

RIETVELD ORIGINALS - HANDLE WITH CARE!

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Abstract

The work of architect Gerrit Th. Rietveld (1888 – 1964) is appreciated throughout the world. Many of the well-known buildings he designed have survived to the present. Some have been restored or refurbished, depending on the condition of the building, current needs of the building users, etc. Rietveld himself had a very clear vision about lifestyle, simplicity, restraint and use of space and building materials. His architecture reflects his vision beautifully. Some of Rietveld's buildings are likely to be affected by developments in the near future. Here, I will discuss his Amsterdam College of Art, which has been restored, and his Arnhem College of Art, which has been refurbished. The restoration and refurbishment approaches with Rietveld's philosophy of a sustainable way of life, sustainability considerations at the time of the restoration or refurbishment, and the current view will be compared in this paper. The approaches used to deal with these two colleges were quite different and illustrate changing attitudes and may act as a pointer for future projects. These aspects fit in the conference theme's of Building for Transformation. The De Ploeg factory in Bergeijk will be transformed in the near future and presents us with an opportunity to consider what options there are, bearing in mind Rietveld's philosophy. To what extent can we change a building like this and still consider it as a Rietveld design?

1. Rietveld and sustainability

The work of architect Gerrit Thomas Rietveld (1888-1964) is known throughout the world. The Schröderhuis in Utrecht is even included on the Unesco World Heritage list. The house was built in 1924 and has since been an icon of De Stijl architecture and is widely used as a key example of this movement. This project started Rietveld's career as an architect. Before that, he had only made furniture and done some small-scale property refurbishments.

The Schröderhuis showed Rietveld's architectural concepts to the world in three dimensions. These architectural concepts always concerned space, enveloping space and preserving the expression of space. The envelope consists of material, and the use of material always aims to support the space. Rietveld (1927) wrote: *"A work of art is a free, creative act: thus architecture makes it possible to delineate space and nothing more; (even the materials needed for this make their presence felt more by their position in space than by their individual shapes)."*

Thus, although Rietveld originally designed the Schröderhuis with concrete walls, he was quite happy for them to be built in brick or lath finished with plaster. The smooth wall was the spatial element and the material was essentially irrelevant. Similarly, Rietveld made furniture which was, at least in principle, intended to be made with materials which anyone had available, easily and cheaply. Rietveld's commitment to the restrained use of materials did occasionally lead to misunderstandings. When someone criticised the use of "worthless" material for his crate chair, Rietveld (1935) responded with a spirited defence of the material: *"When I proposed introducing this fir furniture to the trade, Mr De Leeuw (whom you have referred to appreciatively) wrote: We can't sell splinters; but, what's wrong with splinters? Don't you like fir? It's lighter than silk. Don't you think the grain shows up well in machine-planed wood? (I mean the wood as it arrives from Sweden). The sawn off ends have a rustic look. A lot of wood of the same width together is restful, if the joints are clearly visible and the tendency to warping is not suppressed by desperate attempts to glue it. And another thing: high class hand-made furniture of fine wood is shipped in just such crates to protect it against damage and breaking. Anyone receiving such a crate will, at most, say: well-packed; but it has never been claimed that such a crate represents a free approach to wood working, which aims straight at the target. With the limited resources it has been built with, it is actually stronger than its fine contents. It is also light, has a joyful colour and does not cause our craftspeople to get wrinkled from worrying. That is why eventually there had to be someone who preferred the crate over the "furniture". The furniture is intended to be screwed, with open joints and preferably unpainted, but if one does want to protect it with paint, then each*

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plank should be painted separately, without filler and then be screwed back together; that is, the joints or screws should not be hidden. However, I can understand your indignation, especially as there are so few craft skills as it is. Hence, I respectfully propose to you that should you have a fine piece of work to be done, for which you cannot find anyone who can make it well, and beautifully enough, without warping, that come and visit me, and you will see why I can take the liberty to find a crate beautiful"



Figure 1 Rietveld's 1934 crate chair

This proves that Rietveld understood the craft which he practised as a woodworker and a conscious human being. He was able to see wealth in simple things. He was a man of straightforward concepts and did not want to make compromises. In addition to his ideas about space, enveloping space and a simplicity in the use of material, he was convinced of a philosophy based on restraint and modesty. This philosophy provided the basis for the designs he realised and provided the basis for the way he lived his life, based on simplicity and wasting a minimum of matter for living a fulfilled life. In the current situation this philosophy could provide the basis for a sustainable society. Rietveld appears to have been ahead of his time, both in terms of his spatial thinking and in terms of the way of life he advocated and practised. Hence three quotations are presented, in chronological order, to illustrate Rietveld's philosophy and underline how relevant his statements are today:

Rietveld (1937): *"With the industry of our time used for the common good, we should be able to manage with an obligation to work only a few hours a day if we consider that at the present we can still exist with an industry focussed only on destruction, hence we should be able to enjoy great prosperity if the economy was managed"*

Rietveld (1958): *"In the near future technological developments will be far greater than those made possible by steam and electricity, and many new materials will become available. Further to this, I have one most personal wish. Do not overload society, that does not benefit anyone and remember that all the earth's abundance was not created by nature purely for us and solely dedicated to our existence; thus we will never be able to increase our prosperity without numerous adverse consequences, which might well turn out to be greater than the benefits. Learn to enjoy the wealth of restraint! Does not the appreciation of the very smallest (the atomic nucleus) also harbour the power of restraint? Similarly, restraint also contains the key to all creative work."*

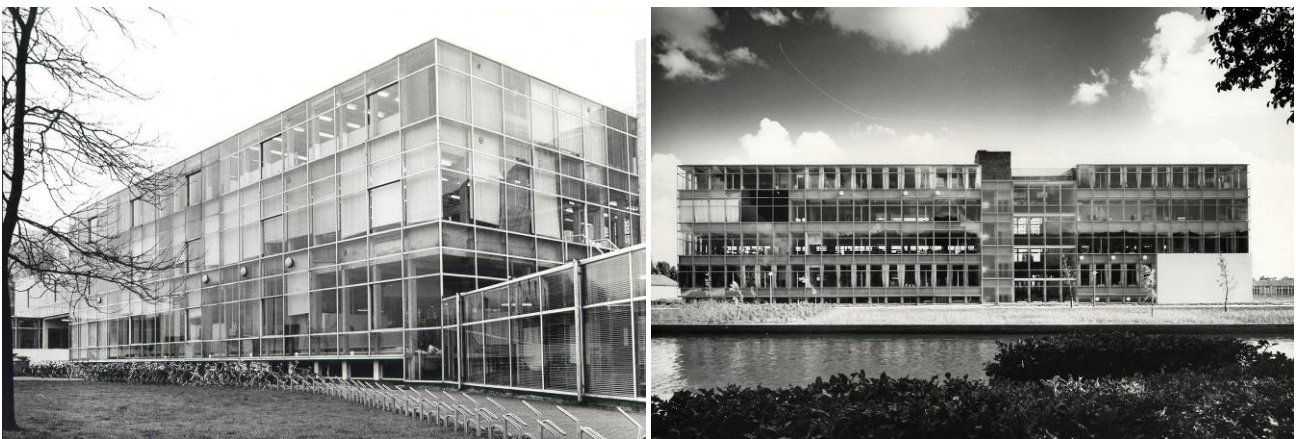
Rietveld in 1964, reported by Van Rens (1979): *"The social system will have to be based on self-preservation and the prosperity of the species and the individual, and the more we can include our surroundings in this, the safer the equilibrium of our existence will be. For centuries, self-sacrifice and compassion have been promoted as the greatest virtues, while selfishness was denounced as the root of all evil. However, in the background self-preservation was necessarily the strongest driver of human survival and compassion may have provided peace of mind but was only a poor fix to cover shortcomings. Why not openly recognise that: we do not have the power of a tree which only borrows some water and air, stands unprotected in harmony with its environs and yet provides shade and fruit. An architect cannot reform the world and is unqualified to draft rules for a better society, but from his profession he can have a share in this, which might even serve as an example. All of architectural history shows us the beautiful forms of the masses of buildings. Let us rather emphasise space, and be as restrained as possible when constructing its delineation. The empty space and light determine the value of architecture in, around and between the confines, which are only there to determine the space. Let our happiness and prosperity not be dependent on the completeness of the installations, but of the appreciation of the economic way in which the quality of space relates to our essential needs. Can reducing our needs to a minimum set our habitation free? Technological developments mean that we are now able to replace superfluous multitude by a beneficial simplicity. In my view it is a challenge of our time to use technical invention to make our existence more restrained, which thereby becomes less dependent on the abuse of what surrounds us, whose wellbeing is directly connected to ours. Art can also make us less dependent on the resources employed; the value of a work of art is not determined by the amount of paint, although some expressions currently appear to prove the opposite. Restraint is no impoverishment, on the contrary, it is the only and most human way to experience reality. This is proven by our senses which divide our attention into seeing, hearing, tasting, and which subdivide seeing into seeing shapes, seeing colours and seeing spaces, while seeing colours is*

subdivided into seeing red, yellow and blue; three forms of sensitivity of our retina. Thus, the nature of our senses points us towards the means to jointly share the wealth of restraint. The old philosophy was hierarchical and elevated man, although himself subject to higher powers, above other creatures; he was a higher being, yet he considered it ugly and materialistic and egotistical to claim so much of his environment; thus he had to become more spiritual to maintain respect. A forced approach, which can never lead to a healthy society. On the whole, people are so intelligent that I do not doubt that the right social system will be found, but they only reach the simple truth through many mistakes; quite apart from the centuries will pass."

2. Rietveld's major projects

Rietveld lived modestly and promoted this philosophy and he made no compromises in his architecture. He designed something and then it had to be built to look exactly the way he wanted. His experience as a furniture maker meant that he was fully aware how objects should be made in this area. In principle, he always started with simplicity. As an object had been conceived with the utmost simplicity, the complexity was created through the realisation. This paradox became increasingly apparent in his architectural projects. This not only concerned the visual appearance, but also the feasibility and technical aspects such as impermeability to water, strength, etc. In the smaller building projects, Rietveld managed to implement simplicity. In the larger projects it became ever more difficult to build the work in accordance with his philosophy. He was most successful with his single-family dwellings, if the client gave him *carte blanche*. This simplicity did not always lead to the most sustainable solution in terms of energy consumption, but it did lead to architectural durability, in terms of a long life of the building and its cultural historical value.

In the 1950s, after the Second World War, Rietveld asked to design larger projects. By that time his architectural practice included a number of staff and the technical aspects of the projects were detailed by his assistants, following his philosophy. The projects that will be discussed now are the Amsterdam Art College, Arnhem Art College and De Ploeg factory in Bergeijk. All three commissions were based on a combination of idealism, spatial design and feasibility. These factors often conflicted with each other. Two of these projects have been restored (Amsterdam), refurbished (Arnhem) and the third one (Bergeijk) needs to be repurposed whereby the question arises if the building needs refurbishment or restoration. "Restoration" means trying to reproduce the original to the greatest possible extent, and "refurbishment" means that the aim is to improve the situation. In terms of transformation + sustainability, the second option would appear the better choice if priority is given to reducing energy consumption. However, architecturally speaking, the first option would be preferable. In some cases, it may be possible to combine the two options.



Figures 2, 3 Arnhem Art College (left) and Amsterdam Art College (right), shortly after completion

3. The art colleges in Amsterdam and Arnhem

In 1951 Rietveld was commissioned to design the Amsterdam Art College. Due to a change in location and administrative issues the final plan was only completed in 1957. In the same year, the Arnhem Art College also commissioned Rietveld to design their new building. In essence, Rietveld made two related designs, as the specifications were almost identical. The differences in layout were determined by the sites. Both designs are based on a consistent module of 2.10 m, which was also applied along the vertical axis. The overall form of the Arnhem College is freer than that of the Amsterdam College. The technical detailing of the buildings is also similar. Bertus Mulder reported (1994) that Rietveld told him that for the art colleges in Arnhem and Amsterdam he could do nothing but provide a neutral background for education, as art cannot be taught and the artists to be should not be influenced or distracted by their surroundings. Further to that, he designed a concrete frame with a glass envelope. The concrete frame was precast off site. Working with

the structural engineer he developed a system which could be used for both colleges and where the largest possible number of components was made in a factory. The envelope was one of the first applications of a curtain wall in the Netherlands: the glass sheets were suspended from the frame like curtains it hangs independently in front of the structure and there are no closed upstands.

The building in Arnhem was handed over in 1963. The facade was essentially an experiment. After the handover there were problems with water penetration through the slender structure of steel profiles, aluminium cap section and single glazing. After considerable effort, the detailing of the facade in Amsterdam was improved by the Wiener company. There were also problems related to the ventilation. Apparently, the building got unbearably hot in summer. According to Slothouber (1997), Rietveld proposed on 24 March 1964 that the single glazing be replaced by double glazing with integrated blinds. Rietveld died in 1964. His colleagues Johan Van Dillen and Johan van Tricht took charge of the projects. Further to their suggestion, the heating system of the Arnhem College was split into south and north sections. A proposal (1967) to install air conditioning was rejected on cost grounds. A limited cooling plant was eventually installed in Arnhem in 1969. The building work of the original facade in Arnhem had been substandard. Once the facade had been fully repaired the problems with water penetration were solved.

The building work in Amsterdam only started in 1964. The construction of the facade was discussed extensively. In 1963, Rietveld threatened to resign from the commission if another facade system was proposed. Rietveld entrusted the detailed design of the facade to the Braat company which used the "chair system" which was popular at the time. (See figure 15 with the "Chair profiles" in red.) He had to make few concessions to the visual design. The Deerns company also designed an air handling plant for the Amsterdam project. The building was officially opened in 1967.

Rietveld had designed a straightforward system of steel profile frames, which could be fitted with walls, doors, display cabinets and storage units which ensured that the layout of the buildings was flexible. Despite some modifications to the buildings over time, Rietveld's main concept was maintained: providing a neutral background for education. This provided flexibility and therefore ensured that the buildings remained functional over time (durability).

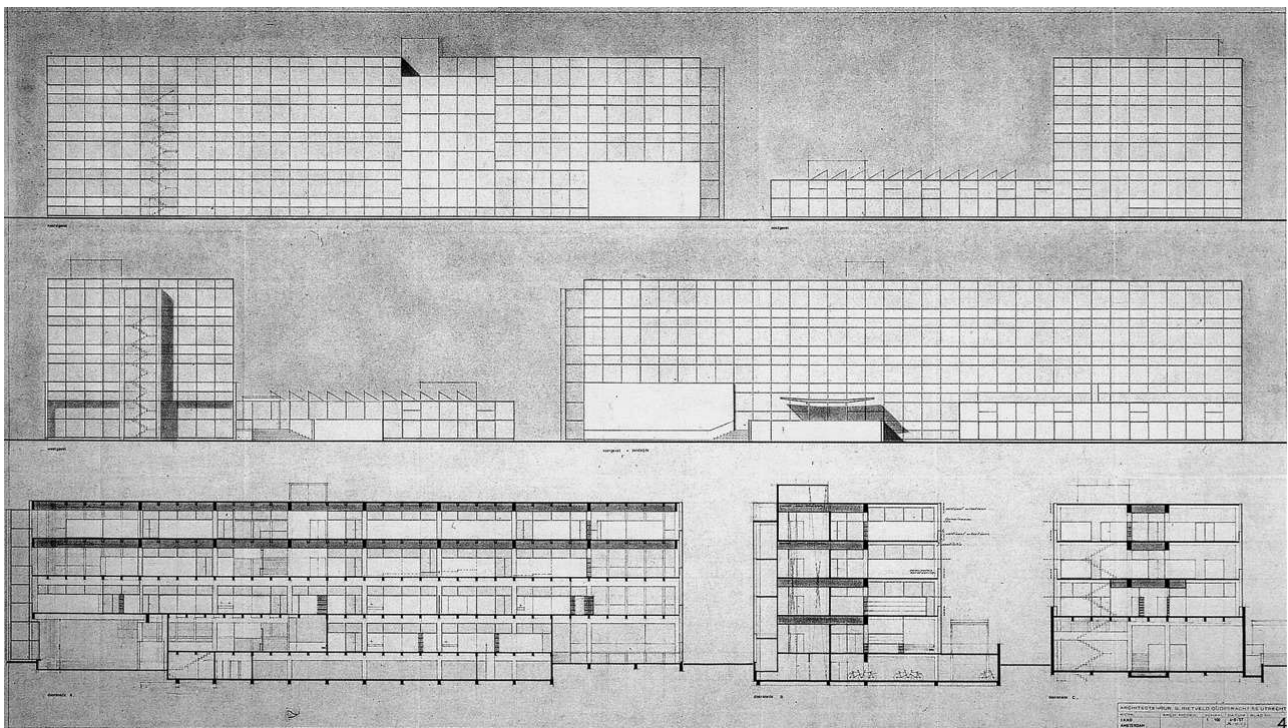


Figure 4 Facade of the Amsterdam Art College

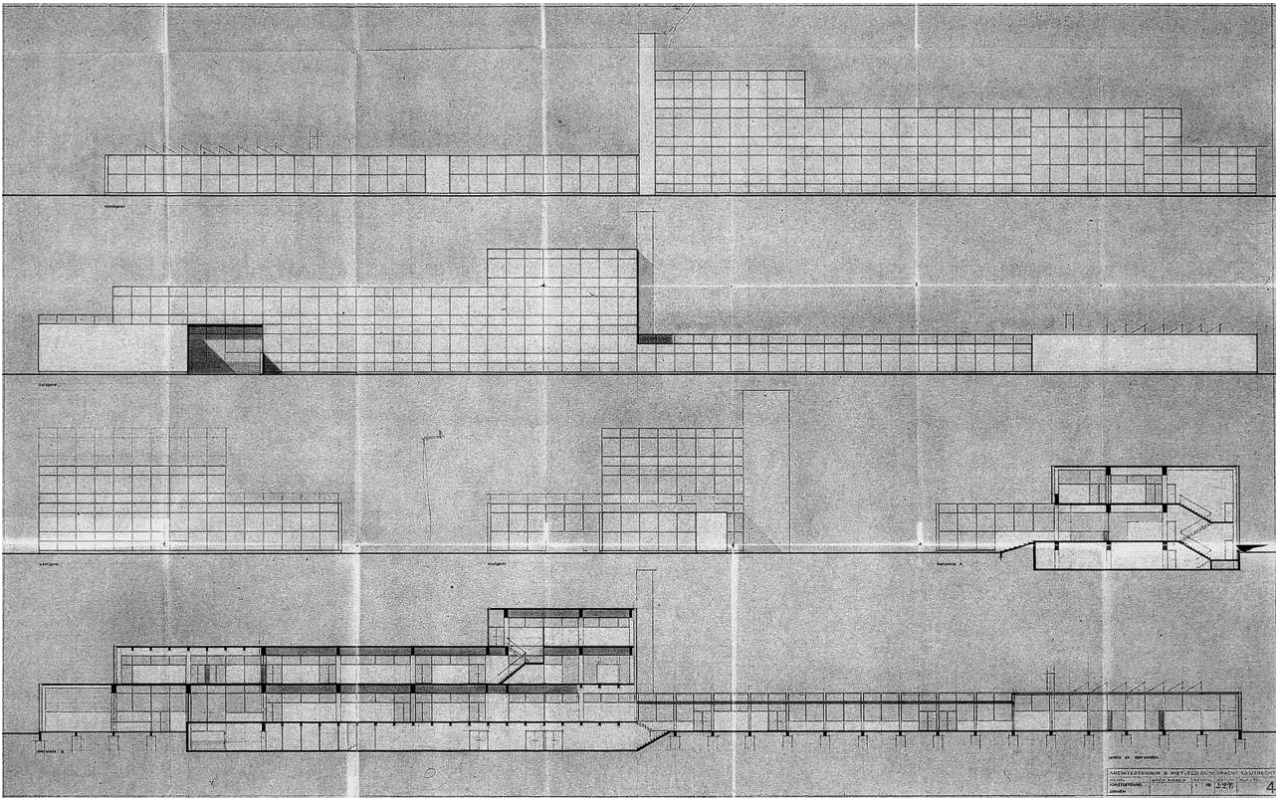


Figure 5 Facade of the Arnhem Art College

4. Refurbishment of the Arnhem Art College

In 1995, Hubert-Jan Henket was commissioned to lead the refurbishment of the Arnhem Art College. He (1997) commented: *"The high emotional and architectural quality also provided the basis for the practical problems which affected the building from the beginning: the single-glazed facades with the highest possible transparency, the lack of thermal insulation and the limited building services plant meant the building felt either like a greenhouse or like a fridge."* The curtain walling featured transparent corner details, with flush details and glazing beads which had an external protrusion of only 5 mm. The facade formed a thin envelope around the building. The detailing was restrained, nothing was superfluous. The vigour of the space was universally appreciated. However, the problems were related to the interior comfort, the energy management. The following three interrelated issues had to be considered: the poor current condition of the building components, new measures, and the principles related to maintaining Rietveld's original architectural and materialised concepts.

The primary principle behind the refurbishment was: maintaining the original visual quality to the greatest possible extent. In Rietveld's days, energy was cheap and so was single-glazed curtain walling. The building users were used to taking layers of clothes off or putting them on to control the temperature, rather than relying on the building services plant. Henket (1997) described this dilemma as follows: *"Satisfied building users are the key to economic preservation (and also historical conservation), hence you have to look for technical solutions. There is a conflict between comfort and appearance. In this case we can solve problems by installing building services plant. However, inside the building, the way the spaces are experienced might be affected and the window profiles had to be replaced as they were in a poor condition. The original items were a nonstandard design and reproducing them would have been extremely costly. Hence, we had to choose between providing authentic replacements at a high costs, or using more readily available products."*

Other options included combining structural and building services features such as a climate control facade. In this case, the outer envelope would be kept, followed by a 300 mm ventilated cavity and then an inner skin of toughened glass. However, this would necessitate cutting large apertures in the existing structure of the building. This design was rejected as would affect Rietveld's original concept too much.

It was decided to use double glazing (the solution Rietveld proposed in 1964). The capacity of the climate control plant was based on the maximum acceptable volume of piping in the central hall. The double glazing had a solar control coating which would reduce its transparency, especially in the open corners. After a range of experiments, glazing supplied by the Bestisol company was installed. The design of the glazing profiles had to be changed in any case. A dry system was selected, which also maintained the 5 mm reveal on the exterior of the facade.

As a result of the refurbishment of the Arnhem Art Academy the energy costs were reduced while the comfort was improved. This meant striking a compromise between the operating costs, investment and the original perception of the space as designed by Rietveld.



Figures 6, 7 Arnhem before and after refurbishment



Figures 8, 9, 10 Arnhem corridor: original appearance, during refurbishment and after completion of the work

5. Restoration of the Amsterdam Art Academy

When developing his plan for the restoration of the Amsterdam Art Academy, now the Rietveld Academy, Slothouber (1997) concluded in 1996 that the technical condition of the building was reasonable. Thus, he interpreted the restoration assignment as major maintenance. The main problems related to the changed demands made of the building. What was acceptable in the past was no longer acceptable. The restoration had to strike a balance between the interests of current users (defined in extensive regulations) and the interest of the building as a monument which was about to be listed. As in Arnhem, the main problems were associated with the facades. Again, the problems were greater in summer than in winter. In essence, the solar gain was the real problem.

The facades were in a good state of repair. The paintwork was poor but the zinc coating was still in a good condition. The impact of the various options was analysed. Eventually, it was decided to restore rather than refurbish the building. The guiding principle was that the building should be maintained in its original condition, with all the characteristics and features of its period. In Amsterdam, Rietveld generally used commercially available products. Hence, components could be replaced, though where possible materials were repaired rather than replaced. Similarly, it was considered perfectly acceptable for components to show some deterioration, it was not the intention to make everything look like new.

A more effective air-handling plant, using top cooling, was designed. This was installed in view, as a later addition. According to Slothouber (1997) the analyses indicated that the investment and operating costs compared favourably with the much higher initial cost of solar control double glazing. To install double glazing the entire facade would have to be replaced as this form of glazing could not be accommodated by the original glazing system. The original chair profiles with a 40 mm rebate would have to be replaced by profiles with a 50 mm rebate. Furthermore, double glazing would increase the reflection and therefore reduce the transparency. For cost reasons and to maintain the original appearance it was decided to repair the facade rather than to replace it. It was also decided to replace the original glazing by drawn glass manufactured in Poland, rather than modern float glass. However, after installation the draw marks were found to run in the wrong direction and a new batch of glass was produced and installed.



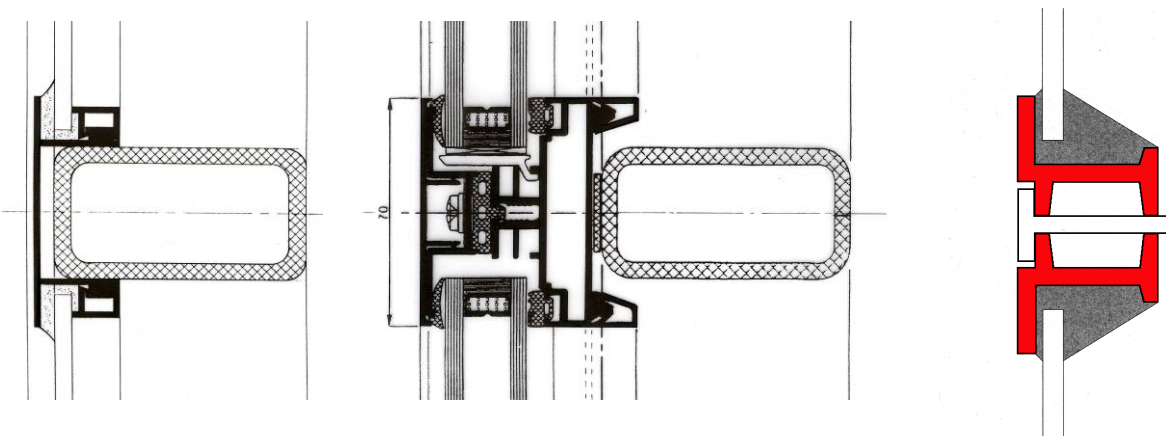
Figures 11, 12 Amsterdam during and after the restoration

6. Comparison of the two projects

The glazing system with "chair profiles" originally used in Amsterdam had proven itself to be a rather better choice than the system used in Arnhem. Given his statement in Bless (1982) it is likely that Rietveld would not have objected to the replacement of the facade: *"And finally I would like to recap what all these words were actually meant to convey: that architecture has to fit in with recognised and changing needs and that we live in an era in which there will be great changes in society. We should not consider the architecture of today as fit for the future, or build as if we know what will be needed in future. We should not think that our children will fully accept our architecture, we did not accept all of our grandparents' architecture although we learned much from it and greatly appreciated it, but did not find it fit for our time. When building we have to consider how relative everything is and aim for restraint, but however we build, it will only become real to us and please us if the visual spatial elements, which we give away to others yet keep ourselves, are not fragmented but are intact, transparent and most of all, clear."*

In Amsterdam it was decided to use a durable solution, in which Rietveld's original design was largely maintained. In Arnhem it was necessary to choose a sustainable solution as the glazing system had to be replaced in any case and comfort and the long-term operational aspects were given priority over maintaining the original appearance of the steel profiles and single glazing. Both solutions also included the installation of climate control plant. This demonstrates, fortunately, that in true restorations, durability, i.e. maintaining the original features, can prevail over the solution which is more sustainable in terms of energy consumption. The initial investment and the long-term operating costs have a major impact on this choice.

Given Rietveld's philosophy about a design for living and creating architecture, he would have opted for the most restrained solution. He would have approved of both solutions, but would have been pleased that an improved version of the facade in Arnhem was used in Amsterdam. Consequently, the original spatial design for the Amsterdam Art Academy lasted longer than the design for Arnhem.



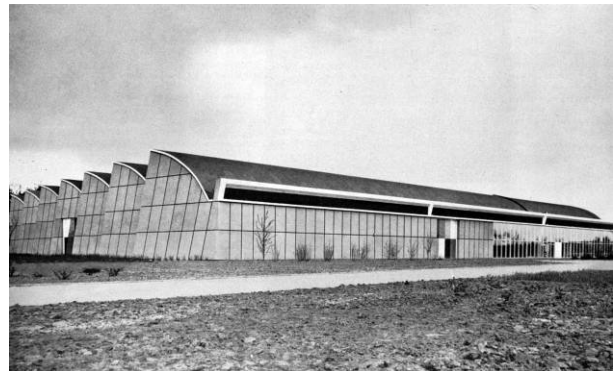
Figures 13, 14, 15

Window frames: Arnhem - original, Arnhem - refurbished, and Amsterdam - restored original frame with "Chair profiles" (in red).

7. A new challenge: the De Ploeg factory in Bergeijk

The De Ploeg factory in Bergeijk has been vacant since early 2007. The building complex, designed by Rietveld, was completed in 1958. It includes a production building, showrooms, warehouses and offices. It may be possible to repurpose this building in a way 'which is both sustainable in environmental terms and does the original design justice. Any maintenance was always done most carefully, to limit the changes to Rietveld's original design to a minimum. In case of a sustainable transformation considering the original qualities a building-in-building design or double skin facade should be possible to improve the energy efficiency while respecting the original design. The offices of the Oranje Nassau Mijnen in Heerlen and the Van Nelle factory in Rotterdam demonstrate that this is a feasible option. At a time when sustainability has priority and is also considered in the context of historical buildings, Rietveld's projects demand a cautious approach. Maintaining the original design should always be a key issue in refurbishment or restoration. Of course, in doing so, you always should consider the future. "*It is a privilege to be living today and tomorrow*" said Rietveld (1958), paraphrasing a quote by Dutch Queen Juliana, which was engraved in the pendulum (designed by architect Rietveld) in the central hall of the United Nations building in New York.

Conclusion: in principle, Rietveld was in favour of a sustainable way of life, which he demonstrated through his buildings. He gave priority to the way space is experienced. When restoring, refurbishing or even transform his buildings, sustainability will be a major consideration. And each building will demand a unique solution. A solution which has to respect Rietveld's original concepts. Consequently, sustainability may have to take second place. This should not be insurmountable when preserving architectural monuments.



Figures 16, 17: De Ploeg Bergeijk

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