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Legislation and practice: the case of historic concrete buildings

Historic
concrete
buildings at
risk

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Abstract

Purpose – Only recently have historic concrete buildings received attention and the need for their protection has been understood. Their listing as architectural heritage in most countries is ruled by legislations. The research carried out within the framework of the CONSECH20 JPI project on the conservation of historic concrete buildings in the Czech Republic, Cyprus, Italy and the Netherlands has allowed to study the legislations in the four aforementioned countries and how these are brought to practice. This paper aims at the evaluation of these legislations and of their function in practice.

Design/methodology/approach – The legislations have been examined focussing on the protection of historic buildings and the guidelines to achieve a correct technical conservation. These were assessed in practical situations. The situations of the four countries were studied and the parameters used allowed comparisons.

Findings – Concrete buildings are at risk and the guidelines should be further developed to meet actual conservation needs, including historical and aesthetical compatibility. The re-use of listed concrete buildings often means transforming and adapting these to a variety of modern needs and norms: the complexity of this assignment asks for a multidisciplinary teamwork. The bottom-up Dutch programme for quality in conservation, striving to bring ethical and technological principles to practice, could be a sound basis for developing respectful conservation strategies of heritage concrete buildings.

Research limitations/implications – The research concerns the four countries involved in the CONSECH30 project and could be extended to include more countries.

Practical implications – More stakeholders have to be involved in the process of conservation and transformation of heritage concrete buildings. This should be directed by the legislation.

Social implications – No direct social implications are foreseen from the outcome of the research. However, the suggestion is made that social involvement is essential in planning concrete building transformations.

Originality/value – The study focussed on the application of theory (the legislation) to practice (thus showing the limits of the legislation), which is an innovative way of contributing to the conservation of historic concrete buildings.

Keywords Historic concrete, Buildings, Conservation, Legislation, Practice

Paper type Research paper



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1. Introduction

The relatively recent interest of the research community worldwide for historic concrete buildings has been greatly stimulated by a rise in the perceived architectural, social and historic value of these buildings. Along these lines, the DOCOMOMO (DOcumentation CONservation MODern Movement [1]) Foundation was established in 1988, at a time when a number of concrete buildings belonging to the architectural heritage of the 20th century had already been demolished or changed beyond recognition, to encourage the study of modern buildings and their conservation. This includes the majority of modernist buildings, whether concrete or hybrid structures. The International Council on Monuments and Sites (ICOMOS) has also devoted attention to 20th century heritage buildings through the establishment of a relevant committee and a recent relevant publication (Harboe *et al.*, 2021; Macdonald and Arato Goncalves, 2020). Moreover, several international conventions and charters have been written since the 1970s, which are also applicable to the identification and protection of concrete architectural heritage: this is of utmost importance for understanding the valuation and conservation criteria in relation to a changing society, and how these may be reflected in national legislations (Chatzi Rodopoulou, 2020).

Nevertheless, there is still a lot to be done for the protection and conservation of 20th century concrete heritage. The fast changing environmental (both climate and landscape) parameters in many cities around the world have deleterious effects on concrete heritage buildings, with many recent examples of man-made and natural disasters highlighting the fact that threats do not tend to reduce with time. The deterioration of concrete heritage buildings is directly linked to the lack of recognition for their values (material and immaterial), as well as the reluctance of the society and relevant stakeholders to adopt adequate conservation methodologies for their protection (Heinemann, 2013). Furthermore, the conservation of modernist architecture buildings currently faces a variety of obstacles, ranging from non-existent or inadequate national legislation and/or its inefficient implementation, to real estate speculation, lack of knowledge regarding the construction materials used for these buildings and the buildings' functions (Guillet, 2007).

This paper draws upon research conducted within the framework of the JPI project CONSErVation of 20th century concrete Cultural Heritage in urban changing environments, CONSECH20 (www.consech20.eu (accessed April 2021)). This project involves partners from the Czech Republic, Cyprus, Italy and the Netherlands. Its aim is the development of innovative approaches for the conservation and protection of 20th century concrete heritage buildings against the ever-changing urban impacts, taking into account both technical and social aspects. The research carried out has made it possible to deepen our understanding regarding existing legislation on the protection of listed concrete buildings, and review how this is translated into practice. The analysis concerned the theory of the legislations, the actors and their tasks and responsibilities in practice. The research further highlighted the complexity of the activities carried out in conservation and the synergies among the various actors involved. The objective of this paper is to study, evaluate and discuss the conservation of listed historic concrete buildings, and specifically the relevant legislation and the way this legislation is brought into practice in the four countries involved in the CONSECH20 project. Besides an analysis and comparison of the legislations in each of the countries involved, some of the issues identified, as well as good practices of implementing the legislation at hand, are also highlighted.

2. Heritage buildings in the countries of the CONSECH20 project

Within the CONSECH20 project, concrete is defined as *historic* when dating from the end of the 19th century until the 1960s (Heinemann, 2013). A common thread in the countries participating in CONSECH20 is that the valuation process for heritage buildings started with vernacular and traditional architecture (i.e. buildings built in traditional materials, like brick, stone and timber were the first to be valued, protected and conserved). In the 19th and 20th

centuries, Romanticism and Nationalism, recognizing values in the architecture of the past, played a role in the identification of heritage buildings. Social factors and politics have also influenced the attitude of both specialists and the general public towards heritage buildings.

For a long time, the creation of heritage was in the hands of experts, and conservation aimed at keeping existing structures in a good state for present and future generations but, sometimes, also at reshaping heritage to bring it back to its (presumed) original splendour, coherence and completeness. A different attitude developed in the light of sustainability, promoted by the World Commission on Environment and Development in 1987; this encouraged valuation, adaptation and re-use of 20th century buildings, as well as the involvement of different stakeholders in the process (Chatzi Rodopoulou, 2020).

Making stakeholders and the general public aware of the significance of recent built heritage is of utmost importance in the protection of 20th century concrete buildings. In the countries participating in the CONSECH20 project, there are cultural programmes and organisations focusing on recent monuments; these are meant to make them better established and also familiar to the general public. Docomomo national initiatives have especially contributed to the development of research on historic concrete buildings and the dissemination of the knowledge which has emerged from this research. Another relevant contribution is a study on the listing of 20th century monumental buildings worldwide, and the creation and protection of heritage, which retraced the steps taken internationally and the contributions of different organisations, and included a short overview of existing legislation in various countries (Vv. Aa, 2017).

2.1 Listing of buildings: socio-political influence

Throughout the first-half of 20th century, with the rising of the nation-state driven political movements across Europe, modernism or better the Modern Movement in Architecture, was often conceived as a means to build a new modern society. Consequently, in each country architecture often reflected the national political context. Nowadays, the legacy of this recent past, both in terms of tangible and intangible heritage, still influences the perception of concrete heritage buildings, especially in countries where a radical change of governance took place.

In the Czech Republic, there is a dramatic difference in the perception of the interwar and post-war architecture. The period between the two World Wars is the time when Czechoslovakia became independent, and the culture and economy of the country flourished. The functionalist architecture became the elected style of the interbellum. In contrast, the architecture of the second half of the century still bears negative connotations, being connected with the totalitarian communist regime, although many structures were innovative in a context of general conformity. A significant change in appreciation has taken place during the last decades. At first, the architecture of the 1960s received a more positive evaluation, belonging to a slightly more liberal period following the darkest Stalinist era of the 1950s. Later on, the architecture of the period that followed gained its popularity. Currently, many constructions of late Modernism have become iconic. However some of them are under threat, whilst others have even been demolished.

In Cyprus, the appreciation of Modernist architecture is a rather recent phenomenon, and at a great degree remains within specific circles of architects, cultural professionals and experts. This architecture mostly comprises of reinforced concrete frame with fired brick infill walls. The introduction of such type of architecture is linked to the island's past of colonialism and decolonization, nation-building, socioeconomic modernization and identity politics (Pyla and Phokaides, 2009). From the 1930s onwards, cities in Cyprus grew considerably, and the first public buildings were constructed along the lines of international Modernism (Fereos and Phokaides, 2006). Modernist architecture was introduced on the

island primarily by the British Colonial Government, appointing architects from abroad for the design of governmental buildings and schools. In addition, Cypriot architects who had studied abroad in countries such as Greece, France and the UK, returned to the island bringing with them their new-found traits. This led to an increasing number of individuals, usually of middle and upper class, opting to turn from vernacular to modern architecture for their private residencies, and from the mid-1950s onwards for new multi-floor developments. After Second World War, urbanization in Cyprus led to the so-called aesthetic of “corporate modernism”, with concrete-frame apartment buildings and office blocks (Pyla and Phokaides, 2009). These are characterized by a structural system (reinforced concrete frame with fired brick infill walls), which has survived through the years and is still dominating the construction industry on the island, probably because it is considered to be safer than masonry in relation to seismic activity.

In Italy the architectural buildings of the Fascist period, characterized by functional rationalism and recalling ancient monumental Roman architecture, had been heavily ignored or penalized along the decades after Second World War, for expressing the values of a totalitarian regime. The 1980s, however, brought calls to judge architects on their merits, rather than their political belief. In fact, as Malone (Malone, 2017, p. 466) demonstrates, since “*architecture perpetuates memories in places of everyday life*”, dealing with the architectural legacy from the Fascist period—which corresponds to a large extent of the first-half of 20th century Italian architectural production – it might still be nowadays a critical issue (Carter and Martin, 2019). This is only an example of how problematic is the evaluation of part of the heritage studied within the CONSECH20 project, also taking into account that heritage dates long before the fascist period and comprehends other kinds of “eclectic” or early “modern” architectures.

In the Netherlands, the long discussion on the listing of monuments, finally leading to the legislation on the protection of Monuments in 1961, took place in a country without a difficult historic past and characterised by a neo-liberal political atmosphere. Awareness rising policies, definitions of criteria for valuation of heritage buildings and inventories initiated by the Dutch government finally resulted in a listing process, which found owners not always willing to comply with the restrictions and obligations related to the new status of their buildings (Kuipers, 1997).

Concluding, in the four countries participating in the CONSECH20 project, the criteria for listing varied in time with changes in the socio-political situation; this affected and still affects the identification and protection of recently built heritage.

3. Legislation in heritage conservation

The origins of the Heritage Protection in the Czech Countries date back to the turn of the 18th and 19th century and the Austro-Hungarian Empire, and are linked to the movements of Romanticism and Nationalism. Heritage Protection was influenced by the Viennese School of Art historians, like Alois Riegl and Max Dvořák. In the times of the Austro-Hungarian Empire, the state organized Heritage Protection in a system of institutions, and the first legislative act was issued in 1881, albeit only for the Hungarian part of the empire (Czumalo, 2008). With the proclamation of the First Czechoslovak Republic in 1918, a new system of Heritage Protection was created, and new institutions were founded, such as the National Heritage Institute (NPU), which is presently the administrator of the Monument Registry, and the Archaeological Institute (Figure 1). Much later, in 1958, during the communist regime, the first legislation was issued, the “Cultural Heritage Act”, followed by “The State Heritage Protection Act” in 1987 and finally by the “Implementing Decrees”. This linked with the “Construction and Urban Planning” legislation, which defines the general legal framework of all urban planning and construction activities. The legislation defines two levels of protection:



Klub za starou Prahu hájí neohroženě pražské památky.

Note(s): Period cartoon depicting the Club for Old Prague (founded in 1900), which has been an important actor in the discussions and the struggles for the protection of Prague monuments: (TRN, 2000, p. 268)

Figure 1.
The old Prague club
fearlessly defends
Prague's monuments

(1) Immovable Cultural Monument (ICM) as the primary level, and (2) National Cultural Monument (NCM) as the highest level. The Heritage Protection Act also defines measures of protection of larger areas (e.g. city centre, neighbourhood).

Until 1972, heritage buildings in Cyprus could only be granted legal protection via “The Antiquities Law”. This law, which dates back to 1905, gave the jurisdiction to the Ministerial Council, following the recommendation of the Director of the Department of Antiquities, to declare as “Ancient Monument” objects, buildings or sites considered to be of public interest by reason of their historic, architectural, traditional, artistic or archaeological value. The majority of the archaeological sites, many historic buildings, as well as a small number of traditional buildings, were given the status of an “Ancient Monument” and were thus protected from demolition or alteration of their authentic character (Philokyprou, 2017). In 1972, the “Town and Country Planning Law” was introduced and has since been the main “legal tool” for the protection of primarily vernacular architecture, with over 100 preservation orders issued to-date, covering more than 5.000 buildings across the Republic of Cyprus. The majority of these buildings are of vernacular architecture, whilst a much smaller number falls into the category of “Modernism” (Philokyprou, 2017). The main inventory on “Architectural Heritage” (following the Granada Convention, <https://www.coe.int/en/web/culture-and-heritage/granada-convention>) in Cyprus is managed by the Department of Town Planning and Housing (TPH), and it currently consists of more than 10,000 buildings (mainly built with traditional materials) (http://www.moi.gov.cy/MOI/tph/tph.nsf/page40_gr?OpenDocument accessed April 2021; http://www.moi.gov.cy/MOI/tph/tph.nsf/page41_gr?OpenDocument accessed April 2021). Approximately 5.000 of these buildings have already been listed. In the last decades, attention has been paid to recently built heritage, aiming to attract the interest of the general public. The DOCOMOMO Cyprus

has produced a list of recently built heritage; however, this includes a significant number of not yet listed buildings. Nevertheless, systematic inventories, such as the one compiled by DOCOMOMO Cyprus, are considered fundamental to better understand and protect existing recently built heritage.

Heritage protection in Italy officially started in 1902, after the unification of the country in 1860. In the first-half of the 20th century, different laws were issued reflecting the contemporary cultural conceptions, debate and practice in protection, conservation and restoration of buildings with historic and artistic values. The protection of the Italian cultural heritage is specifically addressed in art. 9 of the Constitution of the Republic (1946) that “protects the landscape and the historical and artistic heritage of the nation”. Only in 1975, the new Ministry for Cultural and Environment Heritage was created, absorbing the competences of the Ministry for Public Education in the field of culture and protection of heritage. After different changes of its denomination and competences, it is now named Ministry of Cultural Heritage–MIC. In 1999, the legislation concerning the Cultural Heritage was reorganized. In 2001, Regions and Local Authorities were assigned specific functions in the valorisation of Cultural Heritage, and in 2004 a new unified “Code of Cultural and Landscape Heritage” was issued concerning material and immaterial heritage. A minimum age of 50 years for listing the “objects of cultural interest” was then confirmed; this has been recently extended to 70 years, which implies that many recent concrete heritage buildings constructed in the second half of the 20th century cannot be directly considered as Cultural Heritage. Only buildings that the competent authorities declare to be of “outstanding public interest” on a national level can, in fact, be listed at an age of 50 years. An important specific inventory in this field, the “National census of the Italian architecture of the second half of 20th century” (<http://architetturacontemporanee.beniculturali.it/> accessed April 2021), has been started in 2000 by the MiBACT (now MIC). This includes a selection of buildings and urban areas of significant cultural interest under different points of view (e.g. historical, aesthetic, constructive, social, authorial), described in a technical manner. This inventory has led to the selection of a relevant number of eligible buildings for protection. It is necessary to note that no specific protection for buildings of “historic concrete” is in force in Italy, according to the current legislation. This is yet another obstacle in the protection of these buildings.

In the Netherlands, the protection of monuments started in 1875, when a specific body was created at the Ministry of the Interior, which could subsidize the conservation of monumental buildings, until then entrusted solely to the care of their owners. Since 1903, a governmental commission was charged with the inventory of buildings to be protected as national monuments. This inventory started at provincial level and concerned buildings erected at least 50 years before, until 1850. In 1918, the governmental office for the care of Monuments was founded, which is now called Cultural Heritage Agency (RCE). After Second World War, in the Reconstruction period, the problem of the formalisation of the protection of monuments led to new concepts on creating heritage and temporary legislations. The first Monument law was issued in the Netherlands in 1961 and served as the basis for the legal protection of monuments and the creation of the “Register of protected monuments” (<https://erfgoedmonitor.nl/> accessed April 2021). Until the 1980s, only buildings constructed before 1850 could have the status of “monuments”, that is to say of listed buildings with a recognized heritage value. Only occasionally, some iconic buildings constructed after 1850 were given a special status. As a rule, the term “monuments” characterized buildings constructed in traditional materials and methods, which is to say brick and natural stone masonry. An important change occurred in the late 1980s, when the Monuments Inventory Project (MIP) was carried out by the RCE, focussing on Dutch buildings and town planning dating from the period between 1850 and 1940 (<https://www.nationaalgeoregister.nl/geonetwork/srv/api/records/b18a0c7c-1120-414a-b023-68629c8a1da5>). Among the buildings considered there were also concrete ones. The MIP led to the listing of a number of buildings, which gained the status of monuments. A second Inventory, done in 2007, included buildings constructed during Second World War and in the reconstruction period. After this Inventory, the listing of 100 buildings was

proposed (Heinemann, 2013). In 2016, the existing Monument legislation (often updated and changed in the course of time) was developed into the present Heritage legislation (<https://www.rijksoverheid.nl/onderwerpen/erfgoed/erfgoedwet/> accessed February 2021) (now mainly concerning archaeological monuments) and the (<https://www.omgevingsweb.nl/nieuws/de-nieuwe-erfgoedwet-wat-verandert-er-voor-monumenten/> accessed April 2021).

3.1 Four legislations compared

The need for inventories and legislations is clear in all countries involved in CONSECH20. However, the legislations dealing with conservation, protection, re-use and valorisation of listed buildings do not differentiate among building materials, that is to say traditional ones—like brick and stone—or contemporary ones—like concrete. The listing process is therefore guided by other criteria, which also direct the limitations concerning the interventions and the level of protection involved. As the conservation of historic concrete buildings often implies their transformation and adaptive re-use, these interventions are also dealt with in the legislation. However, whilst in the case of buildings made of traditional materials collective experience throughout the years has facilitated the thorough application of existing legislation and the respect towards the materials and techniques used, in the case of concrete buildings this has not always been the case. The procedure followed in the listing of heritage buildings, as well as the most relevant aspects of the legislation of the four countries participating in CONSECH 20, are explained per country in Table 1.

From Table 1, it is clear that the criteria used for listing may vary in terms of time frames in each country, as well as in the level of protection of the listed monuments. The existence of time frames in Italy, for example, affects the listing of the quite recent historic concrete heritage. Furthermore, in all the countries involved in CONSECH20 - according to the relevant legislation—the owner is responsible for the state of conservation of his/her building; regular maintenance is expected and financial sanctions can be applied in case of neglect. In practice, however, neither the controls are always consequently carried out, nor the economic sanctions are applied. The owners may obtain financial support for the conservation of their building.

Concerning the intervention procedure, only in the Netherlands some activities can be carried out without special permission. A relevant problem, though, lies in the development and observance of thorough guidelines on the conservation of historic concrete buildings. In fact, the challenges posed by historic concrete, as an experimental material, make it difficult to develop guidelines for compatible repair materials and techniques.

4. Legislation and practice

Even though the legislations are meant to guide all phases of the conservation/restoration process, and serve the main goal of protecting the buildings, their translation into practice reveals shortcomings and aspects needing further development, especially for recent buildings.

4.1 The protection of buildings and their components

The listing of buildings should guarantee their protection and hinder their neglect and, of course, demolition. This clearly emerges from the study on the main aims of the legislations concerning the listed buildings. However, the criteria directing the listing process and the selection of buildings to be listed may change with time and place and reflect the changing priorities of both the government and the society, but also the status of education, culture and professions in each country. This is evident in the case of the architecture of totalitarian regimes condemned by the democratic state, where a distance in time was necessary to appreciate them for their architectural value and not for their political meaning. At the same time, other criteria seem to govern the listing and un-listing of buildings. In the Netherlands,

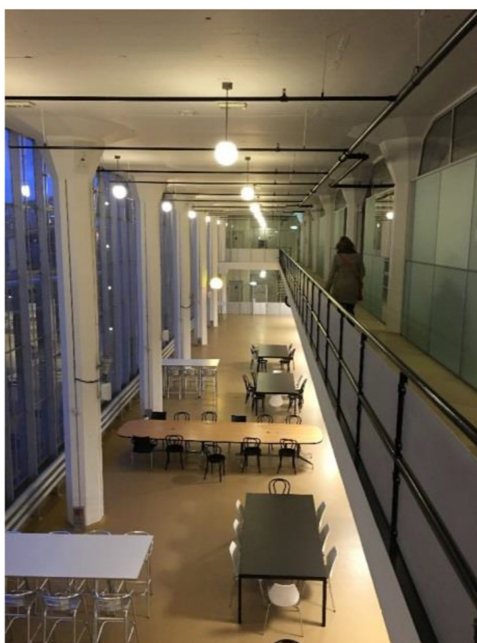
Legislation	Czech Republic	Cyprus	Italy	The Netherlands
Listing	<ul style="list-style-type: none"> No age limit 2 levels: Immovable Cultural Monuments and National Monuments 	<ul style="list-style-type: none"> No age limit 	<ul style="list-style-type: none"> 70-years after construction limit (exceptionally 50) 1 level of protection managed solely by State 	<ul style="list-style-type: none"> No age limit 2 levels: Municipal and National
Owners are obliged to keep their buildings in a good state	Maintenance	Maintenance	Maintenance, in some cases restoration and, if this is granted by the State, opening to the public	Maintenance
Intervention procedure	Submit all intervention plans to commission	Submit all intervention plans to commission	Submit all intervention plans to the local Superintendency (local branch of MiBACT) for Archaeology, Fine Arts and Landscape	Submit intervention plans significantly modifying the aspect of the building to commission
Sanction for neglecting monument	Owner is <ul style="list-style-type: none"> Charged of costs for interventions; Fined; Subject to expropriation 	Owner obliged to support/restore structures deemed dangerous to the public (or pay for the support carried out by the Authorities)	Owner can be fined or even legally persecuted (penal code)	Owner is fined
Financial support for maintenance/conservation	Financial support from Municipal and Regional Councils (mostly)	Financial support or fiscal advantages (transfer/selling of building coefficient; tax exemptions)	Financial support or fiscal advantages can be granted by the State	Financial support (subsidies conservation monuments SIM) via RCE
Intervention guidelines (incl. valuation of building, components and techniques)	Available (monitoring, testing, materials), but not always followed	Available. (restoration principles exist, monitoring). Architectural value prevails upon technical. Guidelines evolve through best and worst practices	Available in different fields, such as strengthening against seismic or fire risks and accessibility, but should be more specific for reinforced concrete buildings	Available, but not always followed
Architect in charge	Yes, for all types of works	Yes, for all types of works	Yes, for all types of works on listed buildings	Depending on works (e.g. maintenance)

Table 1. Comparison of the legislations of the countries participating in the CONSECH20 project

an interesting case is that of the former Calvé factory in Delft, listed in 2009 as municipal monument, being the first example of use of the pioneering Monier system, and recently unlisted to be finally demolished (2019); this shows a certain fragility of the Dutch protection system. This also applies to the Republic of Cyprus and the Czech Republic, where the application of economic sanctions to owners in case of lack of maintenance of a listed building is not always enough to guarantee the protection of these buildings, which are often neglected until such a poor state is reached that demolition is justified. The economic interests of stakeholders may explain some modifications of the legislation, like the decision that

stadiums in Italy will no longer be under the protection of heritage authorities, which implies the risk of demolition of structures like the Nervi stadium in Florence. Even though, as said above, developers seem to have become aware of the economic potentials of the respectful and compatible re-use of the existing, there are cases in which a complete reconstruction, even in similar forms, may guarantee such an economic gain that demolition prevails upon conservation. In the case of the Calvé, the building was especially significant both for historic reasons and in terms of the materials used. This points at an interesting result from the CONSECH20 research project, which is the need—in the four participating countries—for clear guidelines on the valuation and conservation of *historic materials and techniques* to direct the conservation plan. The latter has also been highlighted by Heinemann (2013). Further, the commission or authorities examining intervention plans, for which the legislation requires approval prior to starting the works, do not necessarily include a specialist in historic concrete. An expert is invited only when special features of the building and its decoration make it necessary to have a specific expertise provided. This is another shortcoming of existing legislations.

There are surely excellent examples of not only technically, but also historically and aesthetically compatible interventions for re-use, like the van Nelle factory in Rotterdam (Figure 2) (W. de Jonge Architects, 2006; Europa Nostra recognition in 2008) (<https://www.wdjarchitecten.nl/projecten/van-nelle-fabriek-structuurplan/> accessed April 2021) or the Museum of S. Lorenzo's Treasure in Genoa, built in the 1950s under the courtyard of the Archbishopric of Genoa, near the S. Lorenzo's Cathedral (Vv.Aa. 2005; Franco and Musso,



Note(s): The non-specific spatial logic facilitated its conversion into a centre for design studios and offices; the building substance and its transparent character were conserved, yet enhancing sustainability and climate comfort. Restoration by W. de Jonge Architects, (2006)

Source(s): Photo: S. Naldini

Figure 2.
Van Nelle factory,
Rotterdam, J.
Brinkman and L. van
der Vlugt (1928–1931)

2015) (Figure 3), and the Alexandros Demetriou Tower in Nicosia, Cyprus. However, many interventions fail to respect and correctly preserve the existing, and do not meet the primary aim of listing.

From a technical point of view, the frequently performed patch repair, coating and filling, often lead to failure, which may be due to the wrong diagnosis of the causes of the damage found or the wrong planning of the interventions (Luković *et al.*, 2012). However, even technically correct interventions may further neither show the much needed analysis and valuation of the existing, nor pay enough attention to the historical and aesthetic compatibility. An example is the intervention to solve the problem of the cracks appearing in the walls of the fort Bezuiden Spaarndam (end of 19th century, unreinforced) in the Netherlands, which is poor in technical terms, but also forms a disturbing pattern of white lines on the grey surface (Figure 4) (Heinemann, 2013). The insertion of the dilation joints and the choice of grouting for the cracks were correct, but should have been performed differently (cracks reopened). The original camouflage paint could have been reapplied, in a compatible way, considering the historic and aesthetic aspect of the monument.

There are also examples in Cyprus, where buildings owned by the State do not become listed, as the State does not want to undertake the obligation of restoring them according to the principles of conservation. Such examples include a number of schools, representative samples of prime modernist architecture (such as the Pallouriotissa Lyceum or the A' Technical School of Nicosia). These buildings have recently been structurally upgraded in such a way that and their original character has been modified.

Figure 3.
Main tholos of the underground Museum of S. Lorenzo's Treasure (1950s): the museum was restored in 2011 adopting a planned conservation program seeking a substantial balance between architectural and historical values and safety access needs, and adopting minimal (technically compatible) interventions



Source(s): Photo: Luca Pedrazzi

Figure 4.
Fort Bezuiden Spaarndam 1897–1901 (Netherlands): plain concrete, municipal monument, technically and aesthetically incorrect intervention



Source(s): Photo: S. Naldini

4.2 From practice to legislation

The legislation on the conservation of listed buildings may include extensive guidelines, like in the Italian or the Czech cases (Table 1), which nevertheless do not guarantee the needed support for historic concrete conservation practice. The Czech guidelines for interventions include monitoring during execution, specification of allowed materials, types of certification needed from contractor, examples of previous restorations (<https://www.npu.cz/cs/opravujete-pamatku/ke-stazeni> accessed April 2021). However, their complete translation into practice is rare. In Cyprus, there are general restoration guidelines for vernacular buildings, but no specific guidelines for the restoration of historic concrete buildings exist. Given the limited number of restored concrete heritage buildings on the island, there is a lot of work to be done on this front. The gap between legislation and practice is, in fact, a problem concerning all the countries involved in CONSECH20. The problem is how to guarantee that guidelines are thorough and complete, specifically regarding concrete historic buildings, and that they are correctly followed in practice.

A programme aiming at increasing the quality of the interventions has been started in the Netherlands by various stakeholders involved in conservation, coordinated by the foundation ERM (Recognized Quality of Conservation of Monuments). This *bottom-up* initiative, which started with building contractors and architects, and presently includes traditional building crafts active in conservation, aims at developing guidelines for the certification of the actors and for the control of the quality of their work. The stakeholders themselves, under the supervision of a national committee of experts, develop inspection and intervention guidelines and criteria for quality control. The programme aims at empowering professionals, who in fact define ethical and technical standards and work, accordingly. It is worth noticing that companies and individuals involved in conservation, even if not possessing an ERM certification, can nevertheless declare in their work specifications that they act in compliance with the guidelines. This ensures familiarity with the guidelines and their embedded values spread among actors. An ERM committee has also recently released ethical principles and technical recommendations for the conservation of *historic concrete monuments* (<https://www.stichtingerm.nl/kennis-richtlijnen/url2003> accessed April 2021; <https://www.stichtingerm.nl/kennis-richtlijnen/ur14005> accessed April 2021).

The ERM guidelines refer to an existing network of recommendations, CUR aanbevelingen (<https://www.cur-aanbevelingen.nl/> accessed April 2021), advisory work (VABOR association for concrete repair advisors), concrete certification (foundation KOMO, Quality mark for the building industry) and (BRL) assessment guidelines, which are followed for evaluating interventions based on traditional methods (CUR 118) and injections (CUR 119). The mentioned interconnected guidelines and certifications, however, are meant for the quality control of the intervention in *technical terms*, and *only concern modern concrete, not historic concrete*. Hence the need for specific ERM guidelines for historic concrete and for its technical and historical/aesthetical conservation.

Even in the case that all interventions on a building are entrusted to an architect as the responsible person and to actors with certified professional competences, effective guidelines and procedures should be developed specifically concerning *historic concrete* buildings. Clear technical guidelines for both the assessment of the damage and the choice of repair technique, material and method, could help direct the conservation interventions and maintain the intrinsic value of materials and techniques. Interventions done following guidelines and documented in a report can be assessed, monitored, and form the basis for learning and avoiding mistakes. In this perspective, on a methodological level, the recent “European Quality Principles for EU-funded Interventions with potential Impact upon Cultural Heritage”, prepared by ICOMOS upon the demand of the European Commission, and recently adopted by the world assembly of ICOMOS, can provide some useful references (Harboe *et al.*, 2021).

5. The need for a multidisciplinary approach

Monumental buildings need to be (re-)used to become sustainable (Hees *et al.*, 2014). This means that extended transformations may usually be necessary, and that these should take place while preserving the values they embody, but also meeting the needs and standards of modern life. This often creates conflicts. Exceptions to existing legislations, the possibility to obtain dispensations and derogations and to apply equivalent solutions, offer the means to reach the wanted goals, without affecting the essence of a building, in other words, *disfiguring* it. This matter has been discussed elsewhere, mainly focussing on the fundamental aspects of restoration/transformation, like safety, accessibility and (energy) upgrading of the buildings (Grignolo, 2017; Vittorini, 2017). Considering monuments, in general, there are good examples of interventions based on a thorough study of the existing and well-considered and motivated actions to achieve safety, accessibility and energy saving. These examples could be used to develop guidelines to direct the interventions, case by case (Grignolo, 2017; Vittorini, 2017). The approach should be comprehensive and holistic. During the restoration of the Alexandros Demetriou Tower in Nicosia, Cyprus, for example, the architects managed to get approval to create new openings overlooking the old city of Nicosia (Figure 5). Though the apartments in the original building had a different view, the architects successfully argued that the new societal needs include a view of the old city. This confirms that a good argumentation can justify change. It should, however, be based on the analysis of the building and the site where it lies, and guarantee further life and sustainability to both the monument and the site.

In practice, unfortunately, the main criteria for approval of a transformation plan is often the mere preservation of the *external aspect* of the building. This introduces the risk of an unbalanced valuation of the architecture, implying the possibility of substitutions of materials to reconstruct the highly valued original architectural design (exterior) and acceptance that the interior can be subject to any modifications deemed necessary for the new destination. This risk should be also made clear in the legislation and should consequently be



Figure 5.
The renovated
Alexandros Demetriou
Tower in Nicosia,
Cyprus

Note(s): New openings were created on the façade on each floor, overlooking the old city (see indicative black outline on 4th floor)

Source(s): Photo: University Cyprus

avoided. The local community is often the knowledge keeper concerning use and value of (e.g. industrial) heritage buildings. The involvement of stakeholders, general public and potential users is necessary to guarantee the present and future use of a building. Transformation and adaptive re-use should aim at increasing durability and sustainability; this may be reached involving different experts. The role of the architect should be that of a co-ordinator of a multidisciplinary team, including specialists, owners/stakeholders, and also potential users and the general public. This was not necessarily the case during the decision of the Nicosia Municipality in Cyprus to change the use of the Old Municipal Market to host a new research centre focusing on interactive media, smart systems and emerging technologies. Users of the old city of Nicosia (where the building is located), as well as architects, highlighted their disapproval of the plans. It became apparent that the public would have wanted to see the building become something which could host more social activities, but the decision was never overturned.

5.1 A multidisciplinary teamwork

A historic concrete building is able to positively adjust to changes and create heritage values (Holtorf, 2018); thus its conservation and re-use need an adequate approach, not only in the technical sense. A team of scientists, experts and stakeholders should be formed (Figure 6), in which the architect should have the role of the co-ordinator, and translate the input of the members into a design, supported by their expertise. *“The role of the architect has changed from being the classic conductor of an orchestra into that of the bandleader of a jazz quartet where each member plays an instrument and is therefore equally indispensable. And yet: somebody has to set the tone.”* (Kuipers and Jonge, 2017, p. 23). Only in a team can the complexity of the assignment be faced, starting with the value assessment of the building, including its history, use, memories, and extending to its surroundings, to reach a technically and historically/aesthetically compatible intervention. This is of course true for all heritage buildings, but should certainly be applied in conservation works to concrete buildings.

The general philosophy behind the legislation on heritage conservation is to leave a building as untouched as possible, while making it suitable for adaptive compatible and respectful re-use. In other words, some change is needed to meet modern needs that the building was originally not conceived to meet, but this should never diminish the complex of values embedded in it.

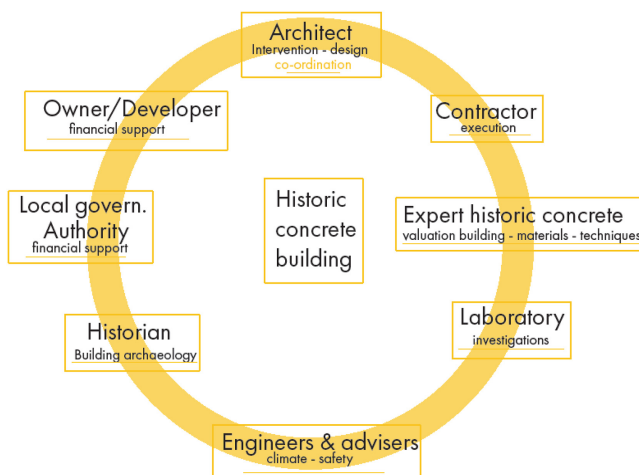


Figure 6.
Ideal teamwork for
heritage concrete
buildings during the
whole process of
transformation and
re-use

It should also be considered that some of the concrete buildings erected between 1900 and the 1960s, not only had an experimental character (as shown, among other things, by the materials used and the fabrication process), but were also not intended to last forever (like a pavilion for an exhibition). The complexity of the transformation assignment demands a preliminary exhaustive study of the various aspects of the project, and a productive discussion between specialists and stakeholders. The technical steps to be taken need to be clearly substantiated by a thorough value assessment of the *historic materials and techniques*, which nowadays are often sacrificed. The transformation plan with the modifications it implies should be rigorously argued, because the decision on what needs to be kept and what needs to be eliminated or substituted is inherent to the individual building, its value assessment and the new destination. This should also be directed by specific guidelines.

6. Conclusions

Buildings made in historic concrete (from the end of the 19th century until the 1960s) belong to our 20th century architectural heritage, which only recently started to receive attention for its technical, historical, and aesthetical value. They witness the development of fabrication and use of a relatively new building material, but their conservation should still be carefully planned and carried out, aiming at limiting the interventions to the essential. Both at national and international levels, legislations have been created to direct these interventions, but a discrepancy is often found between theory and practice.

From the findings of this study, it emerges that existing legislations may be incomplete and demand better elaboration to meet conservation needs, or they may be extensive but not consequently applied in practice. Even though the legislation on the listing of concrete buildings should guarantee their protection and conservation, changes in listing criteria may put concrete heritage buildings at risk. Although existing legislation may include guidelines for the technical conservation of concrete heritage buildings, these should be further developed, to also deal with historical and aesthetical compatibility. A historic concrete specialist should be asked to assess any intervention plans.

The re-use of listed concrete buildings often means transformation and adaptation to a variety of modern needs and compliance to norms. The complexity of the assignment asks for a multidisciplinary teamwork, with the active involvement of users and the general public. The Dutch ERM programme for quality in conservation is meant to bridge the gap between theory and practice: the guidelines for interventions on historic concrete and the quality controls developed derive from the practical experience and needs of the branches involved; this guarantees their application and encourages a respectful attitude towards heritage buildings.

The conservation of historic concrete buildings should be based on a more conscious acknowledgement that they are a significant part of our built environment and shared cultural legacy.

Note

1. <https://www.docomomo.nl/> and <https://docomomocz.tumblr.com/>, <https://issuu.com/docomomo.cyprus>; <https://www.docomomoitalia.it/>, <https://www.docomomo.com/> accessed April 2021.

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