

# Three modern preservation cases

## The restoration of Rietveld's Biennale Pavilion (1953-54) in Venice, Italy, compared to Sanatorium "Zonnestraal" (Jan Duiker, 1926-28) and the Van Nelle Factories (Brinkman&Van der Vlugt, 1926-31)

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The Netherlands Pavilion at the Biennale of Venice was called by the Italian contractor in 1954 "exceptionally beautiful, the most beautiful even of all the other pavilions". A certain measure of partiality can of course be expected of a contractor, but it is true that the confident simplicity of the spatial composition made this building into a very special phenomenon, that seems to evoke a striking portrait of postwar Holland.

However, it is not to be hoped that visitors in the early 1990s on the basis of this pavilion have tried to form an idea of contemporary Holland. By then, the building was only a shadow of Rietveld's original design. Its hardly concealable dry rot and the severe subsidence of the small office joined on to the pavilion would most certainly have left an undesirable impression, quite different from the impression the first visitors in 1954 must have had.

In the course of time the architectural character of Rietveld's pavilion had seriously been affected. The interior spatial concept was compromised by later interventions, while a number of characteristic elements had been radically altered. Also in a constructional sense there was a number of problems which constituted a hazard to both the aesthetical appreciation of the building and its proper maintenance.

That damp in the Venetian lagoon plays a devastating role is common knowledge. The inner walls showed a persistent salt-efflorescence as a result of which the plasterwork had to be repaired every other year. During the frequent downpours in the area, serious leakages occurred and the roof boards and the casings had rotted through.

Yet, the degeneration of this "national showpiece" must be partly attributed to the way in which, until roughly a decade ago, the stewardship was almost exclusively seen as a problem of upkeep. The changing views with respect to the preservation of Modern Movement architecture have resulted in the stewardship of Rietveld's pavilion having to change tack. The time was ripe for no longer considering the running of a technically imperfect building in foreign parts a problem but a challenge in the form of an integral restoration.

An even more striking example of such a process has been the battle to safeguard and revitalise Jan Duiker's famous sanatorium "Zonnestraal" of 1928, that had to be pursued over two decades just to see the restoration of the first of three pavilions completed in 2003.

### Modern Movement heritage

In the 20th Century, architecture, urban planning and landscape during a brief, exhilarating, unique period were transformed in parallel with the Theory of Relativity, Cubism, Twelve Tone Music, Scientific Method, Rational Philosophy, Economic and Social Theory, Medical Science, and Industrialization. Modern architecture was, consequently, a cultural imperative which expressed innovative ideas, the early buildings retaining their potency to this day. It is as much the spirit which generated these forms as the forms themselves, which represent a crucial part of our intellectual heritage.

In pairing the social and the technological concepts of an era, the Modern Movement has been a radical turning point and an essential stage in architectural history. Still, the

preservation of Modern Movement architecture is not a general public concern. Some obvious reasons can be put forward for that, such as the fact that modern architecture still is very recent and it is not easy to recognize older examples as being particular. Secondly, modern architecture has been got in wrong with the general public after the Second World War, due to the misinterpretation of its guidelines in an effort mainly to solve the enormous postwar housing shortage in Europe.

However, the preservation of significant buildings and neighbourhoods, as works of art, presents a demanding economic and physical problem. The continued life of both the icon and the ordinary, as elements in an economically driven world, depends upon the shared recognition of their cultural and social value, as well as upon their continuing economic viability. In order to advocate the preservation of such recent architectural heritage successfully, the unique character of the architecture and urbanism of the Modern Movement must be underlined.

### **Functionalism and “De Stijl”**

Due to the increasing prominence of time as a factor in decision-making, also the building industry underwent great changes still in the 19th Century. The limited range of building typologies dating from earlier ages accommodated a variety of functions and had proven to be quite easily adaptable for other uses. Therefore, they had a long functional life expectancy, and the technical lifespan was aimed to be accordingly great.

With the Industrial Revolution, the programmes for buildings had become more diverse and specific, as did the buildings themselves. As the timespan for use changed as well, time and transitoriness ultimately became important issues in architecture.

Paired with the unparalleled technical progress of the era, these developments ultimately led to the revolutionary ideas and pioneering works produced by the designers of the Modern Movement. Around 1920, in some West European countries, architects started to acknowledge a direct link between the design, the technical lifespan of a building and user requirements over time.<sup>1</sup> In those days this vision represented a revolutionary point of view. In the Netherlands, the consequent translation of these ideas into practice came to be known as “het Nieuwe Bouwen”, a deliberate ambiguous notion that should be translated something like “New Building” rather than “New Architecture”. Jan Duiker (1890-1935) was a main spokesman of this avant-garde group.

Duiker and his fellows in the architectural avant-garde referred to “het Nieuwe Bouwen” not as a style but rather as a working method, setting great value on the connection between form, function, applied materials, construction, economy and time. User requirements and economy were seen as the causes, while appearance and form emerged as a result. They regarded buildings as utilities with a limited lifespan by definition, sometime even as “throw away” articles. No wonder that Le Corbusier, Duiker and many other modern architects loved to compare their works with automobiles, aircraft and other industrial products.

Some famous examples of this architecture in Holland are the Van Nelle factories in Rotterdam (Brinkman and Van der Vlugt, 1925-29), and Duiker’s “Zonnestraal” sanatorium for diamond workers in Hilversum of 1926-28, now also a landmark of social history.

The late 19th Century’s quest for a new architecture, that would reflect the industrial society of the Machine Age, seemed thereby fundamentally answered for the first time. Various earlier attempts had been made to achieve this, but those were essentially based on artistic features. By merely redefining aesthetic principles however, as for instance in Art Nouveau and, to a certain extent, even in the vanguard movement of “De Stijl”, some questions were left unaddressed, particularly social issues. Although a desire to return to

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<sup>1</sup> Henket, H.A.J. and W. de Jonge, Het Nieuwe Bouwen en restaureren, English summary, Zeist/The Hague 1990, ISBN 90 12 06540 2, pp. 96-100.

the essence of architecture was shared, there was a great difference in approach of how to accomplish this, which elements were to play a role and what this role was to be. On close inspection, the approach of architects like Duiker and Van der Vlugt in fact diverged principally with the ideas of "De Stijl" – as expressed in the early works of Rietveld – although all three architects are regarded masters of the Modern Movement in the Netherlands.

### **Spiritual economy**

Duiker and his compatriots were dedicated to construct as light as possible, with a minimum of material used. The dimensions of the concrete frame for "Zonnestraal" follow the moment diagram, and beams are haunched at their supports to take up the shear forces. The necessarily complicated carpentry was not uneconomic in a period with cheap labour. This strive after optimal construction is referred to by Duiker as "spiritual economy" that, as he wrote in 1932, "leads to the ultimate construction, depending on the applied material, and develops towards the immaterial, the spiritual."<sup>2</sup>

The cultural imperative of architecture was therefore not in ornamentation, but in technology itself. Duiker considered the search for the optimum in materials and dimensions as a process combining the artists' inspiration and the engineers' knowledge, an "engineers-art". He compared this with the construction of Medieval cathedrals, the brilliant composition of Bach's fugues and the "horrifying magnitude" of Einstein's theories.<sup>3</sup>

### **Transitoriness**

Advanced building technologies that became available in the early 20th Century were embraced by the architects of the Modern Movement to achieve an abstract imagery producing one of the most consistent building "vocabularies" in architectural history. Much of its visual impact depended upon the impression of lightness, thinness, whiteness and geometric purity attainable in fresh concrete. The rejection of traditional embellishment in the drive for formal clarity tended to lead to the omission of conventional details such as copings, sills, drips and overhangs, weathering falls and surface relief generally.<sup>4</sup>

This built inheritance, which glorifies the dynamic spirit of the Machine Age, employed advanced technology which has not always endured long term stresses. Duiker's nor Rietveld's works do excel in properly detailed construction. To have considered plaster and mesh as suitable construction for external walls in the Dutch climate, as Duiker did at the sanatorium, may not simply be attributed to ignorance or to slender financial means. However, research on the building history of the period has proven that, in technological terms, architects like Duiker and Van der Vlugt were quite well aware of what they were doing. Exploring their motives to accept a limited technical lifespan for their buildings we may conclude that this has been their response to limited financial means as well as a careful understanding of the functional life expectancy the client set on the building. The acknowledgement of a link between the design, the technical lifespan of a building and user requirements over time, as made by the architectural avant-garde of the 1920s, ultimately leads either to a transitory architecture or an adaptable one. Duiker's sanatorium in Hilversum is a stunning example of such reasoning. In functional terms the

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<sup>2</sup> Duiker, J.: Dr. Berlage en de "Nieuwe Zakelijkheid", in "De 8 en Opbouw" 1932, pp. 43-51

<sup>3</sup> Ibidem, pp. 43-51

<sup>4</sup> John Allan, in one of the first comprehensive publications on the preservation of Modern Movement architecture: The Conservation of Modern Buildings, in "Building Maintenance & Preservation; a guide to design and management", Edward Mills (ed.), 2nd revised edition, Oxford 1994.

lifespan of the sanatorium buildings was limited, since tuberculosis was hoped to be exterminated within thirty to fifty years. The technical life expectancy was chosen accordingly, which allowed the buildings to be constructed for a very limited budget.<sup>5</sup> As a result, in the late 1990s, thirty years overdue, they were falling apart.

The changeability and manageability of the 1925-31 Van Nelle factories in Rotterdam, on the other hand, allows for a long functional lifespan, and the buildings have been constructed with a long technical life expectancy in mind. Adolf Behne's influential manuscript *Der Moderne Zweckbau* of 1923 gives us to understand the difference between both approaches.<sup>6</sup>

His book distinguishes a "functionalist" and a "rationalist" approach in architecture. Functional planning departed from the brief and involved the careful design of individual spaces for each particular function, with specific dimensions and performance characteristics, organically producing a "tailor-made" suit. This approach is ruled by a sense of short-term economy. As *form follows function* quite precisely, it is appropriate to structures that serve a relatively static use, such as single-family housing, but it applies as well to Duiker's original sanatorium due to its limited life expectancy.

Behne was well aware of the limits to this strategy: "Functionalist deliberations are correct so long as they concern a specific matter, and they go wrong as soon as things have to fit together."<sup>7</sup> The antithesis of the "functionalist" is the consistent "rationalist", in his search for objectivity. "Just as striving to dehumanise buildings, to eliminate the element of will, actually brings the functionalists to humanization, so the rationalists are led by a conscious emphasis of human will to objectivity and *Sachlichkeit*," concludes Behne.<sup>8</sup> Rational planning thus involved a neutral multifunctional layout which could be partitioned according to functional requirements even during construction. It allowed for future adaptation depending on the functional lifespan of the initial solution and was eminently suitable for buildings that are subject to frequent change such as schools and factories. Also at Van Nelle, and in contrast to "Zonnestraal", the architects' rational approach departs from flexible solutions to respond to general insights, so as to allow unforeseen functional change in the future. Dimensioned to resist occasional overloading, the structure was easily changeable and manageable.

In particular the example of "Zonnestraal" demonstrates that the issue of transitoriness of Modern Movement architecture must sometimes be understood as a part of a designer's approach. This must have a great impact on the design decisions made for the restoration of such buildings.

## Preservation

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<sup>5</sup> The sanatorium was built for the Amsterdam Diamond Workers Union, and funds were in extremely short supply. From the minutes of the January 26, 1924 meeting of the building committee of the "Zonnestraal" Association (Studiecommissie exploitatie landgoed "Zonnestraal"), it appears that the depreciation period was set at fifty years. The minutes were in the Zonnestraal historical archives (uncatalogued) which has since been donated to the International Institute for Social History (IISG) in Amsterdam, current file number unknown.

<sup>6</sup> Adolf Behne's *Der Moderne Zweckbau* (Munich 1926) had already been written in 1923 but could only be published three years later, when publications by Walter Gropius, Erich Mendelsohn and others had already sparked a wide debate. Translated as *The Modern Functional Building (1923)*, Getty Research Institute for the History of Art and the Humanities, Santa Monica, Cal. 1996.

<sup>7</sup> Ibidem, pp. 129.

<sup>8</sup> Ibidem, pp. 134 – 135.

The pioneers of the Modern Movement considered a building's right to exist not to be determined by its history, but by its usefulness. To them, the idea of preservation was totally irrelevant or even contrary to the conceptions of the Modern Movement. By deciding in favour of conservation of their buildings, we might therefore act against their principles at the same time.

On the other hand it makes not much sense to use the provocative points of view of an emerging group of dissidents as a starting point for our attitude with respect to the conservation of their built pamphlets today. Their dreams about a modern worlds turned out differently and the few brilliant experiments of the 20th Century are the only ones we've got. Their cultural impact for today and for the future must be our primary concern. In other words: the main purpose for "Zonnestraal" today, is its being an architectural landmark.

### **Authenticity**

Similarly to the way that the preservation of modern architecture presents particular problems in philosophical terms, so the technical background of these pioneering buildings now poses special challenges to the conservationist.

A practical problem of course is the poor material quality of many of such buildings. Modern buildings weather very inelegantly and, in contrast to most older structures, a "patina" on their concrete or steel envelope rarely suits them.

Allan rightly observed that, apart from a degree of professional naivety, it is the combination of minimalist aesthetic with young technologies that lies at the origin of many of early modern architecture's technical shortcomings. As compared to what we know today, the architects of the Modern Movement obviously lacked certain knowledge with respect to the materials and constructions that were appropriate to respond their ideas of "spiritual economy" and the industrial production of building parts.

But a more delicate problem for us is to find out what exactly was their knowledge and what was beyond that, before we will be able to decide whether replacement of certain components or systems is appropriate or not. In this respect studying the architectural magazines of the period, including advertisements of suppliers, can be very revealing. Also, we must be aware that the experiments of the modern engineers and architects represent a historic value of their own, even if they may have failed.

In the case of Duiker's works a problem is how to deal with buildings where the bare constructions themselves are vital to the original conceptions. How to restore them without the aspect of transitoriness being covered by advanced restoration technology for eternity, leaving an artificial memento behind?

On the other hand, one should avoid to overestimate the absolute value of authentic materials and constructions as applied in the inherited examples of modern architecture. In view of the temporariness of function, most building materials and constructions originally chosen for modern structures are short-lived, so that the authenticity of materials is difficult to maintain.

One could successfully argue that indeed the very materials are not the essence, when speaking about an architectural idea that pursued industrial building methods and the assembly of machine produced components. The authenticity of appearance, form, detail and space-in-time seems more important in this respect. Yet the quintessence of the Modern Movement remains the idea, the conceptual starting points of the original designer. In the case of Rietveld's pavilion in Venice, these proved to be quite different from Van der Vlugt and Duiker's points of view.

### **Restoration approach**

After an initial phase of two years the commission for the pavilion's restoration was given early in 1994. A main principle that was agreed beforehand was to aim at a complete

restoration back in time, which today is rarely accepted for older buildings. In contrast to other, mostly older monuments, which allow themselves to be read as constructed history books, the numerous interventions in this building did not reflect new architectural insights or cultural imperatives but rather concern technical measures to counter maintenance problems in the course of time.

Unlike the work by some of his contemporaries, Rietveld's work does not in the first place stand out as regards constructional ingenuity but rather because of its originality in aesthetical terms. The pavilion is a clear example of this. It is therefore understandable that when in the past the technically inadequate parts of the pavilion had to be replaced, usually an alternative solution was chosen that diverged from Rietveld's original.

At the restoration non-authentic parts and details have been redesigned on the basis of the original drawings. Details that led to early damage or disproportionate cost of maintenance have been improved technically, but only if that could be done without disturbing visual consequences. What is experienced as disturbing and what is not inevitably remains for the restoring architect to judge.

Original parts which were in good condition have been kept and used again, such as most of the stucco and the terrazzo tabletop in the office. As on balance only the walls, some parts of the roof, the concrete floor in the pavilion and a mezzanine floor in the adjacent office were still of the original composition, the question of material authenticity has hardly played a role in this case.

### **Three dimensions of modernity**

The question "if" material authenticity should be a key issue when restoring Rietveld's works remains an interesting one, even if we put the above observation aside.

The three dimensions of modernity, as formulated by DOCOMOMO<sup>9</sup> earlier on during our work for UNESCO's World Heritage List<sup>10</sup>, provide a starting point to see how innovative his works are in technological, social and aesthetical terms. They are also helpful to understand how his approach stood apart from the sometimes rigid rationality of most contemporary modern architects in Western Europe, as displayed for example in Gropius' Bauhaus and Van der Vlugt's Van Nelle factories, or even in a more functionalist' interpretation of these principles such as Duiker's sanatorium "Zonnestraal". Presumably the most successful *De Stijl*-member measured by actual architectural production, Rietveld was initially much more concerned with the artistic and aesthetic aspects of the profession, than with social impact and technological development.

Although his famous Schröder House is a fascinating test case as regards how people can live together in a continuous space, this social experiment was probably a result of an artistic effort rather than a design principle, in contrast to Van Nelle and "Zonnestraal".

### **Industry and crafts**

In comparison to Duiker and Van der Vlugt, Rietveld's approach was certainly directed less towards technological innovation. In the cases of "Zonnestraal" and Van Nelle, the industrial production of building components was a part of the architectural conception,

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<sup>9</sup> The "three dimensions of modernity" were introduced by Catherine Cooke and Ivor Richards in: Modern Movement documentation as a central resource for architectural education, in "Second DOCOMOMO Conference Proceedings. Bauhaus Dessau", Dessau 1992, pp. 68, 72.

<sup>10</sup> The International Council for Monuments and Sites (ICOMOS) is an NGO and the professional advisor to UNESCO's World Heritage Committee. On the basis of a long term project (in progress) for an international register of modern architecture, DOCOMOMO has been invited by ICOMOS to develop guidelines for the inclusion of modern architecture and urbanism in the World Heritage List, published in 1997.

since it allowed for easy replacement, change in time and low production costs. Therefore, it seems appropriate to question whether great value must be attached to the material authenticity of the industrially produced parts of their buildings.

Rietveld however, as a carpenter and cabinet-maker by training, was much more concerned with how things were actually crafted. Particularly his earlier works, before his move towards a more functionalist approach, show strong evidence of workmanship. For example the patina of some elements in the Schröder House is a valuable witness that cannot be transferred by any medium and that should be respected in its material authenticity.

The pavilion on the other hand was built by an Italian contractor, and proper supervision by the architect on actual construction and technical details could hardly be expected. In contrast with the house in Utrecht, the material authenticity of the pavilion in Venice has therefore not been regarded as very significant, with the exception of some specific elements such as the terrazzo flooring. Here, the issue was rather to again establish the spatial qualities and Rietveld's volumetric composition as well as the splendid image of early postwar Holland, as was originally reflected by this little building.

### **Rietveld's Pavilion**

Rietveld's design was developed on a grid derived from an existing foundation with the intention of re-using it. The module of 4 m taken from this was not only applied on the flat surface but was also chosen as a guideline for the entire spatial construction. It turned out as a daylight pavilion providing an undivided space that measures 16 x 16 m and is 6 m high, on the inside.

Three short cross walls somehow divide the space available into three compartments. A square stuccoed ceiling of 8 m has been kept detached from the walls on all sides. This seemingly floating surface in the middle subtly emphasizes, as it were, the space in its entirety. The interior is thus alternatively experienced both as a whole and in its parts, with both asymmetrical space accentuation and a perceptible centre.

Around the ceiling in the middle, the volume has been raised and vertical roof lights applied through which natural light falls on the walls of the pavilion. Horizontal Venetian blinds consisting of plywood slats, usually referred to by Rietveld as "shutters", were to keep out the sun and focus the light on the walls at eye-level.

From the outside one gets the impression of a number of volumes grouped at some distance away from each other. The windows which are kept 2 m lower, are in between. The independence of the cubical masses had to be further emphasized by the contrast between the black rear block and the lightly coloured volumes in the foreground.

Eventually this contrastive effect has been slightly toned down by finishing the rear part in smooth natural stucco, whereas the other blocks have been stuccoed with a rough surface ("intonaco strollato" in Italian, something Rietveld would probably never have applied to any of his buildings in Holland), right of the entrance in pale grey, and to the left in mellow yellow. The black plinth, so characteristic of Rietveld's work of this period, makes the masses float in the air.

At the restoration much effort was put into finding again the original colour scheme. Eventually the original shades could be determined by laboratory tests and on site research so that the authentic textures and colours could be fully respected at the restoration. A remarkable discussion came up when the colour samples of the new paints were judged "too cool" on the Italian part. Indeed the colours of most of the Biennale pavilions today are attuned to the Italian context. For example the apricot shade of the German pavilion, that has been introduced around 1995, produces a curious and quite anachronistic reinterpretation of its rigid 1930s architecture. When the Netherlands' Secretary of State inaugurated Rietveld's pavilion June 1995, it distinguished itself clearly from its neighbours by the brilliant and unmistakably Dutch colouring.

## **Entrance**

Through the large glass fronts natural light falls into the hall, which can be agreeable for the exhibition of some pieces such as sculptures. At the same time some views of the park are offered. A remarkable aspect of the big fronts is the use of the colours white for the transoms and black for the mullions. The result of also choosing white for the beads in the end was a strong pattern which again emphasizes the consistently adhered to grid. The lower half of the entrance front was moved back. Above the entrance section an ingenious coffered ceiling of diagonal lattice work of wooden boards was devised, in between which glass was fitted. The contrasting colour scheme between the black transoms and the white beads produced here a fascinating graphic effect. On the steps in front of the entrance the play with the diagonal patterns was continued. Together with the base of the flagpole, on which a mosaic of the Netherland's Lion designed by Luigi de Lerma was originally fitted, the entrance forms the playful element in the somewhat austere design of the pavilion.

## **The principle of the flat roof**

The most fundamental problem of the restoration, in terms of conflicting technical and aesthetical aspects, was what to do with the lower part of the roof and its relation to the large glass fronts. The roof kerbs were designed very slight, so as to allow the roof boards – as the termination of the facades – to remain very slim. In the three-dimensional graduation of Rietveld's overall composition, moreover, the roof was completely horizontal and so without any slope. In Venice, where it can often pour with rain, there were already serious leakages in the first season after the inauguration in 1954. As the roof construction had been economized on, the roof also sagged strongly so that often water was left on it. In the early 1970s it was rightly argued that the problem could only be solved by introducing an adequate slope and a therefore necessary lowering of the roof's perimeter. Disturbance of the geometry of the windows, that followed the three dimensional grid of Rietveld's design, would be the inevitable result. After much consideration it was decided to do this still, in order to regain control over the problematic maintenance of the pavilion. Unfortunately, the roof perimeter had to be lowered twice as much as initially planned. Also the dimensions of the roof boards themselves had to double as a result of unforeseen problems with the realization and became over pronounced. In this way, the composition of the building as a whole was seriously compromised.

Another result was that in the interior the independence of the central ceiling had been encroached on because those parts of the ceiling that sloped up to the glass fronts had had to be pulled flush with the central part in order to meet to lowered top of the fronts, with the resulting loss of definition of the square.

At the restoration the low roof was again replaced, this time by light corrugated steel panels with thermal insulation. The construction of a slope towards the centre of the roof allowed for the roof's perimeter to be raised to the original height and, consequently, for the windows as well as the interior ceiling to be restored again in accordance with Rietveld's idea.

A special Swiss drainage system guarantees a speedy removal of the rainwater, which of course is essential to such a delicate technical solution. The former rain pipes along the glass fronts now serve as overflow and detector in case the drainage clogs.

Thanks to the contribution of many people, the 1995 Netherlands contribution to the Biennale could be presented in a pavilion that once again exuded the atmosphere that Rietveld realised in 1954. Proper stewardship and systematic maintenance planning have to ensure that this representative little building will not again arrive in a downward spiral of decay and undervaluation.



Since then, also Van der Vlugt's factory complex has successfully been adapted for a new use as the Van Nelle Design Factory, accommodating a range of offices and workshops for architects, designers and creative businesses that are engaged in new media, software design and so on. The main building of "Zonnestraal" has been restored and reopened as a health care centre in November 2003, while the former sanatorium's two pavilions quietly wait their turn ...

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