

# Architecture of weight

**Ruurd Roorda**

If we dig deep enough into the history of monumental buildings, that history will explain the success of their life span. Such knowledge can help us to once more make buildings that will retain their value for centuries.

## Background

### *Planet*

The act of a building means relocating material from the earth. A hole is created somewhere, while a building is erected elsewhere to enclose a desired space. The earth is central to the process: as a source of material with physical properties, and as an ancient metaphor for all that is good in architecture. The earth is the focus of the current debate on sustainability. Halting the depletion of the earth's resources and closing the cycles of materials are ways by which we can maintain the resilience of the earth. 'Spaceship Earth', as Buckminster Fuller once called our planet, requires maintenance so that it will remain inhabitable for future generations.



Thinking about sustainability is topical, but it's still in the early stages of development. Architects paid it little attention in the past. Architecture determined its own agenda and sustainability was ignored as something that lay outside the profession. Within architecture, sustainability was nothing more than a technical issue, a question of numbers.

The life span of building is of course not exactly the same as sustainability. The two concepts are, however, linked to each other because huge quantities of energy, materials, water and carbon dioxide are consumed during construction. Even more is consumed during demolition. In principle, demolition and construction are to be avoided when it comes to sustainability.

Life span forms an important but as yet neglected aspect of sustainable building. Public appreciation (fed by the experience of beauty), utility (determined by adaptability and by cost-benefit analysis) and stability can influence that life span.

Technical issues mean that the architectural implications of sustainable building are still almost unexplored and, where they do exist, conflict with each other. There are avid supporters and opponents of each possible building form — light buildings with as little material as possible that respond rapidly to fluctuations in climate, or heavy buildings with an excess of material and a reduction in ambient temperatures —and every group refers to sustainability to make its point.

Weight is just one of the many variables in architecture, but it can certainly contribute to stability and sustainability, even in contemporary buildings. In most cases, weight relates to Vitruvius's principle of *firmitas* (sturdiness, stability), and is therefore an architectural factor that influences life span.

Here follow three examples of unrivalled buildings that address the themes of weight, phenomenal interior spaces and a long life at the same time. These are certainly canonical buildings, yet they are also buildings worth considering when it comes to achieving lasting architectural value.

### *Overweight*

The Pantheon in Rome is over 1800 years old and is one of the oldest buildings still in use in the world. Apart from an avant-corps with a classical tympanum supported by slender columns, the building consists of a single vaulted space. A brick cylinder supports a huge domed arch that is 40 metres in diameter and is constructed of Roman concrete. An imaginary sphere fits exactly inside the resulting interior space. Both the cylinder and the vault are subtly elaborated with classically composed niches and cassettes respectively. The excess weight of the concrete dome prevents the vault from bursting.



An *oculus* (an eyelike opening) at the top of the dome is the only source of daylight penetration, and rainwater simply runs off the gently sloping marble floor below. Since the human eye cannot take in the resulting spatial form of the interior at a glance, the space surprises visitors upon entering thanks to a sequence of light-and-dark experiences that encourage movement through the interior to take in the whole building. That is why the interior leaves an indelible impression on the visitor.

The building is open to various symbolic interpretations. The circular form and the eye, for instance, could be read as reflections of the cosmos and the sun. Moreover, the interior has succeeded in accommodating various functions, one of them Christian, down through its history.

The heavy building mass contributes to a cool interior climate in the hot Roman summers, while the size of the oculus limits bright sunlight penetration and exposure to the changeability of nature.

That the building is still in use is no doubt down not only to the stability of the heavy construction, but also to the majestic interior in which the excess weight and the lighting conditions create a space that can accommodate various functions and that is open to various meanings.

### *Cosmos*

The City Hall in Amsterdam (now the Royal Palace) is over 350 years old and was designed by Jacob van Campen. This building can be viewed as the architectural pinnacle of the Dutch Golden Age. After a period of unprecedented expansion, Amsterdam saw an opportunity to seal its status as a merchant city with this building, which was vast by the standards of the day. Four city blocks around the Dam were demolished to make way for the building.

The City Hall boasts a classical layout and is composed of a rectangle with four wings around two light wells, on both sides of a vast central hall. This hall is a long and light-filled space with a length of 33 metres and a height of 27 metres, which can be surveyed at a glance. By contrast, the main entrance is discreet. Where you expect a spacious vestibule you find the Tribunal, the ceremonial space where justice is administered.

Stately galleries connect the rooms on the *piano nobile*, which are all arranged around the edge of the building. The exterior presents a volume that is symmetrical in two directions, and all four corners read as independent pavilions. Dominating the façades to the Dam and rear side is a monumental, classically composed avant-corps. Although embellished, the sandstone façades are notable for their relative flatness. They feature an austere double row of pilasters above a sober basement. Volumetric elements such as exterior steps or a loggia are absent.



By contrast, the interior is vastly richer not only because of its dimensions and lavish finishes but also because of the symbolic programme reflected in the decorative schemes, sculptures, reliefs and paintings. In the central hall, the building reads as a reflection of a perfect cosmos that attempts to marry classical and Christian ideas in a single entity. In the French period, Louis Napoleon confiscated the building and lived there for a brief period. During that time the galleries, separated by timber walls, became independent salons. Such alterations to a precisely formulated republican programme were absorbed easily by the building, in part

because of its majestic interiors. This capacity to absorb change, which resulted from the spatial qualities of the interior spaces and the universal world view encapsulated in them, has increased the life span of this building considerably. In the end, this was the reason that the building was not demolished and replaced.

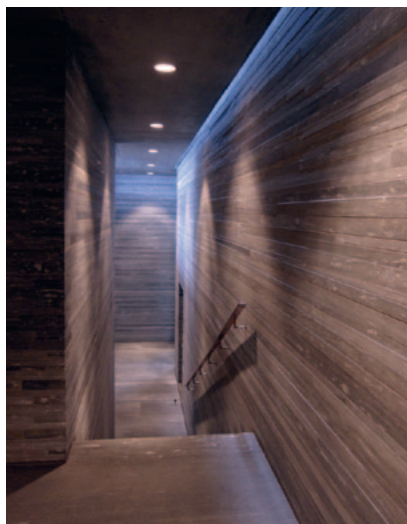
### Rock

The thermal bath complex in Vals by architect Peter Zumthor was completed in 1996. This building, which replaced a 1960s spa complex, is now recognized as a modern-day masterwork. Half buried in the mountainside and composed of layers of solid gneiss extracted from a local stone quarry, the building expresses a desire to blend with the landscape. The structure is solitary and resists any formal integration with existing structures, lending it a timeless quality. It connects with the adjoining hotel complex through the mountain's innards. The building can be interpreted as a continuous geometric grotto system made up of 'rock formations' that nearly, but don't quite, lean against one another. Covering them is a 'floe' of complex double-walled concrete. Just like on a mountainside, the rock formations are located at irregular distances from each other. In the tall interior, the daylight becomes increasingly mysterious the deeper one ventures inside. Strips of glazing between the rock-like roofs offer an additional source of daylight in the sparsely illuminated interior spaces.

The building emphasizes the baths as an experience in which architecture stimulates all the senses. To mention a few impressions: dark and light, light reflecting on the water, the diffusion of light through steam, variations in sound caused by stone

surroundings, the touch of warm stone on naked skin. The building is poetry in water and stone.

The rock formations are hollow and contain smaller spaces that offer a variety of experiences with water in its different states. Located between the rock formations is space for the pools: a spring bath, an indoor bath and an outdoor bath.



One level lower are the treatment rooms for hydrotherapy and physiotherapy in a comparable composition, half buried in the mountainside. The architecture is deceptively sober yet offers a wealth of experiences owing to the balanced spatial composition, the daylight admission, the detailing and the layering of gneiss in varied textures.

With its oversized concrete roofs and walls ('Valser compound masonry') and the absence of finishing, the building embodies the idea of naked material, of mass, of slowness as a timeless phenomenon that resists a world that is obsessed by economics, efficiency and speed. Evoking an overwhelmingly sensual experience, the mysterious interior spaces are

of such intense sensitivity that one can safely predict the building will enjoy a long life.

## Practice

### *Windowless*

When in 2005 Kingma Roorda architects was preparing an exhibition of its work, the partners descended more deeply into their personal histories for the purpose of self-analysis. Which spatial experiences were crucial? Which premature or more recent encounter with architecture was decisive? And how did that influence the designs? <sup>1</sup>

Without exception, the buildings that this analysis threw up contained almost no windows. Works listed included the Pantheon in Rome and the Roman theatre in Orange, France. And Wimpole Hall, with two masterly interventions in the interior of the country house by Sir John Soane, who broke the deadly boring spatial sequence along the endless enfilade by roofing over the two light wells. And Aldo van Eyck's unsurpassed Pastoor van Ars Church in Kijkduin, dating from the period that Aldo was still heavily influenced by Louis Kahn and only used rectangles and circles. And also the work of Luis Barragán, who raised the height of the walls around the terraces of his home bit by bit as the city around him infringed upon his life.

Striking buildings included the thermal bath complex in Vals. Here was a building that the office wished it had designed itself. What applies to all the buildings mentioned here is that they harbour a secret. And this secret has everything to do with an absence of transparency, with light and with an envelope of solidity. This counts as well for the small buildings on Insel Hombroich, designed by Erwin Heerich. It turned out that he had made



buildings of exactly the sort that Kingma Roorda architects had just about finished designing, namely tree follies in Zoetermeer: tranquil buildings set in nature, with phenomenal interior spaces and illumination through rooflights. Architecture of this sort would be realised by the office at a later stage, for example a restaurant in Leiderdorp.



### *The architecture of ‘yes’*

Kingma Roorda architects’ fundamental attitude up to a certain moment was reactive. ‘We certainly don’t want that!’ The 1970s? Please... Post-modernism? Get away! Deconstructivism? No way! Neo-modernism? Come on? Colour? No, unless... The origins of this office partly explain what has become known as the ‘architecture of no’.

In fact, Kingma Roorda architects want to be elusive and avoid categorisation. You could even say that the company strives to create secrets of its own. But resistance demands a lot of energy and ultimately lacks creativity. This attitude was definitively abandoned in 1994 owing to new experiences with sustainable building. Sustainable building

suited offices well in terms of message but also in terms of construction issues: building with clay, the ban on sandwich constructions, the use of thermal mass, the parallels with historical typologies and the references to a time without installations of significance. In short: the continuity of architectural history.

‘Why not simply build what’s good for the world and what benefits people?’ This question prompted Kingma Roorda architects to fully focus on (almost) everything that is sustainable. The company said ‘yes’ to many sustainable initiatives, as long as architectural quality was still a priority. Kingma Roorda became particularly interested in passive buildings that featured a minimum number of installations and architecture that employed orientation, spatial form and passive technology. The question that emerged was whether sustainability should actually be visible. The office’s answer was no, it simply had to work!

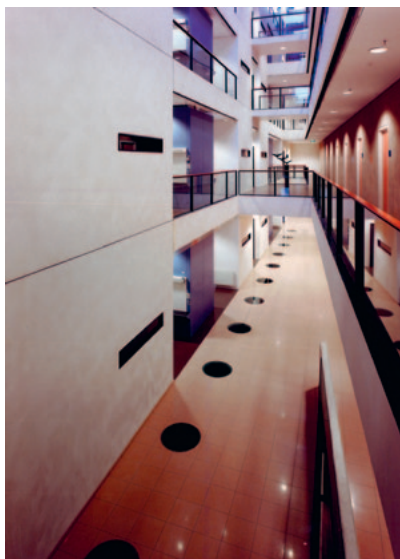
### *Mass*

Sustainability had to be invisible in the commission for the tax office in Enschede. The outside of the building had to prolong the tradition of tax-office austerity as displayed in Bremer and Friedhof’s architecture. In this case, making a ‘friendly’ building seemed kitsch.

Inside, however, the building had to genuinely benefit the tax department’s employees. A combination of daylight and natural ventilation helped to achieve this objective.

Both aspects influenced the design. The façades feature double strips of fenestration, and a 22-metre-high atrium acts as a ‘lung’ for natural ventilation.<sup>2</sup> In the office spaces, the concrete ceiling enhances the emission of radiation and night-time cooling through

heat storage in the building mass, which was generously dimensioned to increase these functions.<sup>3</sup>



Mass has therefore been used here towards sustainability. It resulted in a building without air conditioning and active cooling, so that stale air is discharged via natural updraft in the atrium through six large shafts.

The double strips of fenestration serve different purposes: the upper one for light admission, the lower one for views. Adjustable exterior louvres provide solar shading in the lower window, while reflective glass in the upper window guarantees the retention of daylight.

These rational techniques led to a building that worked. A survey among users revealed that absenteeism was lower than in the period before the extension. Indeed, you sense the difference as soon as you enter the building: it was stuffy in the old building by Bremer, yet the new extension was clearly fresh. This suggests that sustainability can only be measured,

and is fundamentally invisible, in terms of appearance.

The interior space of the atrium also enhances the effect of a majestic interior space that allows for edification, ‘attachment’ and a sense of collective identity. Architectural space is therefore a potential sustainability factor.

### *Shortcut*

The experience gained in Enschede was pursued further within Kingma Roorda architects in various projects for offices, homes and schools. The objective is always passive buildings with as few installations as possible. Often the building mass is deployed to passively reduce the daily temperature curve through short-term heat storage. At the same time, making recognisable spaces is the fundamental aim in all projects. Preferably the interior spaces exceed the standard: able to serve various purposes by offering a variety of heights and open to multiple interpretations.



The design study for the renovation of a government office building in Utrecht combines sustainable ingredients such as daylight and ventilation with new flexible office concepts. The existing building was in a state of disrepair and consumed an astronomical amount of energy every year. Notable spatial

features were the low floor-to-ceiling heights and the size of the floors, which were not tailored to the tenant's needs.

The proposal by Kingma Roorda architects involved a higher level of technology than in Enschede, necessitated by the size of the building. Even so, the emphasis here is on passive building, with natural ventilation introduced through a double-skin façade, and installations to facilitate flexibility housed in a raised floor. The new external skin is proposed in glass, while the inner façade is carried out in softwood window frames with doors. Moveable sun shading is placed in the void between the leaves of the double skin. Interior partitions are also made of softwood and fitted with slats. As many of the lowered ceilings as possible were removed to facilitate the release of energy from the mass of the concrete skeleton.

A void on each floor of the 25-floor building provided a shortcut that compensated for the disadvantages of the confined floor area and the limited net height.

### *Not so fast*

For a housing project in IJsselstein, Kingma Roorda architects enlisted the services of an advisor on sustainability with the aim of putting the project on the market as an advanced and energy efficient scheme. However, technical developments did not evolve as fast as the designers had hoped. Among the features scrapped were a collective energy supply and an experimental roof surface of photo-voltaic cells. The project was completed with more standard fittings, including individual central heating boilers, a heavy structure, balance ventilation and solar boilers.



Taking everything into account, you could say that architecture was the consistent sustainability factor. Apart from the materials (shell ground cover, timber façade finish beneath large roof overhangs), that factor was essentially spatial in character. The homes feature a series of interconnected spaces with illumination through rooflights and sufficient excess areas: veranda, living room, stairwells, bathrooms and bedrooms. Spaces that make living pleasurable, spaces that are worth keeping.

Thanks to the lessons learned in this project, the designers realise that there is a spatial dimension to sustainability that can be pursued almost without figures.

## **Education**

### *Everybody!*

Majestic architecture of weight: that was the theme put forward at the Academy of Architecture. But why and for whom would you erect weighty architecture in this day and age? The premise here is that all majestic architecture will remain useful in the future, even if the ideological or programmatic basis changes or vanishes.

But who today is calling for majestic architecture? The answer to this question is: everybody! For it is only with such edifying,



supporting, comfortable and atmospheric spaces that we can create buildings of lasting value.

As an educational assignment, we selected a fictional programme with an equally fictional group of users: an urban club building for six successive generations. True, fragmentation in today's society make this programme fictional yet also plausible, since the project proposes no exclusion. After all, everybody is one of a generation, everybody belongs, everybody can join in. The collective spirit among the different generations forms the cement of society.

Establishing unexpected connections in and between generations was therefore this project's main objective. In this club building, each generation had its own Great Space, with a net height of at least 4.5 metres. The building as a support structure had to possess 'permanence' and function for at least 200 years, while built-in components, finishes and embellishments could be temporary. The entire building could be left unfinished and had to allow for alterations at a later date. Of course, the building had to be passive, with as few installations as possible and low energy consumption. The challenge was to create fantastic architecture, on a dormant site: the eastern side of Museumplein in Amsterdam, opposite the Concert Hall.

### *Plateaux*

George Justus started his project by focusing on optimal orientation and the spatial idea of through-views in the interior. A comparative study of volumetric compositions came out in favour of a rectangular floor plan. Within this, the programme was arranged along a spiral that rose up around a narrow light well. In the building below there was space for a differentiated landscape with a main entrance, café and auditorium. Placed at the top was

a roof garden and terrace. Passive building technology received a lot of attention and resulted in a double-skin façade and raised floors, with space for climate installations in between. The floors on which the spaces for the various generations are located form landscaped plateaux along which ramps and stairs are projected.

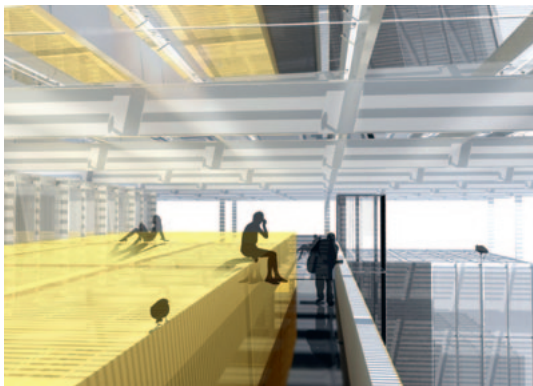


The light well is open and green and acts as a condenser between the generations. The space regulates both contact and separation in an atmosphere in which you show consideration for other people in a natural manner. The building is oriented to the south, where it has the largest percentage of glass, and the inner side of the façade features vertical, alternative blank and transparent strips. The depth of the double façade, its differentiated structure and the delicate colours create a subtle composition that reflects the rich contents.

### *Monumental*

Marco Kramer was determined to realise expressive architecture here. His references were classical. As an antipode to the Big Museum, his building restores balance on Museumplein. The idea soon emerged to house each of the six generations in a separate tower. The first designs were monumental in three ways: a symmetrical composition of identically tall, towering volumes set on a continuous

base and topped by a huge, protruding volume and a theatrical cantilevered roof. Is this the desired expression of the collective power of the population? Not entirely, because in a final move the dimensions of the towers changed so that they are not identical.



As a result, some are not placed on the base. This ‘democratisation’ of the project has a good effect: the towers are tailored to age difference, the floors open up in places, and the (curtain wall) façades are for the most part translucent. This means that the collective spaces at the top of the building, which house a café, dance floor, lounge and auditorium, become spatially less dominant. To compensate for this, the volume is clad in gold-coloured sheeting. The large glazed roof is completely covered in solar cells. An additional effect of the last design move is a much more informal character of the ground floor.

### *Slots*

The project by Wendy van der Knijff arose out of extreme abstraction: pure images without architectural notation, centred on the theme of time. Her focus was on distinguishing between the permanent and the temporary, and both had to find a place in her design. Growth, shrinkage and disappearance of generations had to be reflected in the building, even after completion. The project achieved this in different ways. The

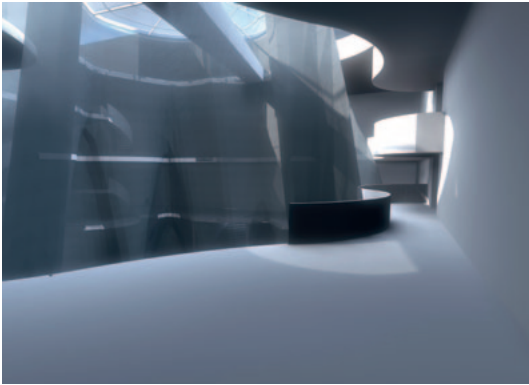
position of the almost cube-shaped building, right in front of the Concert Hall, calls for the creation of a public zone, which takes the form of a diagonal collection of slots that house the entrance, circulation spaces and café. The remaining spaces are grouped around this up to a height of 25 metres, with parents above and elderly and children below.



All these spaces can grow or shrink both inside and outside. This is facilitated inside by adding or removing timber floors in the interiors that reach up to ten metres in height, and outside by repositioning the partition structure that defines the public zone. That is why the structure is made up of stretched canvas. Within this whole composition, a concrete core, steel façade columns and a number of concrete floors guarantee a life span of 200 years. The climate façade, to which planes of expanded metal are affixed, allows space for various wishes concerning intimacy during the first life of this building. The result of all of this is a rare combination of mystery and utility.

### *Cruel*

Martijn Tjassens Keiser started the project with a thumping good reference image: a hollow tree. This image, this metaphor for life, perfectly expressed the aspiration for an overwhelming space. It only needed re-scaling. Put simply, this project was a hollow tree of wire mesh in a single-skin concrete block.

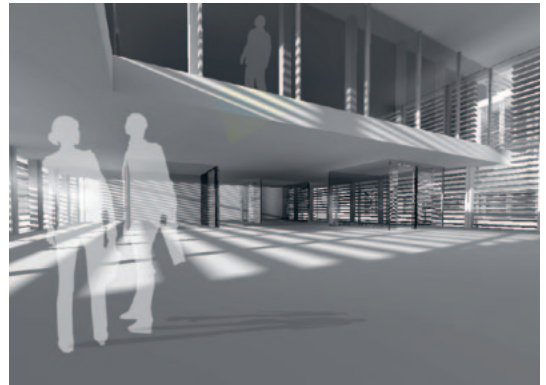


Apart from two narrow strips of fenestration, this block features no façade openings. Access to the building takes the form of a wide exterior stairs that descends to the basement (-6.40 m). Upon entering, you arrive straight into the cavity of the 'tree', an atrium, illuminated through a vast glazed roof. The spaces for the different generations are arranged around the atrium, behind tempered glass, on six split-level floors. Various flights of stairs rise from the basement to these floors. The sparing lighting, which enters through the mesh and comes from focused artificial illumination, evokes a mysterious atmosphere of togetherness. Undulations in the mesh wall encourage special activities. Further articulation in the form of partition walls is avoided. All circulation and service spaces are therefore accommodated in the north façade, which is constructed as two layers. Niches in the basement create space for an auditorium and for light openings of

translucent stone. At the end of the route at the top of the building, a footbridge leads to a café with a small roof terrace. A proposal for passive techniques features, among other things, floors with concrete-core activation and a single-leaf concrete façade for passive heat storage. The contrast between the subtle, slowly unfolding interior and the harshness of the exterior box is extreme.

### *Elegance*

The project by Xander Speelman evolved out of a process of trial and error, but at full speed, as a result of quantitative analysis and energetic intuition. A stack of foam volumes (generation spaces) is treated on the basis of the idea that generations 'interact' with each other.

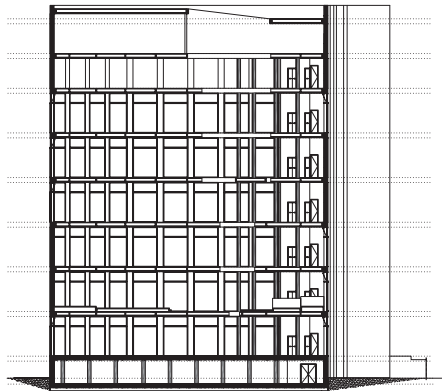


This produces a stack of interwoven horizontal blocks that touch each other in different places, akin to a rigid version of a paper chain. It is an aesthetically determined composition whose lack of logic in terms of usage cannot be grasped immediately. Function follows form? The resulting spatial-structural puzzle leads to a number of design adjustments, among them the rotating of one of the volumes, whereby glazed floors take the place of façades. Generations are thematised: borderless, pragmatic, lost, protest, silent or pre-war. Nonetheless, the floor plans are serene and remain unexplained. Time and again, the

marvellous elegance gets the upper hand on explanations of the functions, and this ultimately results in a building whose exact function is only touched on in passing. Does this perhaps herald more timeless buildings? In the project's elaboration we do of course encounter the slender frames with the large spans, which prompt the use of a steel structural system for the building.

### *Resistance*

The fascination for the 1960s and the ideas of Frank van Klingeren in particular came together in this original project by Marc Keizer. It took shape after some initial hesitation and doubt: what to draw? The exterior form, the irregular pentagon, emerges 'rationally' by dedicating lines from the context as building lines. Floor plans initially display voids, which gradually fill with what at first seem inimitable ingredients. Positioned at the centre of the building is what you could call a gap, sometimes jokingly referred to as the 'generation gap'.



The generations are located on both sides of the gap, the oldest above and the youngest below, 'sandwiched' between roof and ground. Collective spaces are also envisaged: below a foyer on a bike shed, and above an auditorium and café beneath a roof terrace.

In many respects the architecture of this building displays a form of resistance that Van Klingeren at least would have found attractive. With its immense height, blank base, large expanses of glass and narrow, appended balconies, this cannot be called a 'cute' building. Even so, it is an appealing building, precisely on account of its contrariness, and also because it refers directly to the direct character of Amsterdam people. What's more, it is free of almost all politically correct architectural trends.

### *Form*

Mindaugas Savickas took the very opposite approach. Fascinated by the architectural present, his design betrayed a bias towards 'shape' that is easily situated in the current decade.



Taking this into consideration, we can view his design response to this assignment as surprisingly calm from outside. Lines from the context define the taut contours of a compact volume that responds to the positions of the Big Museums and the sloping roof of the underground supermarket on the other side of the central axis. The only hint of the spectacular interior space consists of the glass façade that is composed of vertical sliding doors of about five metres in height. Visible from the sky only, the roof does, however, offer hints of a more lavish interior: behind its sharp

edge line, the roof consists of curves through which a scattering of rectangular timber skylights and structures protrude. More is going on inside: a passage flanked by lightly curving walls connects the three corners of the building. The remaining building mass consists of three layers that are accessed through vertical circulation in the timber towers. Although suffering slightly from 'overloading', both the roof and the passage are genuinely majestic spaces: one a sort of rock landscape, the other a grotto fitted with bridges and balconies.

**Palace for the Generations was organised by Ruurd Roorda as a design project for second-year students of the Amsterdam Academy of Architecture during the 2009-2010 academic year.**

- 1 Kingma Roorda architects in collaboration with Bernard Colenbrander: *Kruising* exhibition, ABC Haarlem, 2006.
- 2 The relation of the interior space refers to *De Passage* in The Hague by architect Westra en Van Wijk, 1882-85.
- 3 The word 'tax office' can also be taken literally. Until 2005, the building had to be able to carry the heavy load of tax returns on paper. On account of the integration of so-called 'teams' and administrative 'units' and the desire for flexibility, the final series of tax offices could be interpreted structurally as archive buildings. The heavy floor loads make these buildings suitable for other functions of course.