

Innovation in restoration

From New Building to Sustainable Building

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What innovative ideas have been developed in the past few years by Dutch architectural offices? What bright ideas are hidden in buildings or on drawing boards waiting for a broader application? What studies, if any, are being conducted by the offices? What limits of architecture are being tested? Is there (still) a role for an architectural office in the development of new typologies or products, in the finding of answers to new legislation, in the proposal of alternative forms of process control? In the eleventh contribution in this series, Wessel de Jonge reveals the lessons for the future that can be learned from the restoration of two monuments from the Dutch Modern Movement.

by Wessel de Jonge

From the perspective of sustainable developments in the construction industry, the renovation and adaptive re-use of buildings are still considered in a harsh light. How unjustified such an attitude is can be seen in the growing interest in the redevelopment of existing urban and industrial areas and buildings. The Vinex urban expansion sites are slowly being filled up, and there doesn't seem to be much space left in our country for new building sites. Therefore, not only the planners, town planners and architects are turning towards redevelopment, but also administrators, developers, housing corporations and investors.

The prediction that the task of building in the coming decades would involve far more old buildings than new ones has been resonating for years but still meets with surprisingly little response in the Dutch construction industry. In other countries, like Italy, working on existing buildings is common practice, but even we shall shortly be overtaken by reality. With a supply of buildings, the large majority of which were built in the past 75 years, we can't really do anything else. Which society can afford to discard and replace such a building volume? Which society can justify in addition taxing the environment with such a quantity of demolition waste and drawing on new raw materials and sources of energy?

This means that investing in renovation and adaptive re-use in the near future in terms of sustainable developments could perhaps produce much more – and in a shorter timeframe – than comparable efforts in new building. It also means that the construction industry will have to learn to recognise its task within the limits of adaptive re-use. Like Hubert-Jan Henket recently repeated in *De Architect*, this change should be initiated in education.¹ Finally, it means that we shall be primarily involved with buildings from the era of the Dutch Modern Movement and post-war Modernism, because they make up the lion's share of the existing stock. The Van Nelle factories designed by Brinkman and Van der Vlugt for Rotterdam and Duiker's former sanatorium 'Zonnestraal' in Hilversum are both prototypes of the Dutch

Modern Movement which have been recently restored and re-used. The experience gained there deserves closer analysis.

Inspiring limitations

The pioneers of the Dutch Modern Movement found themselves in a certain sense in a comparable position to today's designers. They were confronted with the great social issues of a rapidly developing industrial society, and very limited means with which to respond. The social responsibility they felt placed severe restrictions on them. And it was these limitations that inspired them to a renewed vision of architecture and town planning, and a method of working that was targetted at efficiency.

An essential step that they took involved the introduction of the factor time in the creation of buildings. They accomplished this by accepting that buildings no longer have to be intended to last forever, but could be adjusted to the short-term functional needs of the industrial society and the associated restricted budgets. Thereby, changeability and transitoriness became implicit terms in their minds.

Duiker's ideas about a 'spiritual economy', stressing extreme efficiency in the use of materials and optimalisation of constructions, led to wafer-thin concrete skeletons and gossamer-fine steel glass façades.² He was aware of the associated limited lifespan and incorporated that aspect in the introduction of prefabrication for e.g. façade constructions, which allowed aged parts to be replaced or modified. His built legacy is indeed characterised by a very vulnerable beauty.

While previously the focus was on limited finances, today we are more concerned with reducing the squandering of raw materials and sources of energy, which should serve us more as sources of inspiration. There are a number of parallels here between the innovators of the Dutch Modern Movement and those currently busy with innovation in sustainable construction. Some of these ideas from the 1920s still find a modern interpretation in the principles of IFD-building (Industrial, Flexible and can be Disassembled), as well as in buildings characterised by 'Sustainable Functionality' and 'Long Life, Loose Fit, Low Energy and Less Waste'. Both then and now transitoriness and changeability are key terms in these innovative developments or, more conceptually phrased, the relationship between continuity and change.

What can we learn from the pioneers of the Dutch Modern Movement? What does the adaptive re-use of their buildings tell us about the options that will be available for our designs in a few decades – if they haven't been dismantled and processed into newer buildings, or destroyed, 'without producing dangerous waste'.

When considering redesigning, it is important to understand the logic of a building first before starting to change it.³ It is essential to involve the views of the original designer as this exercise sometimes produces a completely different appreciation of the building or of parts of it.⁴ Although for example Duiker's Zonnestraal and Brinkman and Van der Vlugt's Van Nelle factories were built at roughly the same time and both are examples of the Dutch Modern Movement, the ideas on which they are based clearly differ in several points.⁵ Both Van der Vlugt and Duiker showed a strong interest in social modernisation in their buildings, as is evident particularly in the careful attention paid to organising the architectural brief and to the working conditions of the building's occupants. Compared with Zonnestraal, the Van Nelle factory is much more rational in design, certainly when you consider that the

playfulness of certain details, like the diagonal overhead walkways and the round tearoom on the roof, was not part of the original architectural concept. It is understandable that despite the external similarities between the two buildings there are great differences due to the distinction between 'functionalism' and 'rationalism', as defined by Adolf Behne.⁶

Functionalism and rationalism

According to Behne, in functionalism the architectural brief is taken as the basis for the careful design of very specific spaces for every function, with certain specifications and characteristics. Behne had in mind the organic architecture of Hugo Häring, which is modelled around the architectural brief. If you examine the floor plan of the main building of Zonnestraal carefully, you will see how every function is granted a specifically designed space with matching parapet heights in the façade, and you can understand that Duiker's approach was not so different. By also strictly separating the different groups of functions (boiler house/baths, kitchens, administration/medical) in the floor plan with passageways, the floor plan becomes completely specific. This ultimately creates an architectural tailoring which no longer fits once the function has changed. This means that the building is not flexible in use and thus has a short life expectancy.

It is fascinating that this was apparently smoothly linked to the functional life expectancy of the sanatorium function. The client had estimated the latter as 30 to 50 years, anticipating that tuberculosis would have disappeared in that time. Duiker, with his strong faith in science and progress, carefully adjusted the structural life expectancy accordingly. That the building with its non-galvanised steel windowframes and fragile plastering details began to fall apart after 50 years is proof that he understood better than anyone how the brief, budget and time were linked.

The clients also proved to be right in the end. In the early 1950s an effective antibiotic treatment for TBC was developed, and Zonnestraal was transformed into a general hospital in 1957, almost 30 years after completion. The intended relationship between specificity and short life expectancy worked in this instance. Therefore, Zonnestraal may be considered the first IFD-building in the Netherlands, with the commentary that the 'F' primarily referred to flexibility in the design phase and not as much to later possibilities for re-use, and the 'D' was given a very specific, 'spontaneous' interpretation.

In contrast, rationalism is defined by Behne as a method of working based on a spatial layout that is as neutral as possible, aspecific and thus changeable, which can be used for different functions. This approach was therefore suitable for buildings expected to adjust their internal arrangement frequently, like schools and factories. The Van Nelle factories have been given a materialisation which will ensure a considerable technical lifespan.

In that sense, Van Nelle can be considered another example of an IFD-building, where the 'F' is found mainly in the possibilities for use and not as much in the physical modifications of the building, although they would have been relatively easy to make. Even more important is that the factory buildings were not so much 'D' (Disassemble) but had been given a 'Long Life, Loose Fit'. This refers to 'Sustainable Functionality' – as the neutrally designed spaces could be constantly used differently. In addition, it is interesting to ascertain that the development of an adaptive re-use concept for Van Nelle was made considerably less complicated for this reason than it

was for Zonnestraal. That is very relevant for the future value of our own designs and buildings.

Restoration

Although both buildings appear to fit the generally accepted features of the Dutch Modern Movement, they required completely different approaches for restoration due to the different design concepts. Because of the rationalist design concept of the Van Nelle complex, the main emphasis lay on the 'design authenticity' of the complex, and a choice was made for a 'conceptual' restoration. The re-design was therefore less focussed on the precise spatial subdivision of the floors. Any reconstruction of such spaces where they had disappeared would have been practically meaningless. The neutral spatial design and façade lay-out easily allowed new arrangements for new uses.⁷

In contrast, in the functionalist Zonnestraal this approach would have definitely missed the mark, because for example the precise arrangement of space and façades was correlated with each other. The re-use of Zonnestraal was primarily based on the possibilities presented by Duiker's building, and a function was sought to suit them. As in that case the comfort was minimal, that aspect would have to be taken into account when selecting a new function. This matching of function and form resembles the process Duiker went through, when he designed the building 75 years ago. But then it was: 'form follows function', and now it is more 'function follows form'.⁸

Duiker's search for new, specific, technical solutions and applications of materials for Zonnestraal, like the prototype industrially produced curtain walls, led to a high value being placed on the few remains. Some lost parts have been carefully reconstructed at great expense, while this was much less the case at Van Nelle.

The rediscovery of industrial products from bygone eras was the result of an expensive search. For example, there were the steel window walls with old-fashioned 'rolled' and completely colourless sheet glass panes, imported from Lithuania, to resemble the fragile reflections of the original glass and thus retain the vulnerable beauty of Zonnestraal. To insulate the windows in the doctors' offices without them standing out among all the single-paned glass elsewhere in the façade, an even more colourless float glass inside pane was needed that was imported from America. Even more paradoxical was the situation involving the cement plinths Duiker used to save money along the edges of the expensive sound-proofing linoleum floors. During the restoration they had to be manually affixed by a specialist plasterer, which took almost four months to finish. Given the reversed relationship between labour and material costs from before the war, the restoration of a 'cheap building' unintentionally led to one of the most expensive restorations ever.

While the restoration of the Van Nelle factories was primarily concerned with 'design authenticity', you could say that at Zonnestraal – because of its functionalist design concept – relatively more attention was paid to the 'material authenticity'. The restoration was therefore also more artisanal in nature.

Lessons from the past

A good understanding of the original design concepts of a building can provide a strong guideline for a redesign concept, which would go much further than external

features and stylistic traits. If you are successful in collecting enough information, the same applies equally to buildings that are less famous than Zonnestraal or Van Nelle.

The restoration and adaptive re-use of this type of building can produce much more than a renovated building which can be used again under certain conditions. It also provides us with knowledge and insight into the relationship between concept, form, materialisation, technique, investment and sustainability over time. The considerations involved which led to the buildings we admire can still inspire us with ideas for new buildings.

An important conclusion drawn from the renovation of both buildings is that the original design concepts seem to have extensively determined what we can do later with a building in terms of renovation or adaptive re-use. The fact that the development of an adaptive re-use concept for Van Nelle was apparently so much simpler than for Zonnestraal must cause us to think about the future value of our own buildings. Do we choose for specific and short-term, or for neutral, 'loose' and changeable, and how does this choice relate to the client's intentions? The Van Nelle Design Factory and Zonnestraal health care centre serve as prototypes of two different interpretations of sustainable building *avant la lettre* and offer an unique opportunity to evaluate the results of such choices in the long term. Thus, the past teaches us about the future.

* This article is based on a lecture given on the occasion of the awarding of the IFD-prize 2004 on 22 June 2004 at Zonnestraal, Hilversum, organised by the SEV – Experimenting in Living, Building and Living Environment.

1. Harm Tilman, 'Je bewaart iets omdat het leuk is. Interview met Hubert-Jan Henket', *De Architect* no. 6, 2004, pp. 46, 49.
2. Hubert-Jan Henket, Wessel de Jonge, *Het Nieuwe Bouwen en Restaureren* (Restauratie Vademecum 10), Zeist/Den Haag (RDMZ/SDU) 1990.
3. This method of working originated in the educational and research methodology 'Analyse van Gebouwen' (analysis of buildings) which Jan Molema has been developing since 1973 at the Faculty of Building Engineering, Delft University of Technology, which has led to exhibitions and publications on e.g. Gaudí, Duiker, Wiebenga, Van Loghem, the Dutch New Movement, Berlage, Goff and Melnikov.
4. *Het Nieuwe Bouwen en Restaureren* (see note 2).
5. Zonnestraal: start of design 1926, completion 1928, Dresselhuys pavilion 1931; Van Nelle factories: start of design 1925, phased completion between 1928 and 1931.
6. Adolf Behne, *Der Moderne Zweckbau*, München 1926. [The Modern Functional Building (1923), the Getty Research Institute for the History of Art and the Humanities, Santa Monica, CA 1996] See also Wessel de Jonge, 'The Technology of Change. The Van Nelle Factories in Transition', in: Hubert-Jan Henket, Hilde Heynen, *Back from Utopia. The Challenge of the Modern Movement*, Rotterdam (Uitgeverij 010) 2002. The meaning of the terms functionalism and rationalism has gradually changed over time in later architectural theory from the meaning introduced by Behne in his book.
7. The re-use of the factory complex as 'design factory' is an initiative of the Maatschap Van Nelle Ontwerpfabriek. By late 1998, their proposal for the Van Nelle Design Factory was selected out of three nominations for alternative use. Since then, various consultancy teams have been working under the supervision of Wessel de

Jonge architects. The infill for the three factory buildings was conceived by Claessens Erdmann Architects & Designers from Amsterdam; the redevelopment of the storage halls and dispatch building was designed by Wessel de Jonge architects; the landscaping was done by DS Landscape Architects from Amsterdam; Molenaar & Van Winden architects were asked to do the future project for the office building.

8. The new purpose as health care centre was translated into a masterplan for restoration, extension and re-use between 1993 and 1995 by the collaborating architects Henket and De Jonge together with landscape architect Alle Hosper. The restoration of the main building and the workshops was the first part of the project completed.

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