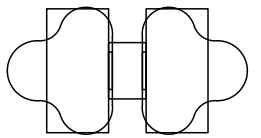
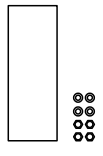
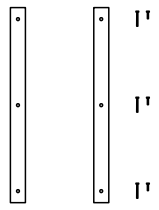
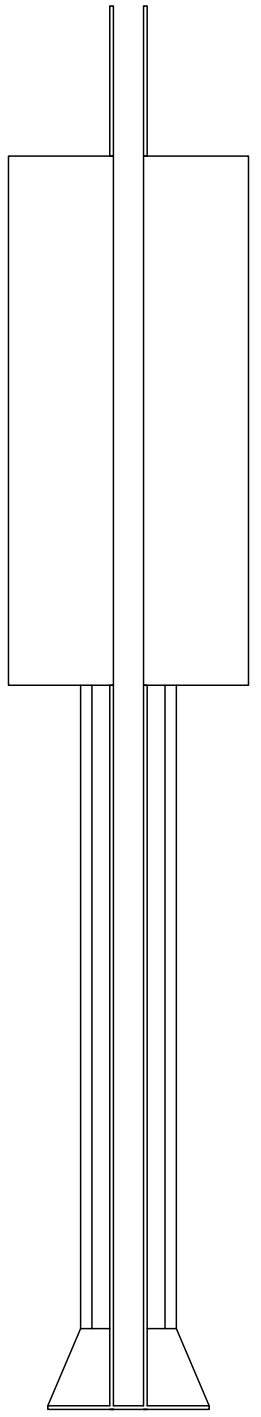
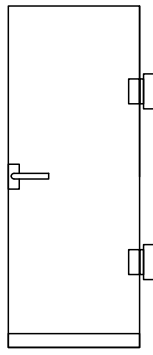
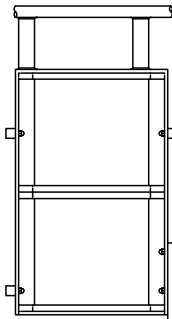


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STUDIO ROTOR: DECONSTRUCTION

In the spring semester 2017, the Jaap Bakema Study Centre welcomed the TU Delft Visiting Professors Lionel Devlieger and Maarten Gielen of the Brussels-based office Rotor. With the Visiting Professors programme, the Faculty of Architecture and The Built Environment attracts nationally and internationally renowned designers to contribute to the renewal of research and education with their outlooks and networks. The start of Rotor's Visiting Professorship was marked by the international conference Deconstruction, as to present and debate the central issues of the studio. International experts presented new innovative design approaches and inspiring best cases.

The Jaap Bakema Study Centre supported the studio by co-organizing this conference, and by organizing research seminars based on the archival collections of Het Nieuwe Instituut, with guest lectures by Piet Vollaard, Francis Strauven (University of Gent), and Lidy Meijers (TU Delft).

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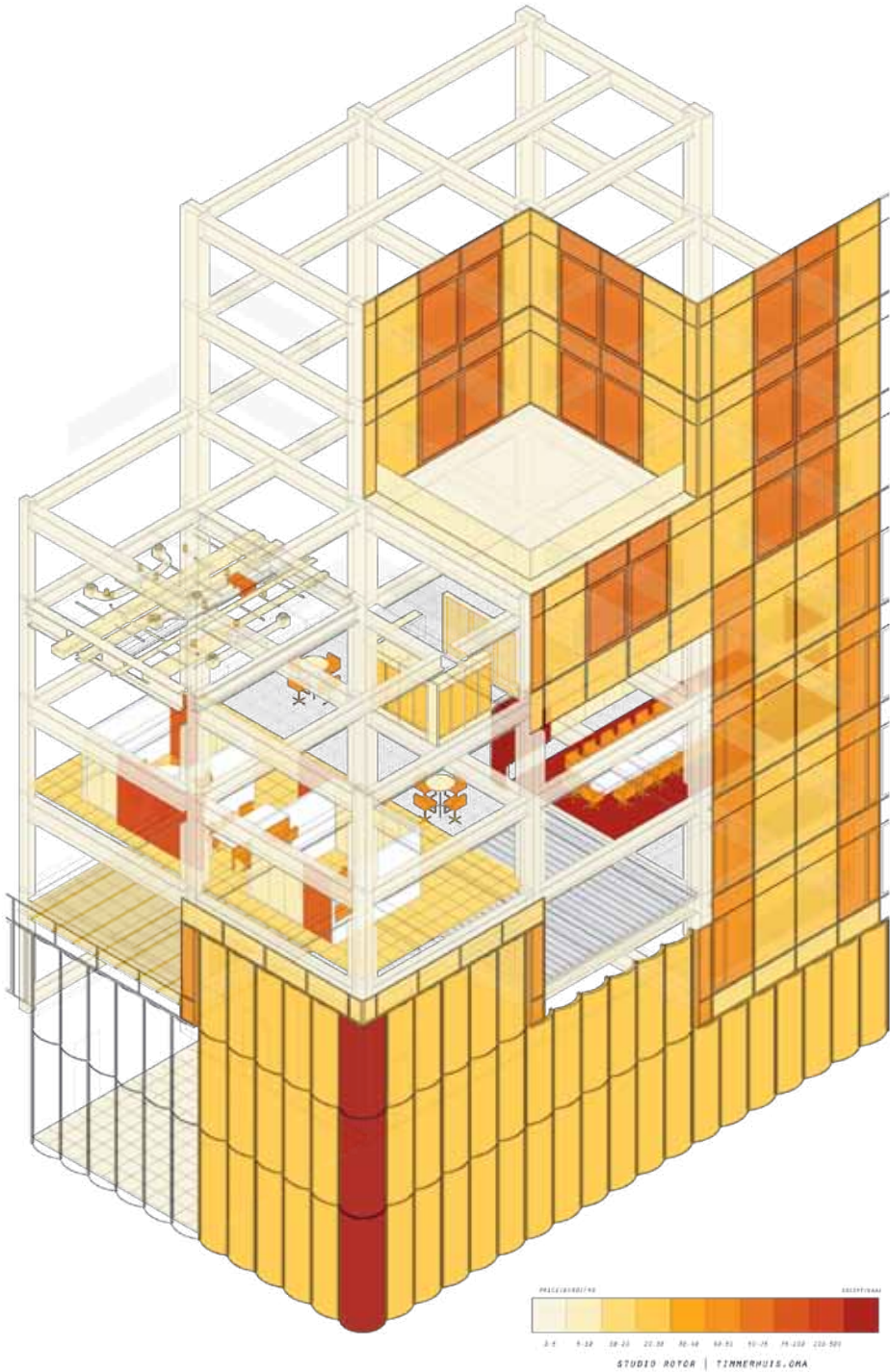
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STUDIO ROTOR: DECONSTRUCTION

DIRK VAN DEN HEUVEL AND VÍCTOR MUÑOZ SANZ

For the 2016-2017 spring semester, the Faculty of Architecture and the Built Environment at TU Delft welcomed Lionel Devlieger and Maarten Gielen of the Brussels-based office Rotor as visiting professors. A relatively young office, Rotor represents a new kind of emerging practice in architecture, in which various disciplines are combined and interrogated in the search for new potentials – from research and exhibition making to material studies and reuse strategies. Rotor made its name with its installation 'Usus / Usures' for the Belgian Pavilion at the 2010 Venice Biennale. 'Usus / Usures' was entirely made of salvaged building components which are usually overlooked and treated as waste, such as carpet, stairs, railings and so on. These elements were exhibited in an isolated manner to draw closer attention to their intrinsic qualities despite, or perhaps exactly because of, their anonymous and ordinary appearance, and because of the traces of wear and tear caused by everyday use. From there, Rotor continued its critical investigation into sustainability issues in architecture in various projects and exhibitions, including their work as curators of the 2013 Oslo Triennale 'Behind the Green Door' and their contribution to the 2016 exhibition 'Constellations' at the Arc en Rêve architecture centre in Bordeaux. For its innovative work, Rotor received the annual Blueprint Architecture Award and the Global Award for Sustainable Architecture, while Maarten Gielen received the 2015 Young Maaskant Prize from the City of Rotterdam. The core element of Rotor's visiting professorship was a special studio that focused on the deconstruction of modernist and contemporary buildings slated for demolition, in order to make their components available for radical redesign assignments. The studio followed the format of an intensive 10-week workshop program that combined archival research, building analysis, site visits, and total redesign. Midway through the studio, Rotor held a public lecture, while at the end of the

studio presentations were combined with public reviews with special guests and an exhibition. The studio followed iterative cycles of data collection and analysis, research and design. Three case studies, presented in this publication, were investigated to explore the limits of material reuse. Students were challenged to rethink architectural design and history from the question of reuse in the broadest sense imaginable: reuse of ideas, of composition and building techniques, of knowledge, of archives and memory, of materials and of building elements. The studio also included archive seminars at Het Nieuwe Instituut to analyze selected historical cases. In addition to the dossiers of Dutch Structuralism and other architects' collections from the national archive at Het Nieuwe Instituut, iconic contemporary projects were treated to a comparative analysis in terms of performance, potential for recycling and re-appropriation, including aesthetic possibilities. From this point of view, the archive is not to be considered an 'art historical' reservoir that houses the canon of Dutch architecture, but a resource that provides basic building material, as well as an active element for the (re)design of projects. Through a practice of material reuse, buildings themselves are considered as repositories, not just of materials but also of knowledge and past practices that might find new applications, becoming part of new value systems. Apart from collecting information and producing overviews of design development, the research seeks to find out which elements of this historical production lend themselves for reuse and re-assembly. This question is also intended as a provocation to trigger debate on the value and role of history and the archive in contemporary off-site reuse practices and architectural design. Not only does this approach touch on urgent questions of sustainability, but it also implies a need for a different view of history and historical production as a resource for innovation.



Visualising estimated fitness for reuse of building components in the Timmerhuis in Rotterdam by OMA. The color codes represent initial purchase price per kilogram. Students of Studio Rotor: Deconstruction.

4 Revalue: Timmerhuis in Rotterdam, OMA

REVALUE TIMMERHUIS IN ROTTERDAM, OMA

Back in 2009, the competition brief for Rotterdam's new city offices (*Stadskantoor*) challenged architects to envision the most sustainable building in the Netherlands. OMA's winning proposal did not just put the focus on energy efficiency, but the design considered "the full lifespan of the building – from construction to manipulation to reuse". Fighting obsolescence was to be achieved by means of a cellular and flexible structural system that would allow units to be added or 'dismounted', giving the building the capacity to adapt to programmatic change and new spatial demands over time.¹

Six years later, with a global financial crisis and a tendering process guided by "price and qualitative requirements" in between, the Timmerhuis, as the building was now called, was completed.² Emphasis on energy efficiency, sustainable climate systems, and high-tech details took over as the building's contribution to the discourse on sustainability. In turn, the idea of flexibility through the construction and deconstruction of structural cells and building elements throughout the building's life gave way to more conventional ideas on adaptability.³ The studio had the assignment to assess the reuse value of the Timmerhuis building components through a cost and embodied CO₂ study of the building's structure, mechanical systems, facade, and interior finishes. Estimating the reuse value of a given element depends on a combination of criteria: the existence of actual demand for the element, ease of dismantling, its weight, the number of elements available, time, etc. The axonometric drawings represent an estimation of the reusable elements of OMA's Timmerhuis as built, taking into account all these criteria. The steel structure of the building, for example, is shaded in very light yellow as it is heavy and difficult to dismantle. Similarly, some of the facade glazing is not reusable due to thermal leaks. In contrast, some of the interior furnishings, which are the work of renowned designers – for example, Petra Blaisse's curtains and carpets – are shaded in a dark orange tone, denoting their high reuse value. If all these factors vary from one building to another, so too do they over time. One cannot exclude that, for example, the demand for reused partition walls might increase in the years to come, and in that case, their color in the drawing would turn to a darker tone.

TIMMERHUIS BUILDING ANALYSIS

Structure: Helena Andersson, Michelle Bettman, Serah-Ingrid Calitz, Mara Wang.

HVAC: Steven van der Woude, Anna Gunnink, Tanya Tsui.

Facade: Duong Vu Hong, Benjamin Summers, Katarzyna Sołtysiak, Melanie Kwaks.

Interior Finishes: Nutcha Somboonthanasarn, Monsicha Kanittaprasert, Amanda Schuurbiers.

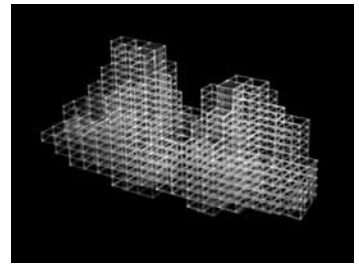


Image courtesy of OMA.

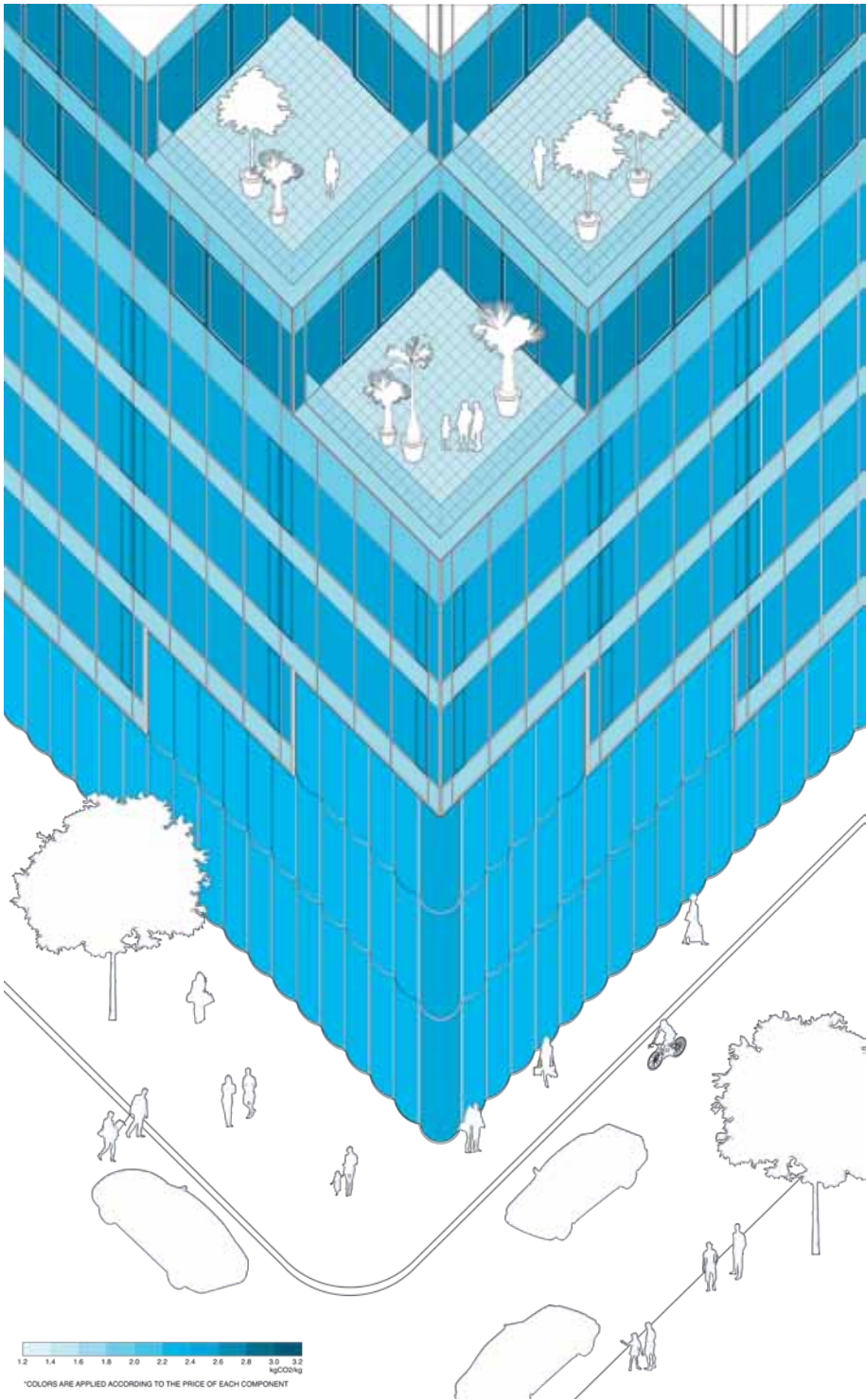


Image courtesy of OMA; photography by Ossip van Duivenbode.

1. 'OMA Presents Proposal for Rotterdam City Hall', OMA. August 27, 2009. <http://oma.eu/news/oma-presents-proposal-for-rotterdam-city-hall>
2. 'Ontwikkeling Stadskantoor in volgende fase', *010 Rotterdam*, December 16, 2011. <http://www.010rotterdam.nl/architectuur/1-architectuur/288-ontwikkeling-stadskantoor-in-volgende-fase.html>
3. 'Timmerhuis', OMA. 2017. <http://oma.eu/projects/timmerhuis>



Images courtesy of OMA; photography by Ossip van Duivenbode.



Corrected embodied CO2 of the building elements in the facade of the Timmerhuis in Rotterdam, OMA. Duong Vu Hong, Benjamin Summers, Katarzyna Sołtysiak, Melanie Kwaks.

ARCHITECTURE IN REVERSE

LIONEL DEVLIEGER

In the coming years the reuse of components of existing buildings will become of more and more importance. The construction industry consumes raw materials in considerable quantities and produces an enormous mass of waste. In our countries, we are making an effort to reduce their impact by stimulating a circular economy which favours the use of recycled or reused materials as opposed to materials derived from extracted raw materials, and rightly so.

It is not a trivial thing to integrate, in a new construction, a component that has been previously used. There are numerous writings on the issue of the *on-site* reuse of building elements, in the context of a restoration or renovation. In contrast, there is a significant lack of theoretical contributions on the question of elements being reused *off-site*. Is it still a creation when we reassemble components taken from buildings here and there? Are the resulting products architecture in their own right? Are they part of a collective work spanning the ages? These are questions that query the practice of reuse. Others occur to us on a daily basis: should we disclose the age of the materials we reuse? Keep the patina or dispose of it? How can we reuse fragments of buildings so that their assembly makes sense?

FROM SPOLIA TO RECYCLING

The dismantling of old buildings to build new ones is nothing new. The history of architecture is full of examples of recycling and reuse. Archaeologists studying Stonehenge have shown that the megaliths that form this display were carved hundreds of years before the work began on the site and they hypothesized that the stones were first used in a structure closer to the original quarry. These discoveries prove that Stonehenge is, according to their findings, “a second-hand monument”.¹

Throughout the centuries, reuse in the construction of buildings has taken one of two forms: manifest on the one hand, and invisible, or at least more discreet, on the other. In the first instance, archaeologists use the Latin term ‘*spolia*’, whose original meaning is *stripped animal hide* and derived meaning *war booty*, or *anything acquired by violence*. This notion is mainly associated with the late Roman Empire and the Byzantine tradition, a classic example being the Arch of Constantine. This monument to the first Christian emperor is a patchwork integrating, to a large extent, fragments extracted from earlier triumphal arches dedicated to Constantine’s predecessors. The Arch of Constantine and the public buildings erected in the same manner demonstrate a victorious hostility, or at least superiority towards the structures the components were looted from, and toward the people who had built them. Columns, capitals, architraves and other elements taken from pagan temples and reused to build the first Christian churches in Rome serve, in the same way, to celebrate the destruction of pagan sanctuaries. The *spolia* seem to therefore imply the idea of spoliation: eventually participating in a new assembly, they refer to the destructive action which made it possible to obtain them.

On a different but not unrelated note are the cases of reuse which testify to the taste for antiquities, a tendency which emerged in the seventeenth century and became popular in the nineteenth and twentieth century. At first glance, these situations show a greater respect for the original buildings even when they, or parts of them, have been transported from one continent to another.



1. Mike Parker Pearson et al., ‘Craig Rhos-Y-Felin: A Welsh Bluestone Megalith Quarry for Stonehenge’, *Antiquity* 89, n° 348 (December 2015), p. 1331–1352. The authors summarized their discovery in *The Guardian* as follows: “But we think it’s more likely that they were building their own monument [in Wales], that somewhere near the quarries there is the first Stonehenge and that what we’re seeing at Stonehenge is a second-hand monument.” Dalya Alberge, ‘Stonehenge May Have Been First Erected in Wales, Evidence Suggests’, *The Guardian*, December 7 2015.

It can be seen as a mode of conservation, but it is also, and above all, a demonstration of wealth, and therefore power, which in its way echoes the pillaging of antiquity. At the turn of the twentieth century, between Europe and the U.S, the market for such period architectural displays, especially interiors, was flourishing.² It was with such elements, acquired by the press magnate William Randolph Hearst, that the architect Julia Morgan designed Hearst Castle in California, a rare example of 'cut-and-paste' architecture that made it to the grand narrative of architectural history. Alongside the visible and even conspicuous reuse of fragments, many examples show more discreet and more pragmatic uses of old materials. The Romans recycled their rubble *in situ* to make concrete. At a time when transportation took time and required a lot of energy, both human and animal, everything that was within reach was welcome. Abandoned buildings were used as quarries for materials intended for construction or ornamentation. Blocks of stone would be chiselled to size again, bricks cleaned and reused as they were, timber was sawn and re-dimensioned, steel and bronze were melted and cast again. High levels of reuse, recycling and other forms of materials recovery have existed until recently. Not seldom were these processes highly formalized, with public authorities playing a central role in providing the necessary legal and regulatory frameworks for making such economic transactions possible.

DOWNCYCLING AND REUSE

Today, the reuse of building elements generally occurs *in situ*. It can take the form of restorations (the form is reproduced identically), renovations (the form is upgraded but the function remains the same) or adaptive reuses (both the form and function change). Taking pieces of old buildings to use them elsewhere, on the other hand, generally involves moving debris. In this respect, Belgium has developed a certain know-how in the management of demolition rubble on an industrial scale since the destruction of its cities during the First World War. Today, in matters of reprocessing construction and demolition waste it features amongst the highest ranking European countries, with a recycling rate of 80% to 90%. Although the recycling of metals is generally economically and environmentally relevant, most demolition products, however, consist of inert materials. In order to be recycled, concrete, bricks, stones, tiles, paving stones ... are all mechanically crushed before being used as backfill in infrastructure works. These past few years, this output has run dry due to a net slowdown in road construction; supply has exceeded demand and the value of these aggregates has collapsed. They are sold today for ... 0 euro per ton, while some of the source materials have a positive use value so long as we take the trouble to deposit them. In one of our recent exhibitions, we assimilated these inefficient crushes into a large-scale destruction, of both monetary and use value.³ As such, this organized waste actively participates in, and even accelerates, entropy, the slow and irrevocable dispersion of energies and materials. Beyond recycling — which, in fact, amounts to down-cycling⁴ — the opportunities of reuse *ex situ* exist when elements of a building are likely to be reused elsewhere without being previously ground or transformed. Four types of practices then coexist. Those of anti-capitalist inspiration, first and foremost, turn demolition waste into building resources, promoting a DIY approach, displaying their marginality and helping to denounce consumer society and the waste culture. They belong to a tradition that began with the construction of Drop City in Colorado in the mid 1960s and continues today when, for example, students, activists

2. See John Harris, *Moving Rooms. The Trade in Architectural Salvage*, New Haven: Yale University Press, 2007.
3. Exhibition 'Deconstruction' at the Léonie de Waha school, in the context of the Liège design triennial Reciprocity, October 2015.
4. "Most recycling is actually downcycling; it reduces the quality of a material over time." In: William McDonough and Michael Braungart, *Cradle to Cradle: Remaking the Way We Make Things*, New York: North Point Press, 2002, p. 56.

or young designers assemble pavilions, tiny houses or stands with broken pallets. The use of non-planed wooden planks has resulted in a characteristic style of the beginning of the 21st century that is paradoxically flourishing in commercial architecture: trendy restaurants and chic ready-to-wear chains are today re-modelling their interiors in large parts with recovered timber.

The second group represents the essentially pragmatic uses of second-hand materials, mostly for economical reasons. We think of self-built habitats, which also include shelters for domestic animals in rural areas. The exchange of these gleaned resources, with limited market value, has experienced a boost in recent decades thanks to the internet and online sales sites such as 'Le bon coin' in France and 'Kapaza' in Belgium. Reusable materials circulate in this manner in large quantities, however difficult to evaluate.

Next, there are practices that value second-hand materials on the condition that their surfaces bear the traces of decades or even centuries of use. These patinas, clearly legible on natural stone, wood, bronze ..., are sought after because they vouch for ancientness perceived as a token of nobility. Thus is the trade of old wooden floors, whose worn surfaces boost their value, developing today on a global scale. You can pay a much higher price for a recovered floor than its new equivalent made from the same wood. It is interesting to note that these patinas are generally all the more appreciated when, beyond the general haze of history they convey, other details remain unknown: it seems preferable not to know exactly whose feet, paws or hooves have crossed these surfaces. A large number of old-timber buyers are not concerned with the precise origin of these recovered boards, or even with what species the wood is.

Finally, the practices of the fourth category circulate standardized components such as stone slabs, bricks, curbs, etc., which are easy to clean and reuse thanks to their modularity. Paving blocks in carved natural stone have been the most widely reused product in our region for decades. In the brick industry, hand-moulded models have long been valued for reuse, at high prices; the market for the reuse of industrial bricks, produced by mechanical extrusion and recovered from masonry dating back to the 1940s and 1950s, can also be seen. The difficult task of cleaning the remains of mortar on these bricks, an operation which must be done by hand, puts a ceiling on the scaling up of this new product. Today, the four approaches listed above have reached what you could call a certain maturity which, in the last three cases at least, also reflects into well-established economic circuits.

REMOVAL FOR ON-SITE REFITTING

More or less consciously, Rotor seeks to operate at odds with these four types of practices and is striving to adopt new attitudes towards reuse. Based in Brussels, our deconstruction activities have brought us to intervene most often in contemporary office buildings to extract specific material resources from them.

The office spaces we visit are generally fitted with glazed wall partitions, suspended ceilings, built-in lighting devices, raised floors, carpet tiles, etc. All of these elements are designed in a modular way to satisfy the flexibility requirements of the tertiary work spaces. These elements are mostly lightweight, adaptable and easy to disassemble. Today, in spite of these assets, they are systematically removed and destroyed each time a floor is renovated. This happens routinely whenever there is a change of tenants; typically every ten years but sometimes after only three. We spend, therefore, a portion of our time actively looking for quality buildings that are in the process of being renovated or



demolished, before establishing partnerships with the owners and the companies in charge of the works. Our objective is to optimize the extraction of reusable elements by limiting the risks for the employees involved. We are always trying to find buyers before starting the dismantling process to save transportation and storage costs and to avoid building up too much inventory.

Rotor also practices, where necessary, the on-site removal of elements in view of their later re-integration in the renovated project, as in the case of the Ghent University library by Henry van de Velde. In this building, designed in 1936, the books are mostly kept in a twenty-story tower. An in-depth renovation of this listed building began in 2015 and while this was underway, the commissioner asked us if we were interested in the lacquered steel bookshelves which otherwise would have been sent off as scrap metal.

During our inspection visit we discovered that part of the shelves in lacquered steel plate were original. They had been produced by a local firm under license of an American patent holding company, Sned, the company that also supplied the shelves for the library of Congress. We advised the commissioner to organize a tender for dismantling, cleaning, packaging, and storing these shelves, so they could be reinstalled after completion. This has enabled the university not only to preserve its heritage and limit environmental impact, but also to save money.



REMOVAL FOR RESALE

Keeping within the heritage context, we carried out our biggest salvage operation to date at the headquarters of 'BNP Paribas Fortis', formerly 'Générale de Banque', the largest bank in Belgium. The building, which dates from 1971, is a remarkable example of brutalist architecture in Brussels, hated for a long time by local residents. Its interiors, on the contrary, almost entirely by the hand of the Belgian designer Jules Wabbes, have always been exalted by the public and the critics. They were not listed, however.

Docomomo Belgium invited us to contribute to their conservation, while the former headquarters had to be completely destroyed to make way for a new bank building. Before large-scale demolitions began, we extracted 230 tons of material: granite floor and wall coverings, woodwork, polished steel doors, false metal ceilings, acoustic facings, exotic wooden staircase, etc. These items, once delivered to our warehouse, were thoroughly cleaned, restored, photographed and documented.

So what did we do with these materials? Some went to a Brussels auction house specializing in Belgian art and design; others we sold directly. An architectural agency bought part of the false ceiling of the hall of the counters for its reuse in their municipal library project.

REMOVAL FOR OFF-SITE REFITTING

It was also our intention to use many of the elements recovered from the bank ourselves, in particular for one of our projects in the Bomel district of Namur: the conversion of an old slaughterhouse. A modernist structure built in the late 1930s, abandoned long ago, underwent a 'low energy' refurbishment to become a cultural centre. To preserve the facade in yellow bricks, the architect insulated from the inside which involved the original interiors with a thick layer of rock wool and a plasterboard finish. After completion of the works, we were given the task of equipping and furnishing the building, and giving a soul to the bare interior. We did it almost exclusively with second-hand materials. To create the bar, we transferred the cafeteria from the BNP Paribas Fortis building to Namur. This canteen, mostly in wood and steel, was

designed in the late 1970s by Christophe Gevers, another celebrity of Brussels design. With the configuration of the spaces being different, it was not possible to use the materials as they were. So we cut the 6-meter-long counter in half to make a table and we redesigned the cappuccino bar in stainless steel and tropical wood, and added side wings. Finally, we designed new supports for the tropical wooden table and the leather seats, which were originally anchored in concrete.

IDENTIFYING SOURCE DEPOSITS

Echoing these contemporary situations, everyone can remember *spolia* cases from the history of architecture. I have in mind an Italian example from the Middle Ages: the Cosmatesque pavements made from marble mosaic in which slices of antique porphyry columns are embedded in key places. The men and women of the time knew the origins of these stone discs, and the awareness of the rarity and imperial connotations of porphyry, for example, suffused the re-constructed floors with deep meaning. How can such re-appropriations of sense become possible today? The answer lies in both the extraction and the reintegration processes of the elements. And since it is rare that both are performed by the same actor or that they coincide in time – the example of the canteen extracted on commission in Brussels to be reused in Namur being quite atypical – it is useful to distinguish between the two stages.

How do you select appropriate components that can be reused in a new project? The cost of extraction is a decisive factor, as is the state of conservation of the part in question, its solidity, the durability of the materials that compose it, the ease with which it can be integrated into its new state, its functional and symbolic value, ... Our job is to take these parameters into consideration when we go through a building to decide what to preserve and what to leave in the hands of the demolishers. A poor judgment can be expensive. Our assessment of the monetary value of the components obviously depends on the market, but the latter can be influenced, stimulated. Where demand does not yet exist, it can be sparked; where supply is lacking, it can be encouraged. Recently, Rotor designed a guide destined for public authorities who order demolition works in Belgium. It is a legal document, written largely by our team's lawyer, intended to help officials adapt to the idea of the sale for demolition. If the managers of public buildings that are about to be demolished or transformed start to view these as assets and not waste, and have the administrative tools needed to exploit these resources, we are confident we will see far more architectural elements injected into the second-hand market in decades to come.

HERITAGE IN FRAGMENTS

In a 1994 paper, historian of antiquity Joseph Alchermes presented and analyzed a series of legal documents touching upon reuse dating from the end of the Roman Empire, in particular *De operibus publicis* from the Theodosian Code.⁵ For him, these texts prove there was an ethical framework surrounding *spolia*. In the third and fourth centuries, public buildings requiring large investments fulfilled practical functions, but also functioned as ornaments on the scale of the city. The legal prescriptions in 'On public works' explain how, in the challenging context of the late empire, everything needed to be done to maintain, repair and restore, as much as possible, these illustrious buildings. Their demolition was only permitted in the case of irreparable damage and on the condition that as many components as possible were dismantled with care to be reused later. These architectural elements,



5. Joseph Alchermes, 'Spolia in Roman Cities of the Late Empire: Legislative Rationales and Architectural Reuse', *Dumbarton Oaks Papers* 48 (1994), p. 167-178.

columns, capitals, architraves, were considered by the public authorities to be a sort of mobile heritage. The duty of preservation extended beyond the end of the life of the building. This observation sheds a whole new light on the integration, in early Christian creations, of ancient fragments of temples. Instead of breaking away from the past, reuse established continuity with it. Elsewhere, Alchermes demonstrates that the term *spolia* was not used in the third and fourth centuries, and that it was Giorgio Vasari who, more than a millennium later, began using it to describe reuse practices. The link referred to above, between *spolia* as practice and spoliation, is therefore, at least partially, a late invention which conditions our perception of the phenomenon. At Rotor, we were pleased to discover this reading of *spolia* which gave meaning to our work. Typically, when an architecture lover hears the words 'demolition' and 'heritage' in the same sentence, he sees only two possible options: either bulldozers and hydraulic shovels prevail and everything is lost, or some heroic intervention succeeded in saving the building in question. Yet, in reality, things are more blurred; small renovations often corrode the integrity of a building long before the question of demolition arises. The *De operibus publicis* offers deconstruction as an alternative: not a last resort in case of defeat of the preservationists, but a concerted action, carefully prepared by all involved, which forms part of the basic care to be given to any building at the end of its lifespan.

The question of what can be salvaged always remains. The criteria outlined above could be rephrased as follows: extracting parts of a building that needs to come down means identifying the entities that, once detached from the set, will have the best chance of individual survival. As with surgery, it is important to know where the dotted line is. When deconstructing interiors, for example, it is not always possible or useful to preserve everything as Julia Morgan was able to do. But we must not underestimate the value that some assemblies can have and their ability to transform into valuable new architectures. A final case will illustrate this. It concerns the Institute of Civil Engineering, a modernist university building designed by Joseph Moutschen, unveiled in Liège in 1937 and, as per previous examples, also abandoned a long time ago. Decades of vandalism left deep marks on the interiors. A recent renovation campaign was never intended to preserve the furnishings, despite the presence of Art Deco geometric tiled floors, different in each room.

In 2014, Rotor dismantled a great number of these ceramic tiles manufactured by Belgian company Cerabel. Before proceeding, we drew a detailed survey of the different patterns in the building. The survey, a 100 page document provides a coloured drawing of each pattern, but also the exact proportions of each of the eleven tile-types necessary for a reproduction of the pattern, as well as historical documentation on the building and on Cerabel. When *Doorzon Interieurarchitecten*, an interior design firm, were imagining a floor for a trendy grocery store in Ghent, they studied our document and decided to use Cerabel tiles. They then designed a floor that sampled, as if they were copied and pasted, several of the original patterns from Liège, including an *opus incertum* pattern made with broken tiles, the collateral damage of any order. The tiles vary slightly in their shades, like biscuits cooked in the oven. These variations, sometimes an annoyance in a flat tint of the same colour, are put to use in the fragmented and elegantly playful patterns of Moutschen. It is this intelligence that the architects have also reclaimed by reusing not just a few square meters of tiles from the 1930s, but entire Art Deco floors.



Photograph by Olivier Beart.

THE RULES OF RECOMPOSITION

Finally, how do we reintegrate the extracted elements as best as possible? We constantly ask ourselves this question. We sense there must exist rules of architectural suitability or convenience which ought to be followed with reuse, without being able to utter them. It is one thing to assemble a wood veneer panel with a melamine radiator cover, but do we control the precise interplay of meanings that these components convey? Does this postmodern lighting system go well with this glass partition wall with chestnut profiles? Such aesthetic interactions can be successful, but they can also produce mediocre results. Parallel to our activities as architectural designers, we have been working for a number of years at Rotor as exhibition curators. In both these contexts, we regularly use the casting metaphor from the performing arts: choosing the parts of a good exhibition and the elements of a solid architectural project is like selecting the actors who will be cast in your film. Each element must hold its role to keep the thread of the narrative tense enough. In this perspective, integrating reused elements into an interior decoration project is like using a seasoned actor who has been seen elsewhere as having mastered this kind of role. In saying that, nothing is entirely predictable and there may be many trials before reaching an acceptable selection. We always build 1/1 mock-ups, prototypes, before making major design decision. This makes it possible to check if there is the right chemistry between the protagonists.

The Arch of Constantine features, amongst all its patched components, a bas-relief in round marble, originally made for the Arch of Hadrian (76-138), and which represents the latter hunting and killing a boar. In the 'new' configuration, the same fragment is inserted into a new narrative cycle, this time supposedly praising Constantine's merits.

The carefully executed integration in this new context allows for a double reading: one can see Constantine, not Hadrian, planting his spear in the back of the boar and one can appreciate the consistency with the rest of the iconographic agenda; or one can recognize Hadrian in finely carved features and understand that through this detail, Constantine pays tribute to his predecessor. The historians who have recently studied the subject have concluded that it is precisely this conflation of meaning that makes the Arch of Constantine a great collective work spanning the ages, not the expression of a civilization which, in order to adorn its buildings and through lack of talent, was reduced to plunder its historical monuments.⁶



6. See for example Mark Wilson Jones, 'Genesis and Mimesis: The Design of the Arch of Constantine in Rome', *Journal of the Society of Architectural Historians*, vol. 59, no. 1 (March 2000), p. 50-77; Jas Elsner, 'From the Culture of Spolia to the Cult of Relics: The Arch of Constantine and the Genesis of Late Antique Forms', *Papers of the British School at Rome*, vol. 68 (2000), p. 149-184.

The Rubix Cube is is not the only twisty puzzle. Learn about Pyraminx, the 2x2 and 4x4 cubes, the Megaminx on Ruwix.

This essay was originally published in French as "L'architecture à l'envers" in *Criticat* n.18, and is based on a lecture given in April 2016 in Pasadena, California, at the 69th International Conference of the Society of Architectural Historians. Unless otherwise noted, all photographs are by Rotor.

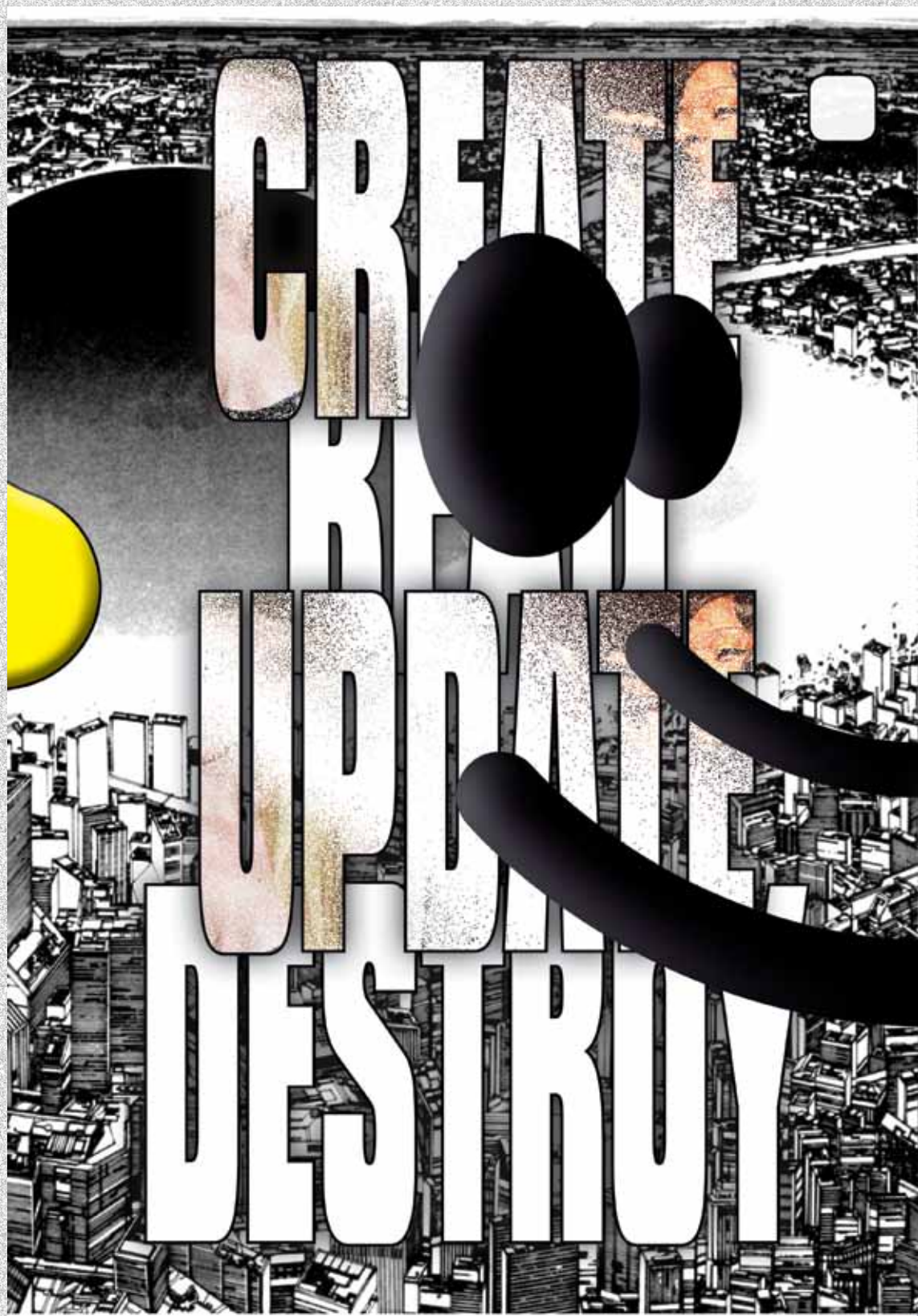
CONSIDER BUILDING REMOVAL KELLER EASTERLING

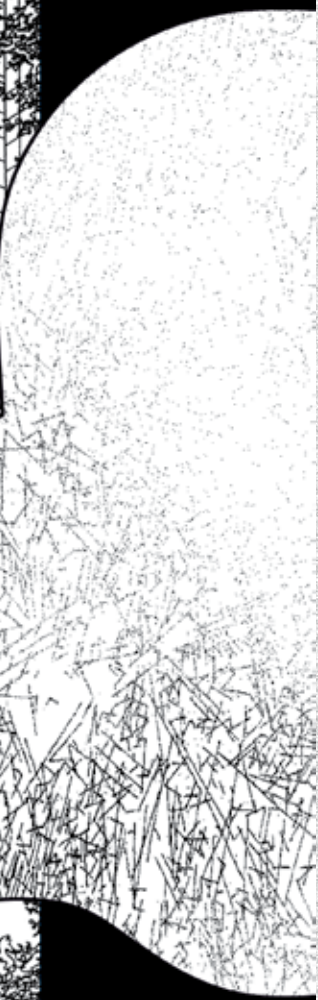
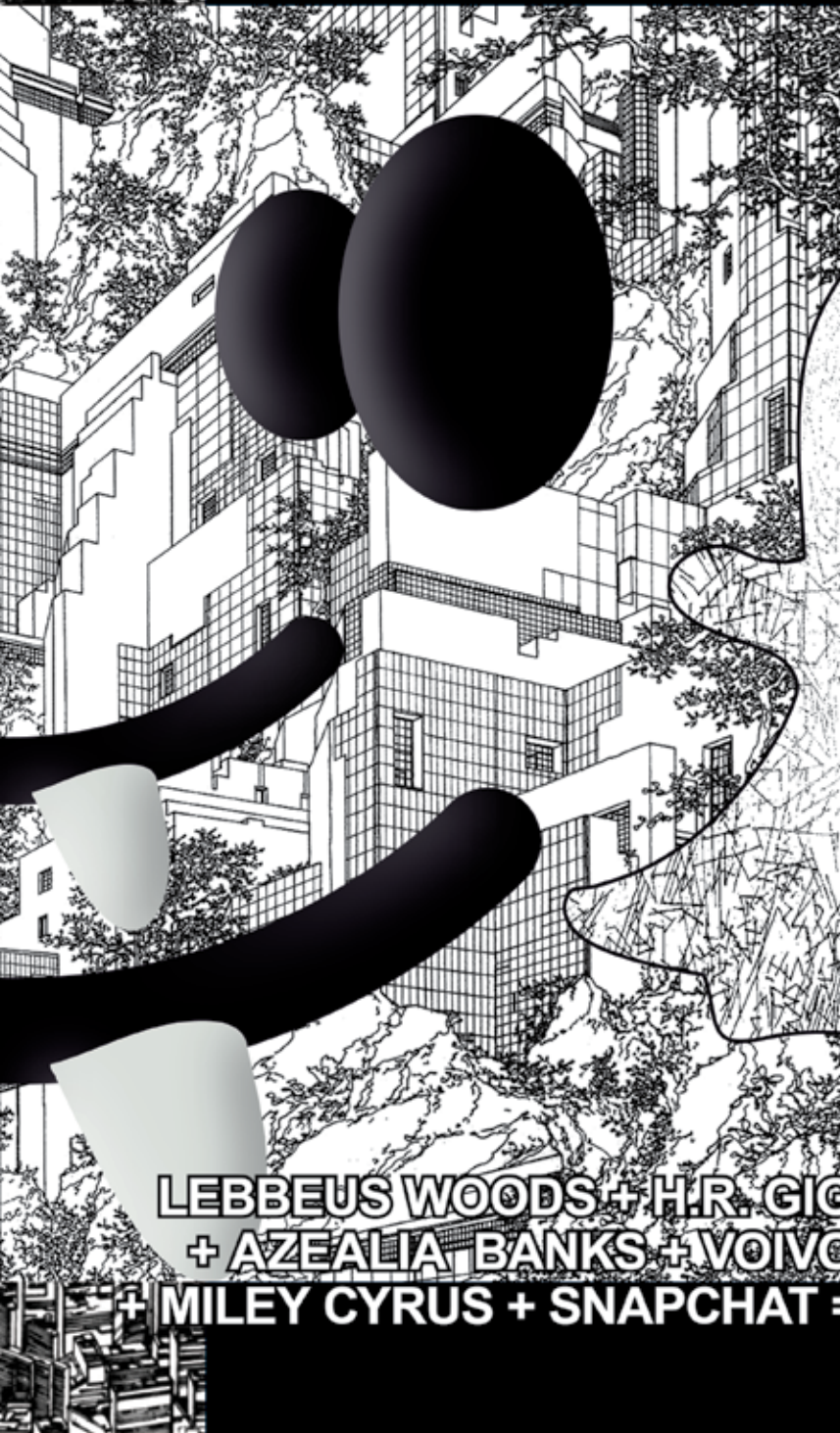
Whatever the pleasures and prodigious efforts associated with erecting architecture, the art of causing it to disappear can be equally compelling or satisfying.

The subtraction of buildings is as important as the making of buildings, and most buildings trigger a subtraction of some sort. As marketers, financial experts, planners, and politicians develop buildings, they also detonate buildings and landscapes. Financial industries surround seemingly static and durable structures—from small houses to massive sport stadiums or four-thousand-room casinos—with a volatile balloon of inflating and deflating value. Development encourages migrations into and away from cities, causing rapid growth and rapid decline. Buildings themselves even cause destruction not only because they replace previous buildings, but also because they can, by their often toxic presence, destroy their surroundings.

In the wake of recent crises, catastrophes, and population shifts, as buildings radiate negativity, a significant portion of the heavy machinery used to construct buildings is now busy taking them apart. Ruin and decay has its own pornography. Demolition has its own TV shows. Disassembly and teardown are not popular art forms. The newest approaches to building removal even appear to retract skyscrapers into the ground. Finally, it is easy to see, with half closed eyes, an accelerated time lapse within which large swaths of building and landscape seem to be simultaneously cultivated and harvested or built and unbuilt—an economy where subtraction is the other half of building. While a subtraction economy already exists, it is still perceived as something that does not exist—as something negative and therefore unknowable or to be avoided. Even when subtraction is planned, it is often treated as the disposal of an accidental or unintended consequence—a failure of planning's already fragile utopias. Subtraction is erasure rather than exchange—hiding an error rather than managing an ecology. Subtraction generally signals loss while accumulation or accretion generally signals growth. And when building is the only proper, sanctioned event, there is no platform in place for constructively handling the deletions that reasonably or unreasonably accompany building.

Architects and urbanists are connoisseurs of object form expressed with shape, outline, and geometry, and the design of object form usually results in the addition of building. But a subtraction economy that removes building must also deploy active forms. Subtraction is not simply absence, but a moment in a set of exchanged and advances, aggressions and attritions that are part of most active organizations.





**LEBBEUS WOODS + H.R. GIGER
+ AZEALIA BANKS + VOIVOD
+ MILEY CYRUS + SNAPCHAT = ???**

Active forms are multipliers, switches, remote controls, or governors—time-released protocols that generate these exchanges with a stream of objects and spaces. They are capable of orchestrating the ebbs and flows—the appearance and disappearance—of buildings.

A subtraction economy might even significantly alter the longstanding cultural habit of regarding buildings as financial instruments with the flexibility of currency. The financial industry has elaborate schemes for manipulating the virtual values attached to buildings despite the fact that buildings are often too durable to respond as if they were money. But an alternative subtraction portfolio materializes risks and rewards with tangible spatial variables that can be traded and banked on in a parallel market. These negotiations, designed as spatial levers, can stabilize, compete with, or even overwhelm financial markets to expand, contract or erase development.

Building subtraction, as a major industry and a design protocol, is a lucrative emergent global enterprise, a source of employment, and a political instrument. A subtraction protocol might be appropriate in many parts of the world where sprawling development has attracted distended or failed markets, where development would be wise to retreat from exhausted land or floodplains, or where special preserves, like rainforests, are valued for attributes that development disrupts. Such a protocol may also offer somewhat less violent tools of acquisition and more safeguards against disenfranchisement in the margins of informal settlement.

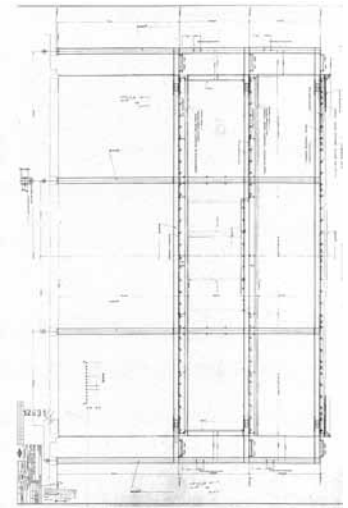
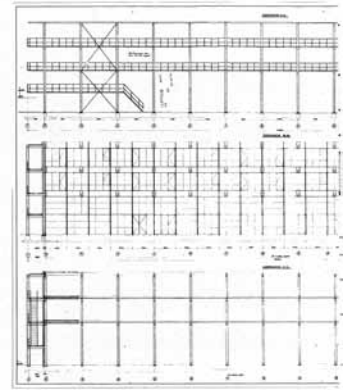
With its own aesthetic pleasures and an expanded repertoire of form making, subtraction also offers a redoubled territory for design. Before the 1960s, there were no historic preservation programs in universities. Soon, training in managing the subtraction or contraction of development—a practice that arguably even has a significant, if unacknowledged, tradition in the disciplines of architecture and urbanism. Architects—trained to make the building machine lurch forward—may know something about how to put it into reverse.

REDESIGN YOUTH HOSTEL IN OCKENBURGH, FRANK VAN KLINGEREN

The extension to the Ockenburgh youth hostel in The Hague was designed between 1971 and 1973 by Frank van Klingeren, and built throughout 1974. The building is a celebration of the unfinished and functional ambiguity that this architect strived for in his search for an architecture that fosters stimulation, encounter, and change influenced by users. Although it was originally designed as a concrete structure, the urge to start construction forced the architect to redesign it in steel. The resulting structure allowed for a flexible programmatic layout, and the large glass windows made seamless the transition between inside and outside.

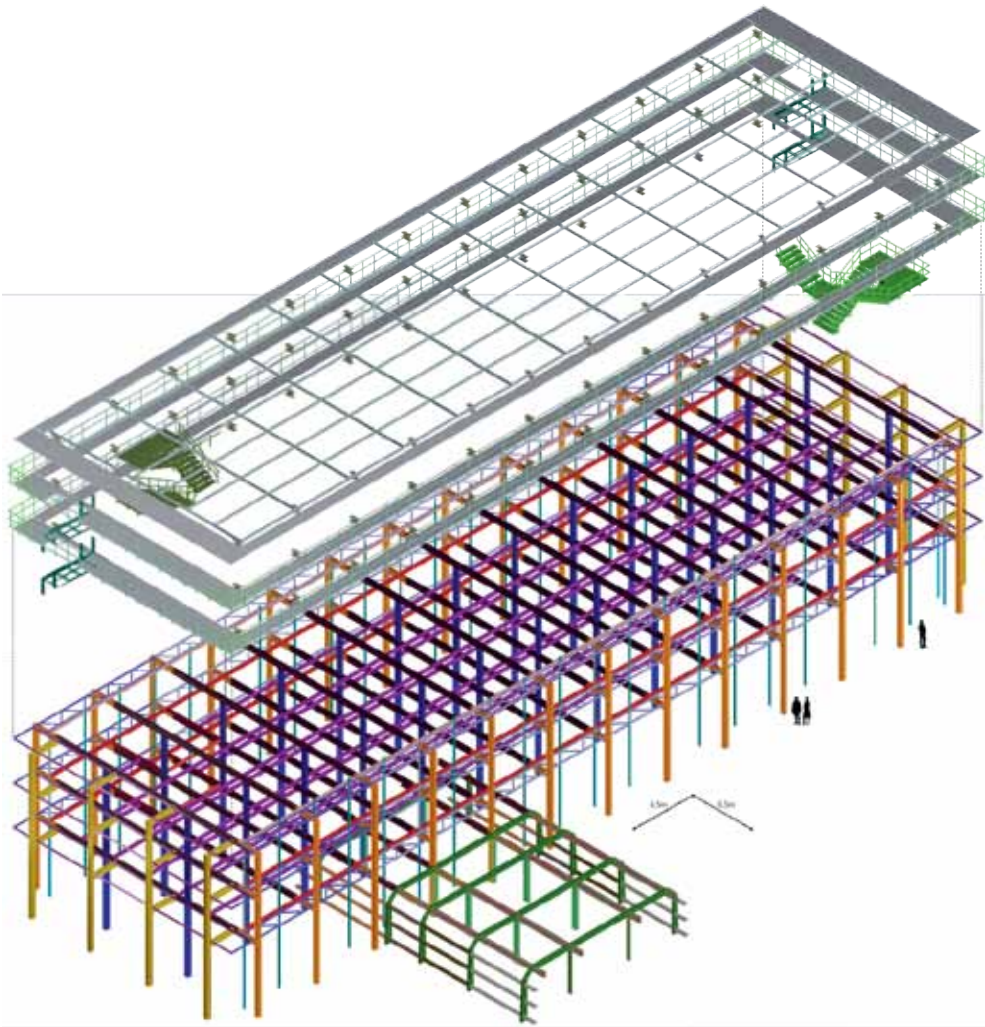
In 1997, the building was left vacant, and shortly after, the municipality of The Hague began to plan the transformation of the hostel into a conference hotel. However, it was not until 2007 that its demolition was suggested, as the building could not “be satisfactorily integrated into” the new requirements, both functionally and aesthetically.¹ Under the leadership of architect Leon Thier, a plan to save and reconstruct the building in a different location was put forward. In 2010, its steel structure was dismantled and stored.² While its rebuilding was planned for a year later, today the rusty steel beams and columns remain outdoors in the same location, awaiting their reassembly.

In this exercise, studio designs made use of the available steel components from the dismantled Van Klingeren building. Students visited the site where the steel pieces are stored and made an inventory. An equitable split of the available components was planned, and then these were distributed among the groups following fair rules. Components were allocated to a group; the ones that were not being used were put in a common materials bank and made available to the other groups. Exceptional items such as staircases were distributed on a different basis. The use of new steel elements was possible, but final designs were evaluated according to how they were able to minimize such external uses. At the end of the day, the designs used all available components of the original building.



Images courtesy of HVE Architecten bv, Studio Leon Thier, & Stebru Transformatie B.V.

1. ‘Protest tegen sloop jeugdherberg Van Klingeren’, *Architectenweb*. September 7, 2007. <https://architectenweb.nl/nieuws/artikel.aspx?ID=10246>
2. ‘Verplaatsing jeugdherberg Ockenburgh’, *Architectuur.org*. March 4, 2010. http://www.architectuur.org/nieuwsitem/1325/Verplaatsing_jeugdherberg_Ockenburgh.html



Above: Youth Hostel in Ockenburgh.
Original distribution of steel components.
Students of Studio Rotor: Deconstruction.

Right: Designs using the available steel components.

From left to right, top to bottom:

Birds: Helena Andersson, Tanya Tsui.

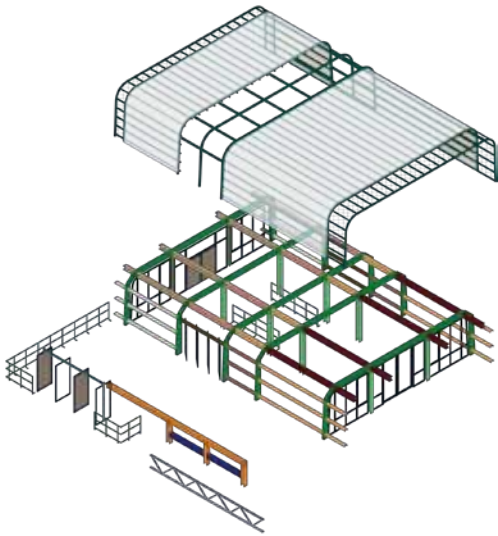
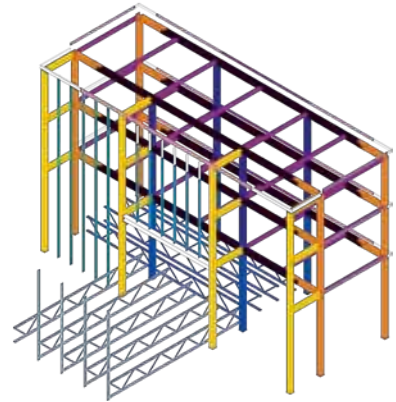
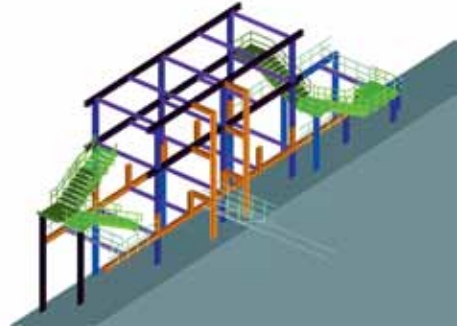
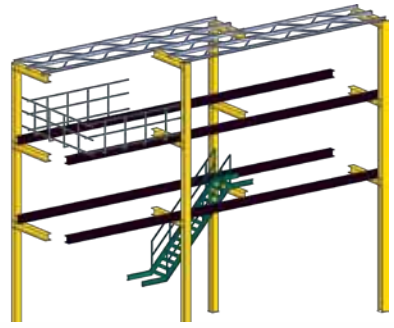
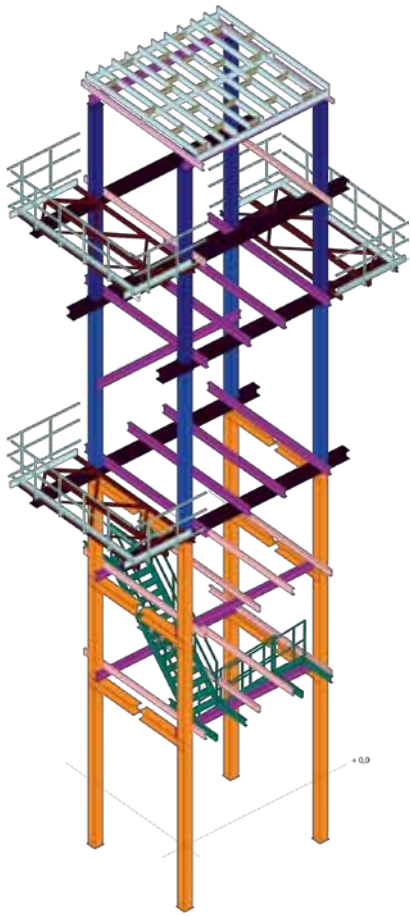
Scientists: Monsicha Kanittaprasert, Mara Wang.

Writers: Melanie Kwaks, Katarzyna Sołtysiak.

Seminar: Steven van der Woude, Ben Summers,
Serah-Ingrid higCalitz.

Cafe/Restaurant: Duong Vu Hong, Michelle
Bettman, Nutch Somboonthanasarn.

Spa/welness: Anna Gunnink, Amanda Schuurbiersb.





Dismantled steel components of the structure of the former youth hostel in Ockenburgh by Frank van Klingeren, removed and stored in 2010.

Photograph courtesy of HVE Architecten bv, Studio Leon Thier, & Stebru Transformatie B.V.

REUSE

MINISTRY OF SOCIAL AFFAIRS IN THE HAGUE, HERMAN HERTZBERGER

The third and last case study in the studio concerned the former Ministry of Social Affairs in The Hague, designed by Herman Hertzberger from 1979 on, which was inaugurated in 1990. The building ranks as one of the last major achievements of Dutch Structuralism. Using a limited number of basic concrete prefab elements, Hertzberger devised a spatial framework or grammar for both social interaction and collective co-creation, and individual self-expression. The building was tailor-made to house the Ministry, yet in 2016 the 70,000 m² structure was auctioned and sold to the real estate operator MRP Development, which has plans for its partial demolition and redevelopment.

Departing from this scenario, the students explored the material implications of this demolition. Gathering information from the Hertzberger archive kept at Het Nieuwe Instituut and from site visits, the students developed a quantitative analysis of the demolition and an assessment of those elements that could be salvaged for off-site reuse in an economically plausible manner. Herman Hertzberger joined the studio for a tour of the building and a profound discussion with the students and professors on his design and the current state of affairs. A detailed description and inventory of building components, including prefab concrete structural elements, ceilings and lighting fixtures, various pieces of technical equipment, glass, window profiles, steel, doors and partition walls, and signage and art works, was followed by the dismantling of representative samples of materials by the Rotor DC team. The final review exhibition was set in the public halls of the Ministry and staged as a contemporary archaeological site, with the samples arranged in a new compositional order, while the design work by the students showed its potential for reuse and reinterpretation.



Images courtesy of AHH / Herman Hertzberger.

MINISTRY OF SOCIAL AFFAIRS IN THE HAGUE BUILDING ANALYSIS AND REDESIGN FOCI

Techniques: Duong Vu Hong, Benjamin Summers.

Lighting and ceilings: Nutchā Somboonthanasarn, Monsicha Kanittaprasert.

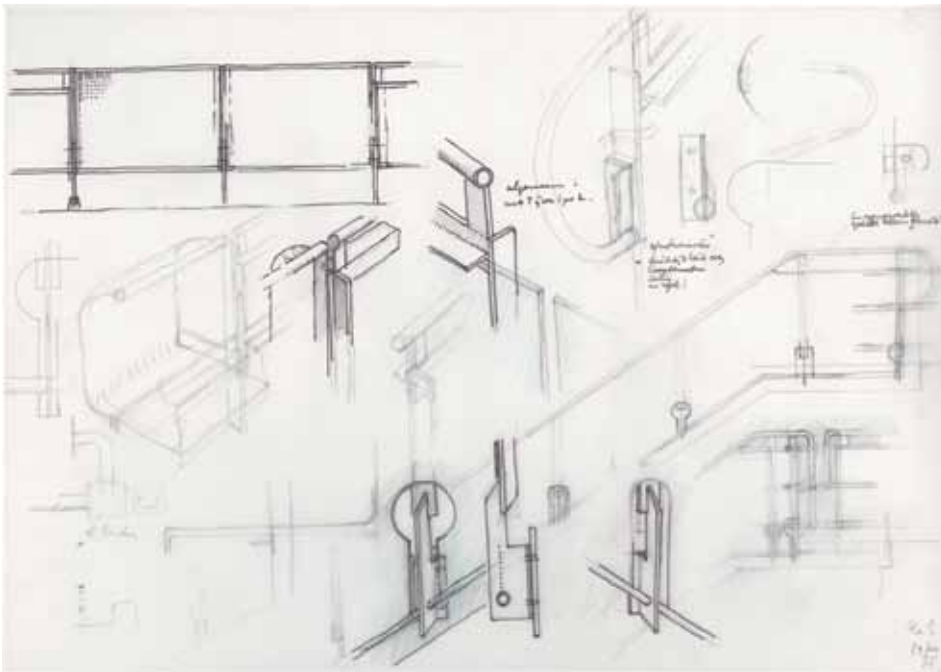
Steel: Helena Andersson, Serah-Ingrid Calitz.

Glazing: Michelle Bettman, Mara Wang.

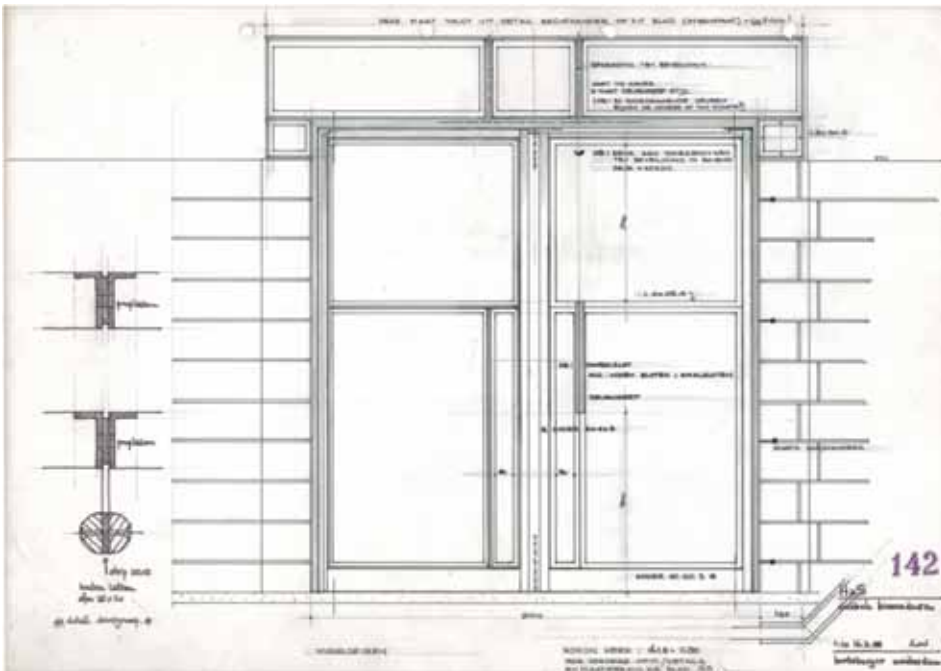
Concrete: Amanda Schuurbiers, Tanya Tsui.

Doors and partitions: Melanie Kwaks, Katarzyna Sołtysiak.

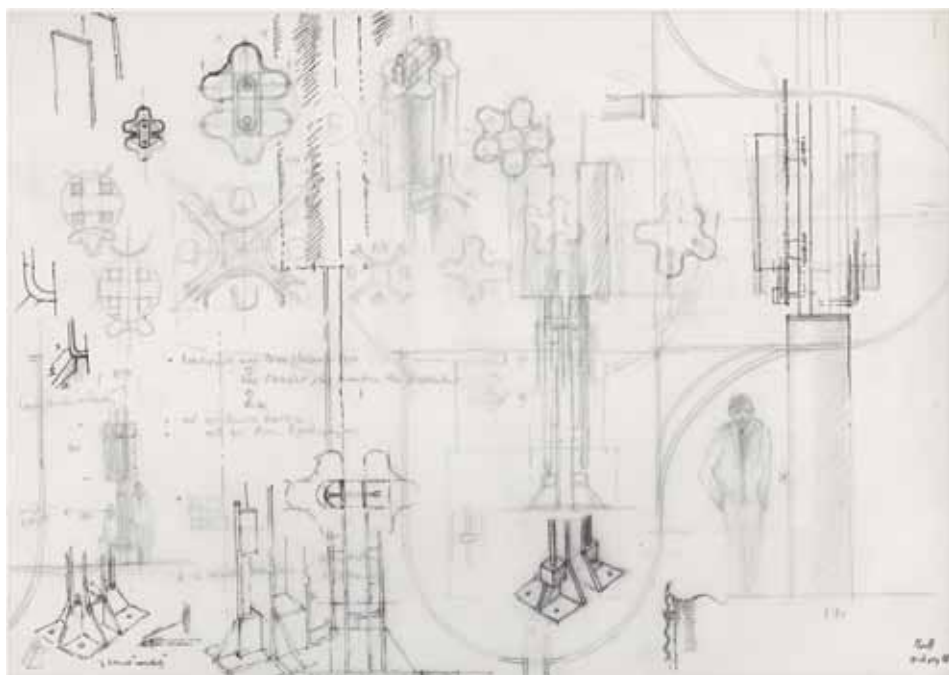
Art and signage: Steven van der Woude, Anna Gunnink.



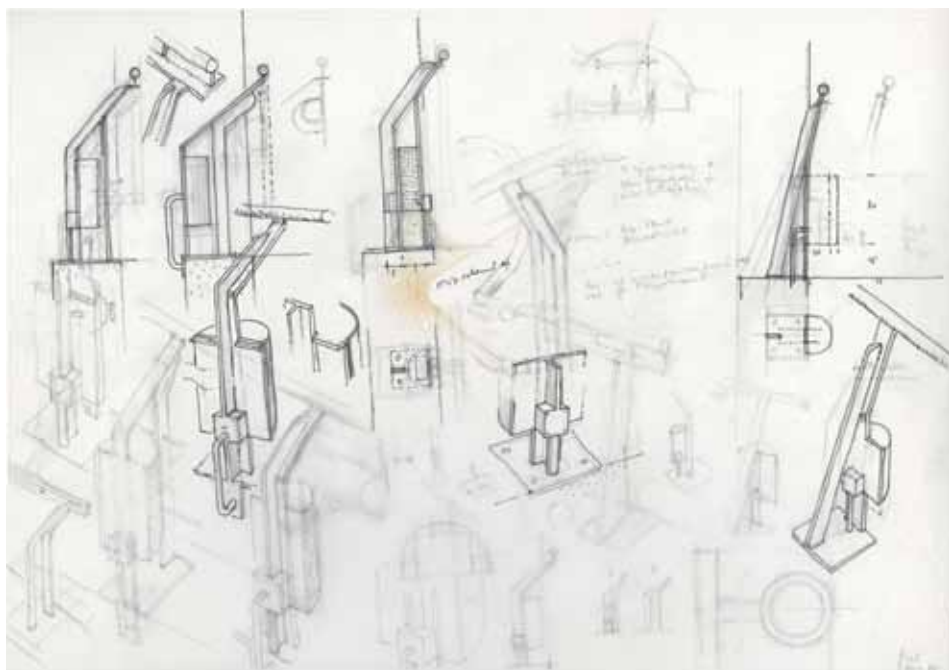
Sketch of the detailing of the balustrade, February 1988. Het Nieuwe Instituut, Rotterdam, Hertzberger, H./Archief (HERT), inv.nr. HERT 29.23-9. HERT 29.23-9.



Drawing of a interior double door with details of the wooden door handles, March 1988. Het Nieuwe Instituut, Rotterdam, Hertzberger, H./Archief (HERT), inv.nr. HERT 29.119-4.



Sketch showing the development of the design of the light posts in the atrium of the Ministry, September 1988. Het Nieuwe Instituut, Rotterdam, Hertzberger, H./Archief (HERT), inv.nr. HERT 29.23-8.



Sketch showing the design of the integration of the lighting fixture in a staircase, August 1988. Het Nieuwe Instituut, Rotterdam, Hertzberger, H./Archief (HERT), inv.nr. HERT 29.23-6.

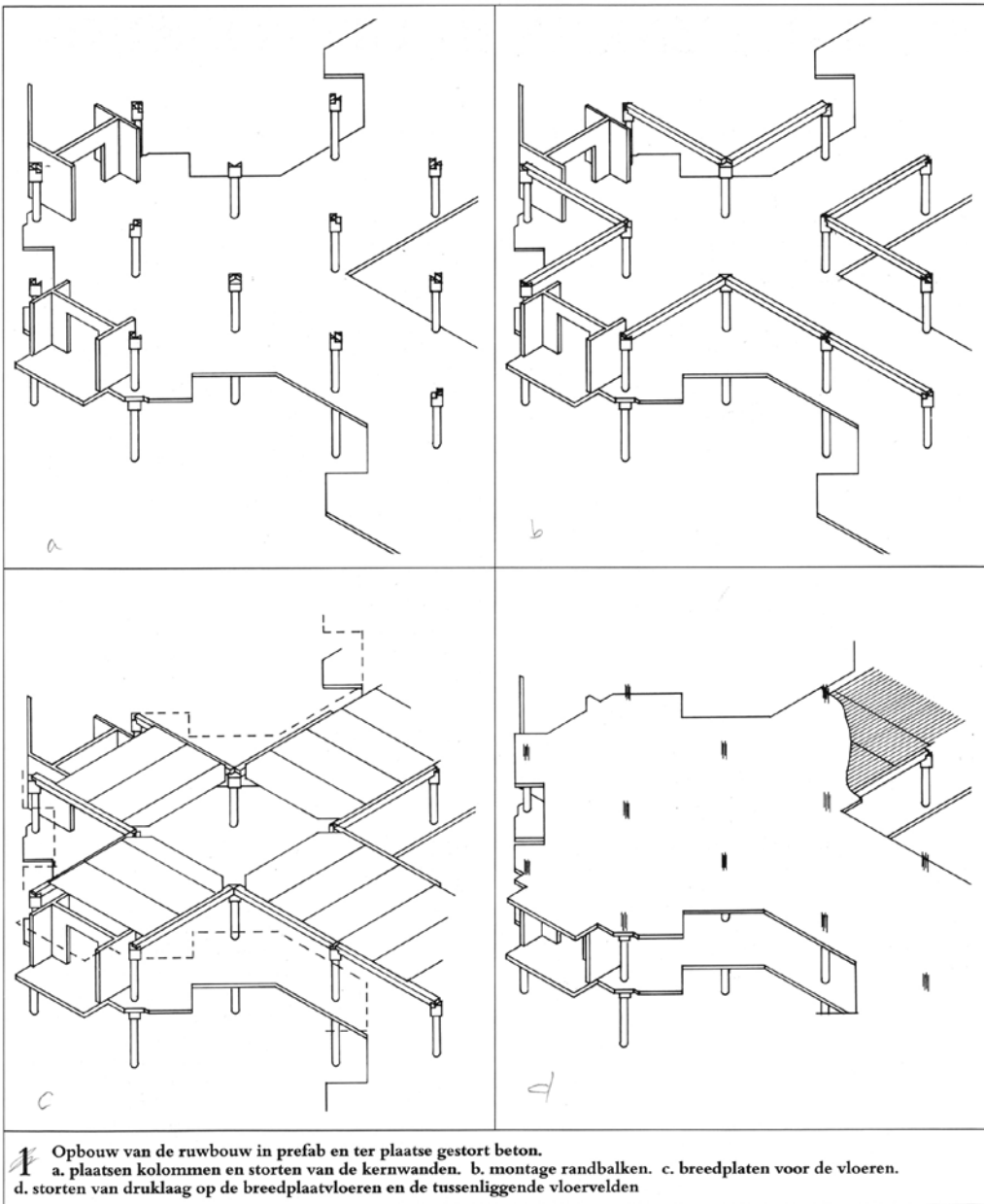
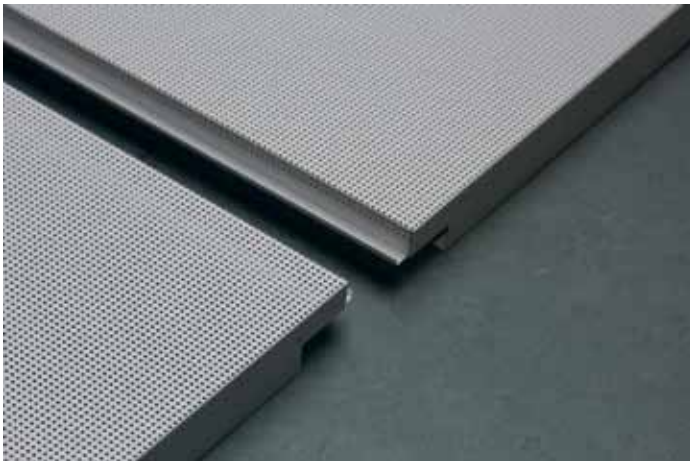


Diagram of the construction process using concrete prefab elements, undated.

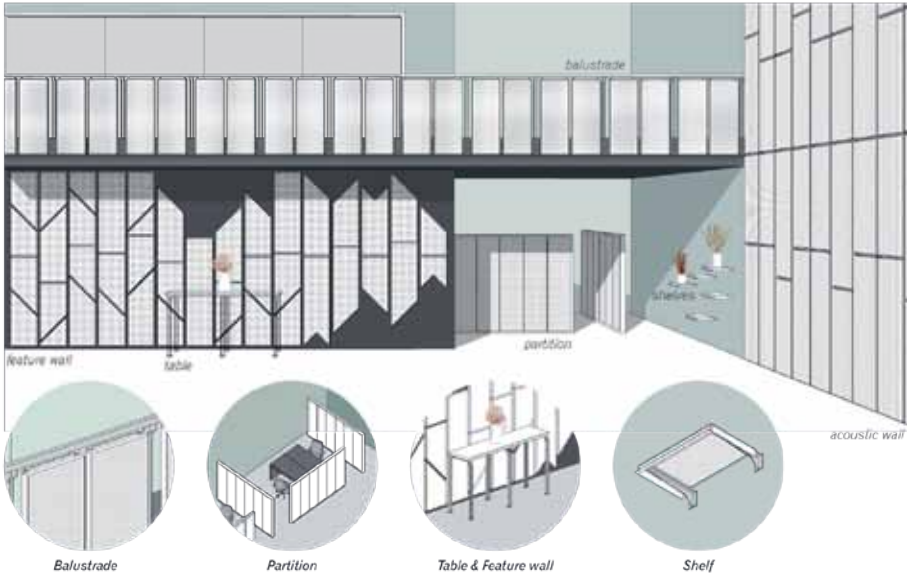
Het Nieuwe Instituut, Rotterdam, Hertzberger, H./Archief (HERT), inv.nr. HERT 29.130-4.



Lighting & Ceiling — Nutchta Somboonthanasarn, Monsicha Kanittaprasert



Cultural Value: Light ornaments scenario, an exhibition at Het Nieuwe Instituut.

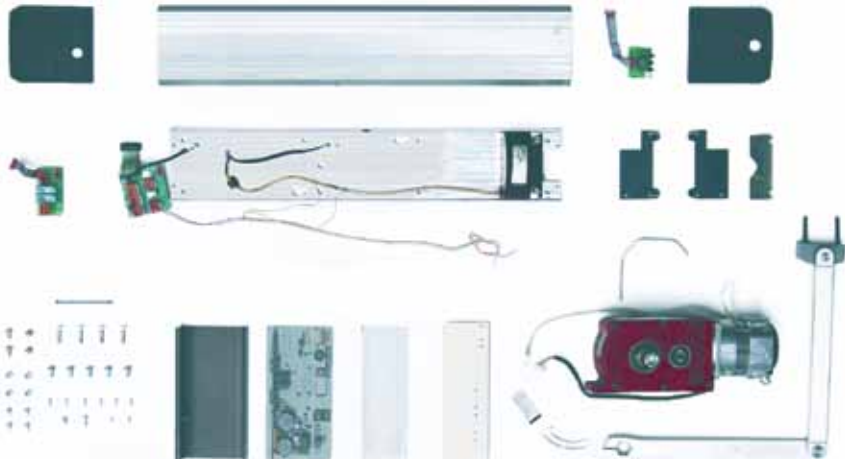


Non-cultural Value: Ceiling scenario, interior design with reused fragments at Rotor showroom in Brussels.

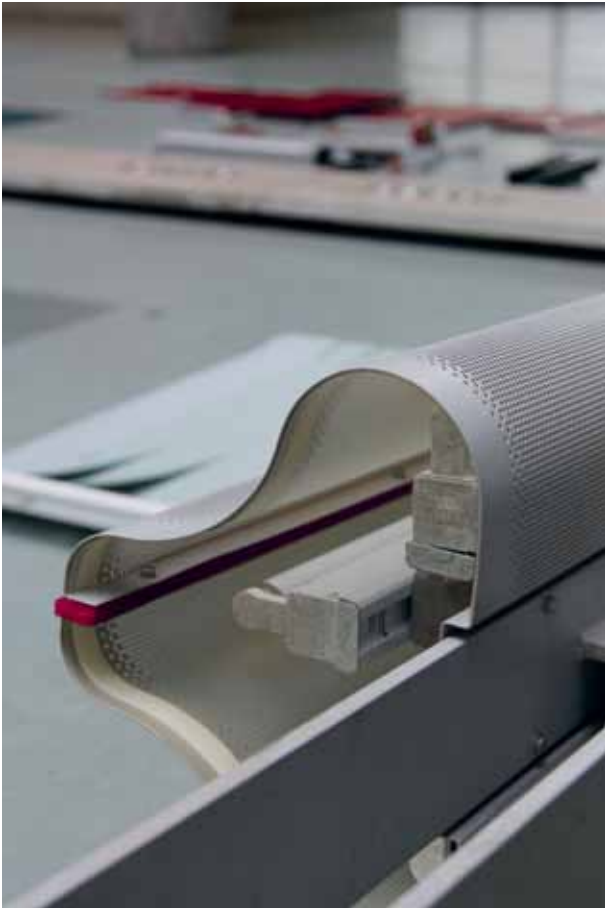
Captain Component: Proposal for a Material Reuse Certification
— Duong Vu Hong, Benjamin Summers



The automatic door openers, activated with motion sensors, were placed on all double glazed doors during a renovation campaign in 2005. The students who deconstructed this equipment remarked: “Our desire to disassemble components came from trying to understand how difficult it was to deconstruct a building. In this case, it took two people taking turns for at least half an hour to fully dismantle the object. The services of a building can be compared to the body’s nervous system: sensing, moving, adapting: very functional objects that people barely notice until they stop working. If our process is analogous to an autopsy — determining cause of death — then you would have to call it a pre mortem (as opposed to post mortem), seeing as the subject is still living, moving, breathing.”



Overall the most numerous service item in the building with 1,464 individual elements at 3 kg apiece (and 2 kg for the duo). The students were able to separate this one element into 81 constituent parts, although there were a further 9 elements that we were unable to separate. Therefore in the whole building, for the plug sockets alone, there are around 131,760 pieces, weighing a total of 3.07 tonnes. To their knowledge, not one of them was faulty before deconstruction began.

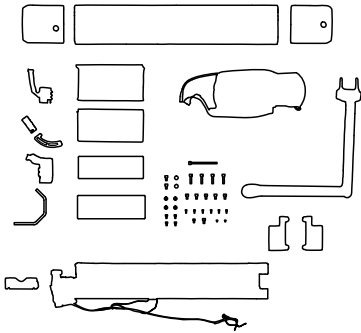
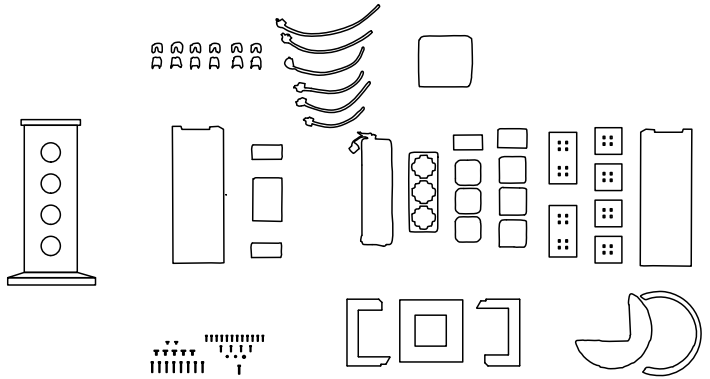
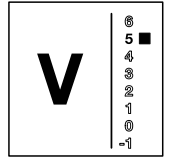
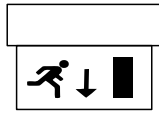
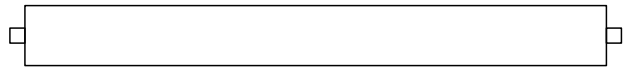
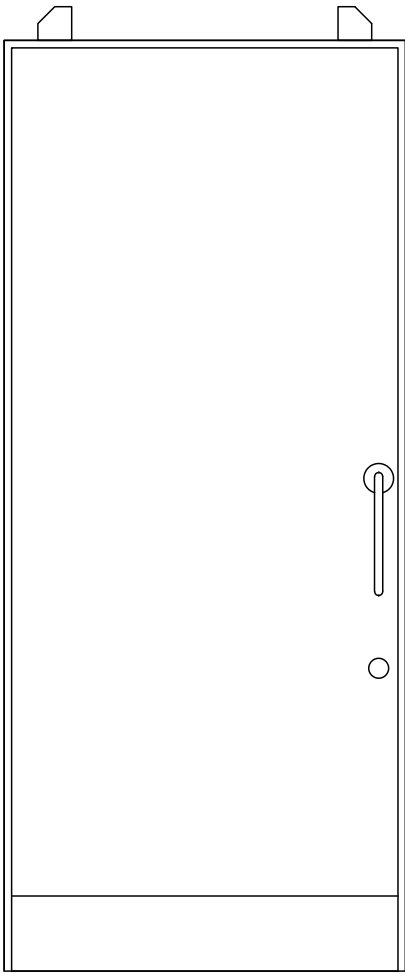


POSTSCRIPT
STUDIO ROTOR: DECONSTRUCTION
INSTALLATION IN THE EXHIBITION
“ARCHIVE INTERPRETATIONS”
HET NIEUWE INSTITUUT, ROTTERDAM
7 SEPTEMBER – 31 OCTOBER 2017

As part of their final review, the students of Studio Rotor: Deconstruction displayed extracted components of the Ministry of Social Affairs and Employment in the public halls of the ministry itself. The *in situ* exhibition was the result of a series of dismantling tests conducted there, and was staged with the samples recollected laying out flat on the floor, at the bottom of the atrium, so that they could be seen and pictured from the floors above. Elements on display were: an hermetically sealed sliding door, a light post of the atrium, a concrete block, a concrete tile, two mosaic inlaid in a concrete bench, an aluminum door handle, wooden door handles, an office openable window, a box window, a tube-light cover, a stair light cover, an end segment of balustrade, a plug tower, an automatic door opener, acoustic ceiling panels, and diverse signage. The ambition was to restage an adapted version of this show as part of the exhibition ‘Archive Interpretations’ at Het Nieuwe Instituut and to confront it with a selection of drawings taken from the Hertzberger archive, held at the same institution. Unfortunately, after the initial collaboration, the real estate operator decided at the last minute to keep all building components in The Hague. We choose to stick to the planned scenography, but replaced the items no longer available by an outline in white tape to emphasize the notion of absence and transposition that is part and parcel of the practices of deconstruction, reuse and preservation. The experience shows once more how much simpler it is to preserve documents than it is to preserve buildings.



Photograph by Johannes Schwartz.



Het Nieuwe Instituut

In the Spring semester 2017 the Jaap Bakema Study Centre welcomed TU Delft Visiting Professors Lionel Devlieger and Maarten Gielen of the Brussels based office Rotor. Focus of *Studio Rotor: Deconstruction* was the potential for re-use of the legacy of post-war modernist buildings as well as some iconic and didactic contemporary projects. The studio work was exhibited at the halls of the former Ministry of Social Affairs, and later as part of the exhibition *Archive Interpretations* at Het Nieuwe Instituut.

programme
Landscape and Interior

project
Studio Rotor: Deconstruction

file
TU Delft Visiting Professors
Programme

design
Lorraine Furter