has been nominated for the third time for inclusion in the list of UNESCO World Heritage Sites, it is useful to revisit one of his icons built in the aftermath of World War II: the *Unité d'Habitation* in Marseille. Far from wishing to retrace the genesis of this outstanding building, it is a different story that I would like to sketch out here. Less well known, it is, however, fundamental to the material understanding and conservation of modern architecture. It is a history of the many repairs and other restoration projects that have accompanied this monument of 20th century architecture ever since its inception.

Sited at 280 Boulevard Michelet in Marseille, the “*Unité d'habitation de grandeur conforme*” built by Le Corbusier and the *Atelier des Bâisseurs* (ATBAT) between 1947 and 1952 is one of the most emblematic buildings of the past century. The culmination of long and patient reflection on housing, architecture and urbanism, the *Cité Radieuse* embodies of a quantity of inventions that are at once plastic, programmatic, typological, technical and structural, providing a living environment for the humanity of the future. Yet rarely in the history of architecture has the construction of a residential building crystallized polemics to such a degree, unleashing passions and multiplying obstacles to its construction. Without going into this history, whose broad outlines and many vicissitudes are well-known today,¹ this paper is concerned rather with the life of the building after its construction. Here I will explore the many interventions that have affected it down to the present and which testify to the evolution in methods and strategies of the restoration of the modern heritage.

“*Romantisme du mal foutu*” and defects

Building work on the *Unité d'Habitation* was carried out in Marseille in the difficult postwar context, where the innovative character of its construction techniques struggled with chronic shortages, procurement problems and administrative bottlenecks, encountering obstacles that eventually undermined the proper execution of the building. From this point of view, the “romanticism of the rough and ready” [“*romantisme du mal foutu*”]² later invoked by Le Corbusier in relation to his exposed concrete architecture took on a particularly bitter tone for the inhabitants.

Shortly after being completed, the *Unité d'Habitation* was at the centre of protests due to the poor waterproofing of the façades and rooftop terrace, plus the chronic malfunctioning of the forced air heating system. Following numerous complaints, the union of co-owners decided in 1961 to take the case to the Administrative Tribunal. In three law suits

(*Les Travaux du Midi, Asphaltoïde-Seuralite and Neu*) they applied for interim measures against the architect, who then admitted that the *Unité d'Habitation* was “an extremely powerful building but delicate in terms of technique”³. This was the beginning of a protracted legal battle that ended in 1974 with a decision unfavourable to ATBAT, *Les Travaux du Midi* and the *Fondation Le Corbusier*. The succession of expert reports was final, calling into question both design errors and flaws in construction.

As a result, one of the experts, the senior Marine Engineer Camille Sommer, was responsible for the first waterproofing work to be performed in 1963. Carried out with a single-minded concern for effectiveness, the sealing of joints and fissures and the application of a water-repellent opacifying resin to the vibrated elements denatured the original appearance of the concrete. Following repeated infiltrations of water, which continued all through the 1970s and 1980s, multiple repairs were made to the prefabricated parts and those cast in-situ in the building.

Listing as a Historical Monument and first “de-restoration” work

On 20 June 1986, the Marseille *Unité d'Habitation* was listed as a Historical Monument, a decision which followed its first inclusion in the inventory during Le Corbusier's lifetime, in October 1964. Protection was extended to the façades, the whole of the roof terrace, the area of the pilotis, the entrance hall, the internal “streets” and apartment No. 643, which could be visited⁴. The listing was timely because in the absence of effective maintenance, the building was, according to the newly-appointed chief architect, “in a particularly deplorable state”⁵. The list of damage observed is significant in this respect: crumbling of the cladding, exposed iron reinforcing bars, staining of the surfaces, fissuring of the joints, besides the accretions installed by some of the co-owners in the loggias and on the rooftop. Added to this were the many repairs made piecemeal to the concrete

01 Le Corbusier, *Unité d'Habitation*, Marseille, France, 1945-1952. State of the rooftop terrace in the 1980s. © Archives of architecture of the *Université de Genève*, Bruno Reichlin fund (slide library). FLC/2016, Prolitteris, Zurich.



02 Le Corbusier, *Unité d'Habitation*, Marseille, France, 1945-1952. Work on restoration of the east façade. Replacing the prefabricated cladding of the loggias rebuilt identically. © Photo F. Bolton/ssea, November 2015. FLC/2016, Prolitteris, Zurich.



03 Le Corbusier, *Unité d'Habitation*, Marseille, France, 1945-1952. One of the apartments most damaged by the fire. © Photo F. Bolton/ssea, February 2012. FLC/2016, Prolitteris, Zurich.



04 Le Corbusier, *Unité d'Habitation*, Marseille, France, 1945-1952. Work on restoration of the east façade. Prefabrication on site of the reinforced concrete cladding of the loggias. © Photo F. Bolton/ssea, November 2015. FLC/2016, Prolitteris, Zurich.



for nearly thirty years, while its premature aging further impaired the building's dilapidated appearance.

Assisted by the heritage bodies, the co-owners decided to undertake an extensive program of work to deal with the normal aging of the *Unité*, and fulfil the “wish to return to more authentic arrangements, conforming more closely to the project”⁶. Conducted between 1986 and 1996, the work focused on restoration the façades and rehabilitating various structures on the roof (elevator towers, ventilation stacks, the day-care centre, gymnasium roof, theater, etc.). They included the systematic removal of the sheets of plastic film used in the previous decades and its replacement with waterproofing mats of the same colour as the concrete, applied after high pressure surface cleaning and passivation of the steel elements. Described as “de-restoration” [*dérestauration*] by the chief architect himself, the initiatives favored spot repairs that emphasized the conservation of the “skin” of the building to the detriment of thorough repair of the damaged parts. While deploring the “patchy effect” of successive interventions, the architect in charge of the restoration work actually legitimated this form of intervention, because it had been accepted at the time by Le Corbusier in some parts of the building. In this way he inscribed his approach in the history of the building and the practise of its author, stating that “any resumption of work in this way preserved a certain coherence with the path that Le Corbusier himself had followed in making such repairs”⁷.

Among the various parts of the complex that were restored, the case of the elevator towers is representative of the theoretical problems of preserving the building.⁸ Indeed,

due to the poor positioning of the formwork during pouring, Le Corbusier was forced to apply a cement plaster over the whole surface of the tower; defects in its bonding then led to the danger of material falling in the 1980s. The question then arose whether an identical coating, with improved adhesion, should be applied to the elevator towers or whether it should be removed and returned to Le Corbusier's original arrangement by reproducing the pattern of the formwork that appeared under the cement plaster. The choice fell on the second solution through the execution of a lightly reinforced micro-concrete layer 5 centimetres thick. Apart from the technical decisions, this example is indicative of the difficulty — sometimes even the impossibility — of complying with a reliable state of reference. In this case was it the one originally executed, knowing that the formwork plans drawn by the ATBAT had not been followed, or the one finally applied as a result of rethinking?

Spot repairs versus comprehensive refurbishment

The early 2000s marked a new era in the restoration of the *Cité Radieuse* in Marseille. The arrival of a new chief architect of Historical Monuments augured well for the adoption of new practises and a break with previous methods. From the start, the building's closeness to the sea and defects in the installation of the concrete were the cause of many pathologies that the previous repair work had never fully contained. Then the architect identified the limitations of the strategy of repeated local interventions adopted previously and advocated “comprehensive renovation” aiming first of all at the permanence of the work, even to the detriment of its authenticity.

Launched in 2001, the restoration of the west façade was an opportunity to test the validity of this approach. A trial section (2001-2006), including the pilotis, was first chosen to develop the technical solutions essential to carrying out the work on a larger scale. Diagnosis and an accurate survey of the damage (fissuring, crumbling of the concrete caused by corrosion of the rebars, spalling, etc.) then revealed the fragility of the concrete, which suffered from “numerous pathologies with a low degree of severity”⁹. In addition to conventional methods, involving replacement of the areas affected, more advanced repair techniques were adopted, such as dechlorination and electrochemical realkalisation of the *pilotis*, or preventive impregnation with corrosion inhibitors applied to many of the prefabricated elements (vertical *brise-soleils*, railings, façade cladding panels, etc.). Unlike the *Maison Radieuse* at Rezé, where almost all the façade elements were changed in the late 1990s, here only the worst affected parts were removed and replaced with identical panels. An on-site prefabrication workshop was installed for this purpose beneath the *pilotis* at the foot of the building. In addition to physically restoring the façade, the work included the renovation of its original polychrome finish, altered over time, which rapidly emerged as a “defining issue in the relevance of the project”¹⁰. Thanks to careful study in the archives and stratigraphic surveys, the initial distribution and range of colouring appear to have been restored.

When work on the west façade was completed, an ambitious program to restore the roof terrace and its structures was launched in 2008. The preliminary study by the chief architect referred to “repeated infiltration that cannot be dealt with piecemeal”¹¹. Passing severe judgement on his predecessor’s method of intervention, and instancing the chronic deterioration of the terrace, the architect invoked the recent example of the renovation of the roofing of the *Unité d’Habitation* at Firminy to support the need for the building to be completely re-waterproofed and the cladding of the ceiling slabs restored to their original state. Work continued in 2010–2011 with the necessary restoration of some emblematic elements that were part of the roof, such as the planters, benches, ramps, theater and other *formes libres* [“free-formed objects”] designed by Le Corbusier. The two major concrete ventilation stacks, badly decayed, were made the subject of a thorough technical study that led to the structural reinforcement of their walls, repair of the damaged parts, and a general realkalisation of the concrete. The parasitic kiosk (a locker room) built in 1967 on the solarium terrace was demolished. The roof of the gym, a major component of the composition of the roof terrace, was completely rebuilt in order to prevent the infiltrations which had spread damage continuously ever since it was first built.

Currently it is the turn of the façade to be restored. Begun in spring 2015, the work is following essentially the same procedure as the restoration of the other façade, the degree of decay observed being equivalent on each side of the building. Some improvements have also been introduced, such as optimising the phasing of work to minimise the inconvenience to the occupants or inserting stainless steel

fibres to facilitate the installation of the concrete elements that need to be reconstituted.

Exact reconstruction of the apartments destroyed by fire

On 9 February 2012, a violent fire destroyed several apartments and hotel rooms in the *Unité d’Habitation*. The statement of damage revealed “the weakness of the internal structures in the wooden walls and the utility ducting that spread the fire”¹². Represented in the press as a “fire trap”, Le Corbusier’s building then raised the issue of the fire regulations even more sharply and rekindled debate about the waivers it had benefited from because of its unusual nature and its heritage status. Delayed by the need to remove asbestos and decontaminate the blighted areas, the diagnosis of the chief architect drew a comprehensive picture of the damage affecting the structure and utilities of the building, all due to the fire and smoke as well as the effects of the intervention of the emergency services and systems (flooding caused by the fire hoses, landing doors demolished with axes to evacuate the inhabitants).

Developed with the idea of preserving the decayed original elements, whenever this was possible, the reclamation project deals with both the impacted public areas (façades and internal “streets”) and the units completely destroyed [*hypersinistrés*], namely 8 duplex apartments, 2 studio apartments and 2 hotel rooms¹³. With regard to the reconstruction of nine of the apartments, it should be borne in mind that they are not listed, but the work was based on an agreement with the owners to restore the original architectural layouts of the interiors while incorporating the necessary technical improvements, especially fire protection. This entailed negotiating compensatory measures case by case with the security services, for example to enable the new landing doors to comply with the fire regulations while maintaining the original design characterised by the lack of surrounds, or the intermediate floors in wood and metal for the residential units to be remade new without altering their *Modulor* dimensions. The whole of the integral furniture was reproduced exactly, as were the *Prouvé* model stairs, the kitchen units designed by Charlotte Perriand (including the parts in diecast aluminium), or again the remarkable glass panes that open onto the loggias. In 2007 the many challenges to be faced and difficulties to be overcome already foreshadowed the “transcript” of a standard cell of the *Unité d’Habitation*, later presented in the modern and contemporary gallery of the *Cité de l’Architecture et du Patrimoine* in Paris.¹⁴ Begun in September 2013, the reconstruction work was completed in the autumn of the following year, the choice of the polychrome finish having been finally left to the residents in the absence of reliable information on the subject.

The difficult conservation of the Brutalist oeuvre

This rapid overview of the successive interventions to preserve the *Cité Radieuse* in Marseille provides a glimpse of the building in a new light, that of a permanent construction site. If the work done betrays the unsuspected



06 Le Corbusier, *Unité d'Habitation*, Marseille, France, 1945-1952. Reconstruction of fire-damaged apartments. Installation of the firewall partitions of precast gypsum panels. © Photo F. Botton/ssea, March 2014. FLC/2016, Prolitteris, Zurich.



07 Le Corbusier, *Unité d'Habitation*, Marseille, France, 1945-1952. Reconstruction of fire-damaged apartments. A kitchen and its furniture fully rebuilt identically. © Photo F. Botton/ssea, September 2014. FLC/2016, Prolitteris, Zurich.

fragility of this “mass of concrete” which was stranded there 60 years ago, though it may seem timeless to the layman, these interventions reflect above all the progress made in the techniques of repairing and restoring concrete, whether precast or cast *in situ*. They also reveal the evolution of the gaze in relation to a recent heritage which is now receiving recognition, with the result that practices are gradually changing. Finally, the interventions reveal the evolution of the doctrines of the conservation of 20th century architecture, which here embodies, in the early 2000s, the transition from one generation of architect-restorers to another. By their richness and diversity (repairs, restorations, exact reconstructions and conversions), these interventions have also raised a series of questions about conservation and the future of Le Corbusier's built oeuvre, in particular the post-war works known as Brutalist architecture. They highlight the innumerable difficulties, and even contradictions, posed by the preservation of an architecture whose defects and other forms of decay are somehow part of the character of the work, its very life. The *Unité d'Habitation* in Marseille is, therefore, emblematic also in this respect. ■

Notes

- 1 See Jacques Sbriglio, *Le Corbusier. L'Unité d'Habitation de Marseille*, Parenthèses, 1992.
- 2 *Le Corbusier, Entretiens avec Georges Charenzol (1962) et Robert Mallet (1951)*, Vincennes, Frémeaux et Associés, 2007.
- 3 Letter from Le Corbusier to the building manager of the *Unité d'Habitation de Marseille*, 25 October 1962, FLC 03-13-517.
- 4 In 1995, protection was extended to apartment No. 50, previously inhabited by Lilette Ripert, the first director of the kindergarten of the *Unité*, a fervent admirer and friend of Le Corbusier.
- 5 Telephone interview with Jean-Pierre Dufoix, chief architect of Historical Monuments, in August 2012.

- 6 Jean-Roger Cremer, Jean-Pierre Dufoix, *Cité Radieuse, Unité d'habitation Le Corbusier. Superstructures sur Terrasse, Façades, Couvertures, Sols*, preliminary study, May 1993, 15, DRAC PACA, Aix-en-Provence.
- 7 *Idem*, 77.
- 8 See Jean-Pierre Dufoix, “Le Corbusier: archéo-ingénierie 1986–1996 à la Cité Radieuse de Marseille”, *Les Cahiers de la section française de l'ICOMOS, “Béton et patrimoine”*, 1997, 127–133.
- 9 *Laboratoire d'Etudes et de Recherches sur les Matériaux (LERM), Diagnostic et caractérisation de l'état de conservation du béton de structure. Cité Radieuse, immeuble Le Corbusier — Marseille (13)*, study report No. 00.2524.001.01.A, February 2001, 58, DRAC PACA, Aix-en-Provence.
- 10 François Botton, “La restauration de l'Unité d'habitation de Marseille”, *Monumental*, No. 1, 2006, 67.
- 11 François Botton, *Unité d'habitation “Le Corbusier”. Restauration de l'étanchéité de la terrasse*, preliminary study, February 2008, n. p., DRAC PACA, Aix-en-Provence.
- 12 Régis Prunet, “Réglementation incendie et Monuments historiques”, in Roberta Grignolo (Ed.), *Diritto e Salvaguardia dell'Architettura del xx secolo/ Law and the Conservation of 20th Century Architecture*, Mendrisio/Milan, Mendrisio Academy Press/SilanaEditoriale, 2014, 187.
- 13 See François Botton, “La restauration et la reconstruction de l'Unité d'habitation de Le Corbusier après incendie, Marseille, Bouches-du-Rhône”, *Monumental*, No. 2, 2014, 85. Another example is the architect's recent contribution to the 19th Conference Meeting of the Fondation Le Corbusier, entitled “Le Corbusier — his works and the challenge of their restoration”, held in Paris from 16 to 18 April, 2015; scientific committee: Franz Graf, Rémi Papillault, Jacques Sbriglio.
- 14 See Robert Dulau, Pascal Mory, *Le Corbusier Echelle 1: Expérience et Réalisation Pédagogique*, Paris, Ed. PC, 2007.

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