MUTUALISTIC UNDERSTANDING OF FILL-IN ARCHITECTURE

Betül Gürcan

Architectural Engineering Graduation Studio
AR3AE013 Research Paper

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INTECTURE

TU Delft

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I. Theory

Introduction

Cities develop differently depending on factors like economic and social problems and are formed by their districts, neighborhoods, and communities[1]. The stronger these communities are, the more immune they will be to the harmful factors that may lead to e.g. urban decay, vacancy, and degradation. One blight, neglected building has the potency to infect this community and can cause a continuous chair of disrepair until this community becomes lifeless and unproductive, making the community "ill". (McDaniel, 2008)[2]

Aldo Rossi developed in the mid-1960s an urban theory where the city was a three-dimensional fabric which developed through time. But at the same time under the influence of Modernism, a lot of city centers were destroyed and taken down to be replaced by new buildings (Van Kooten)[3]. This was an individualistic approach towards the city since the city's soul was damaged by achieving new planning through destroying valued existing structures.
Over the last years, a new type of architecture arose, existing buildings became relevant for architects, a step against the individualistic thinking about the city. Besides buildings also the unbuilt between the built, interstitial spaces, became relevant. Dense doesn't mean higher it means being better organized. By filling these interstitial spaces around the city with low rise buildings, density is increased, but also broken communities are linked together, by doing so both environmental and social sustainability is increased (CNN 2008)[4].

These interstitial spaces have been addressed in a variety of terms: as simply unused urban spaces (Nefs, 2006)[5] to social-spatial phenomena of "urban cracks" (Van Eeghem, Steel, Verschelden and Dekeyrel, 2011)[6], to economically "dead spaces" between buildings (Griffiths, 2012)[7]. Together with another set of leftover spaces these gaps in the urban fabric maintain called what amongst others American geographer and planner Abraham Akkerman and architect Ariela Cornfield see as a typology of "urban voids". They are unplanned, discarded and unhappy spaces, without pretense (Akkerman and Cornfield, 2010)[8]. In their article, they criticise that these spaces are completely off the map, not even shown in urban blueprints as no one has planned for them. These spaces emerge by accident; sometimes as the result of negligence or omission, sometimes as simply a feature of time flow in the city. Having the characters of an infection, the urban voids symptomise a sustained decline.
As the population grows, the accessible empty spaces within the urban fabric are becoming less and less reachable. Recent design strategies that engage densification through these interstitial spaces often approach them in terms of "urban infills". But attitudes towards the use of urban voids vary drastically around the world and there are many urban centers in which every centimeter of space is precious and good to use.

Urban infills, which are strategic interventions, are built on vacant or under-utilized

1 A community is a group of people living in the same place (https://en.oxforddictionaries.com/definition/community)
2 McDaniel, C. N. (2008). Strategic Intervention: Parasitic Architecture. (Master thesis), University of Cincinnati, Cincinnati. Retrieved from https://etd.ohiolink.edu/!etd.send_file?accession=ucin1212011864&disposition=inline
3 Van Kooten, L. A. (n.d.) retrieved from: http://www.architectenweb.nl/aweb/archipedia/archipedia.asp?ID=790
4 CNN (2008) Urban densification: Creating space to live retrieved from http://edition.cnn.com/2008/WORLD/asiapcf/12/03/eco.denseliving/
5 Nefs, M. (2006). Unused urban space: conservation or transformation? Polemics about the future of urban wastelands and abandoned buildings.
6 Van Eeghem, E., Steel, R., Verschelden, G., Dekeyrel, C. (2011). retrieved from https://isea2011.sabanciuniv.edu/paper/urban-cracks-interstitial-spaces-city
7 Griffiths, A. (2012). retrieved from: https://www.architonic.com/en/story/alyn-griffiths-mind-the-gap-architects-fittingextraordinary-buildings-into-small-spaces/7000665
8 Akkerman, A., Cornfield, A. F. (2009) Structurist 2009/2010, pp. 30-35 here p.32

properties or between existing buildings, giving new meanings and functions to obsolete spaces that have lost their functionality. They can be seen as an attempt to achieve urban architecture and can be found under the name “parasitic architecture” (Pit, Steller, and Streng)[9]; structures clamping their selves on an existing building or a structure.
This paper is an attempt of a research of making a problematic area attractive by strategic interventions shaped by lightweight structures instead of demolishing. This paper will explore an alternate form of urban densification where the focus will be on the multiple empty spaces found in the urban fabric as a way to achieve sustainable densification, therefore this paper will research the potential of strategic interventions.

Genesis of the term

Nowadays it’s common to use the designation parasitic architecture on any intervention attached to, up or clamped to an existing building, because of the close relationship between two different structures. But is “parasitic architecture” the proper term to describe this close relation? To understand this it is important to investigate the genesis of this term. In biology, the term parasite is defined as:

> *‘An organism which lives in or on another organism (its host) and benefits by deriving nutrients at the other’s expense.*[10]

It is a relationship of two organisms which are phylogenetically unrelated, co-exist over a prolonged period of time. But it also understands its host; it knows how to use it to its full potential without killing it.
In the Renaissance it was believed that parasites were a product of the body itself. A massive tapeworm was considered to be an independently functioning organism, but nobody had ever seen this worm crawling into somebody’s mouth, so it had to be produced by the body.
As the definition already tells, there is a “close relation” - a symbiosis - between two different organisms. Parasitism represents a specific kind of relationship in which just one organism benefits from the other’s expense, but this is not the case here. A parasitic relationship doesn’t describe the kind of relationship that these interventions establish with their “hosts”. Pit, Stellar and Streng describes in their article that a parasite is “selfish” since it does not return it host’s favor.
There is a big contradiction between the intentions and the individualistic meaning of this term. Since the urban infills are deployed as an architectural tool to contribute to the larger urban scale. These urban infills are creating a specific kind of co-existence between the new and the existing. Shapes of these urban infills vary drastically, but the intentions are the same: they are there to ensure the existing structure a longer durability.

Architectural parasites don’t follow ‘the traditional building rules’, a parasite building or structure wants to make new urban living possible. According to Brown (2003), the parasitic species of architecture are flowing with the natural organic cycle that requires a higher level of adaptability and flexibility than conventional architecture.

According to Brown (2003)[11], there are five types of Parasitic Architecture:
1. Architecture can be pre-programmed to self-destruct on a certain day at a certain time
2. Architecture can grow over time, be a part of a cycle that performs on a city

9 Pit, M., Steller, K., Streng, G. (n.d.) retrieved from http://www.gerjanstreng.eu/files/T02%20essay%20parasitic%20architecture.pdf
10 https://en.oxforddictionaries.com/definition/parasite’
11 Brown, G. (2003). Freedom and transience of space (Techno-nomads and transformers). Retrieved 10 October, 2015, from https://www.academia.edu/1472829/Freedom_and_Transience_of_Space

scale, similar to a clock, in that it yields an awareness of time
3. Architecture can be designed to be constructed with its imminent disassembly in mind
4. Architecture can be designed as a framework for universal facilitation; this approach is similar to a loose set of cloths or the elasticated 'one-size-fits-all' philosophy
5. Architecture can be designed as a transformer, adopting more than one geometrical out of stasis
The second type is the most inspiring to this paper

The notion parasitic architecture is often associated with German architect Oswald Mathias Ungers. In his article "Großformen im Wohnungsbau" he describes his vision on the city: 'Grossform generates the frame, the order and planes space for an unforeseen, unplannable, and dynamic process, for a parasitic architecture. Without this component planning remains inflexible and devoid of life'. According to Unger, parasitic architecture is a filling of Großformen in a city.[12]
Lara Schrijver (2006) describes in her article this quote as the situation that will be intensified in the notion of "a city within a city"; whatever goes in a city is based on individual parts, and everything within is related. This is a completely different vision of the city than the modernists had.
Melet and Vreedenburg (2005)[13] define in their book "Rooftop Architecture" the strategic interventions as "symbionts". This refers to organisms that take part in any kind of symbiosis. They define it as: 'Symbiosis is the constant, close physical association between two dissimilar organisms. Mutualism, in which both symbionts benefit from the association, is its most positive form. Parasitism, in which the host-symbiont is harmed by the guest organism, is it's most negative form'.
This new term is the replacer of the term parasite, exploiting the "host" is impossible within architecture because of a negative outcome, meaning that the intervention would hardly find space to exist.
Also Pit, Stellar and Streng substitute the term parasitism for another therm: mutualism:

Mutualism is a more positive form of symbiosis where both organisms benefit from their relationship. Within this relationship, one organism is usually smaller than the other.

But what is the difference between these three relationships?
Mutualism in biology is the most positive form of symbiosis, and "mutualistic architecture" is defined as:

Mutualistic architecture is, by its very definition, an inclusive discipline that allows for diversity and integration.

Parasitic architecture isn't the proper term to describe projects which are made for mutual benefits. Since they are buildings which are built to exploit the potentials served by urbanism.
Mutualism is the most positive form of symbiosis; mutualistic architecture therefore too, the effect on the surroundings is greater than the sum of the parts. Not only the local area benefits from the positive effect/outcome but also the city.
Whilst architectural journals often refer to urban infills as parasites and are considered as isolated
architectural objects, an understanding like this totally ignores the impacts these interventions can have on their surroundings. They also have the potential to aspire

12 'Warum Großform? ... Die Antwort: Die Grossform schafft den Rahmen, die Ordnung und den geplanten Raum für einen unvorhersehbaren, nicht planbaren, lebenden Prozess, für eine parasitäre Architektur. Ohne diese Komponente bleibt jede Planung starr und leblos.' Oswald Matthias Ungers, "Großformen im Wohnungsbau" (1967) cited after Lara Schrijver, "The Archipelago City: Piecing together Collectivities," OASE 71, November 2006, pp. 18–36, here 26.
13 Melet, E., Vreedenburg, E. (2005) Rooftop Architecture: Building On An Elevated Surface.

Fig. 1
Parasite in biology - Cymothoa Exigua

Fig. 2
Symbiosis in biology - A clear example of this phenomenon is the “Egyptian plover”, this bird helps a crocodile keeping parasites of its body, while retrieving food for itself.

Fig. 3
Symbiosis in architecture
Parasite office by Zabor Architects

to be more than just a structure and can change the way cities are densified.
In this way, parasitic architecture can start a process of changes. They function as a medium used by a group of people to negotiate with existing systems and to propose certain changes of these systems: a mental desire has been transformed into a tactile structure.
Once the urban infill is embedded, the immune system of the city comes into action. Urban infills are always a provocation against what already exists. It activates the battle between the people who support the intervention and the people who want to maintain the city as it is, the second group are the people who are provoked by the intervention.
The co-existence between urban infills and their hosts should be regarded as an example of mutualism since it's deployed to meet mutual benefits. Also, the users of the city need to be convinced about the good intentions of these interventions. An urban infill will be deployed to manipulate the host to serve its needs, which is also the frightening part since nobody likes to be controlled by an external force. Useful interventions allow the users of the city to further develop around it.
Besides all the advantages urban infills can have on their surroundings, there is also an important disadvantage: in a mutual relationship, an organism won't survive if the other organism is destroyed, in architecture the intervention can't sustain its own existence without siphoning energy from the surplus supply demonstrated in host buildings.

Methods

The research presented in this paper will be split into two parts:
1. A study on the theory behind mutualistic architecture / of mutual relationships with lightweight structures
2. A database consisting of 34 case studies

Methods and techniques of research, which will be used, are in the beginning literature studies; reading relevant literature is an essentially important aspect of research.

The second one will be a case study, in the form of a database of lightweight structures in architecture. Several attempts are made where the same subject and/or techniques were applied.

When it comes to finding the suitable location(s), location study has to be applied to harvest proper results.
- Mapping the chosen area
- Visit city archive for floor plans of existing buildings
- Visit the municipality of Heerlen

The last method will be researched by design, although it's a very personal way of discovering things, I surely believe that by implementing the previously described methods, I will be able to create my own applicable design.

Overall research question

"How to design an architectural intervention, which could be implemented on various urban cracks, while taking the opportunities that existing constructions may provide into account?"

Herein fits the Technical Research Question, be researched in this paper:

How to design an architectural element attached to an existing building, consisting of a lightweight structure?

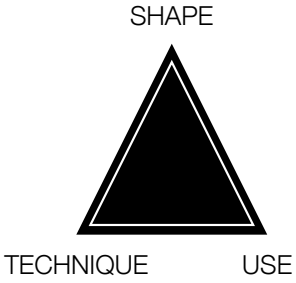
II. Database

Database categories

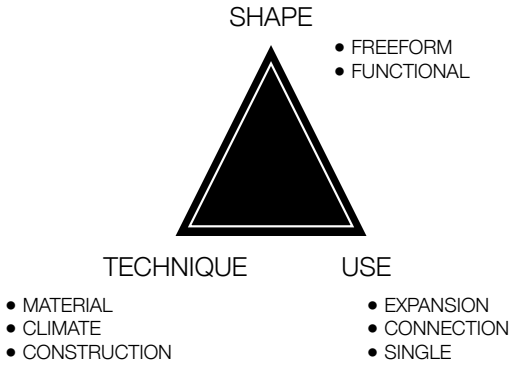
The selection of the case studies are based on the following aspects:

- The mutualistic features of the interventions
- Lightweight materials and structures
- Interventions which are supported by host buildings
- Contrast
- Improvement

The projects needed to be organized to obtain results from them. They are organized by the Vitruvian Virtues of Architecture, based on the aspects shape, technique and use:

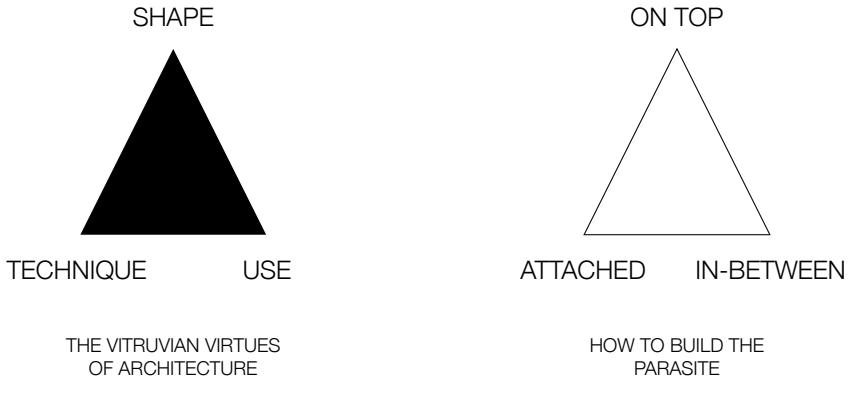


Adding more detail to these aspects brought the following scheme:



The shape of the intervention could be freely formed or was better to have it more functional. But the intervention could also act as an expansion or connection, or added as a single element. The relevant aspects of technique are in this case: material (lightweight), the indoor climate and construction techniques.

The way these interventions are built also matters. To questioning the technique behind these interventions the projects are categorized again:



IN BETWEEN

PARASITE OFFICE

01

Location:
Moscow, Russia

Function
Office

Year:
2011, Not realized

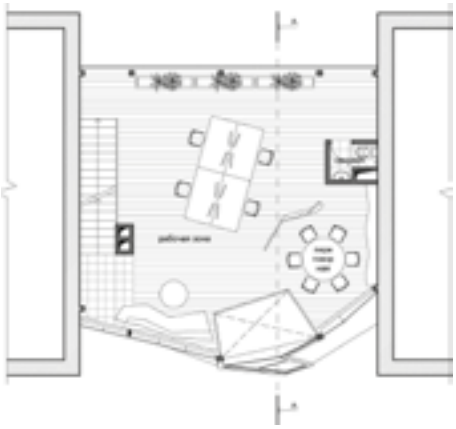
Architect:
Za Bor Architects

Durig the architectural biennale “Arch Moscow” in may 2011, Za Bor Architects presented an essentially new idea of effective use of inhabited areas with the aim of practical business spaces creation Many areas in Moscow are featured by the presence of multi-storey buildings with end walls and wide passages between them. In this project, these free spaces between buildings are used for the creation of economic offices which do not block the courtyard access.
The Parasite Office shall become Za Bor Architects’ own work area. It provides a three-floor volume with an accessible roof area, divided with modular floor panels. A single structural unit clamped between the blind facades of the houses is the shaping framework. The dynamic polygonal main facade is made of light and durable cellular polycarbonate. The courtyard facing facade is flat and completely glazed. (Borisenko & Zaytsev, 2011)

From left to right:
1. Exterior render
2. Exterior render
3. First floor
4. Second floor
5. Third floor
6. Section
7. Interior render

1

2



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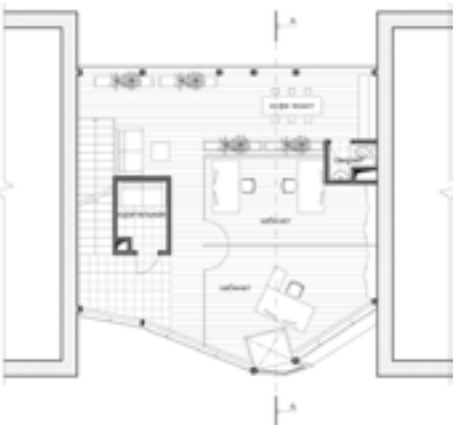

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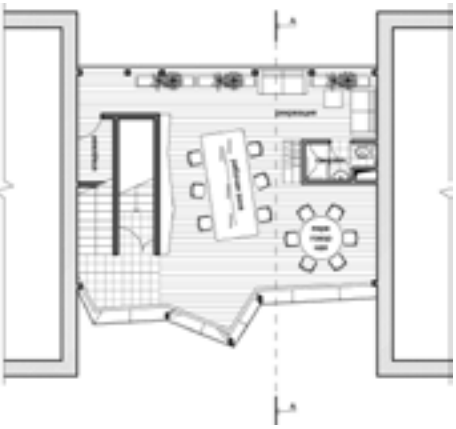

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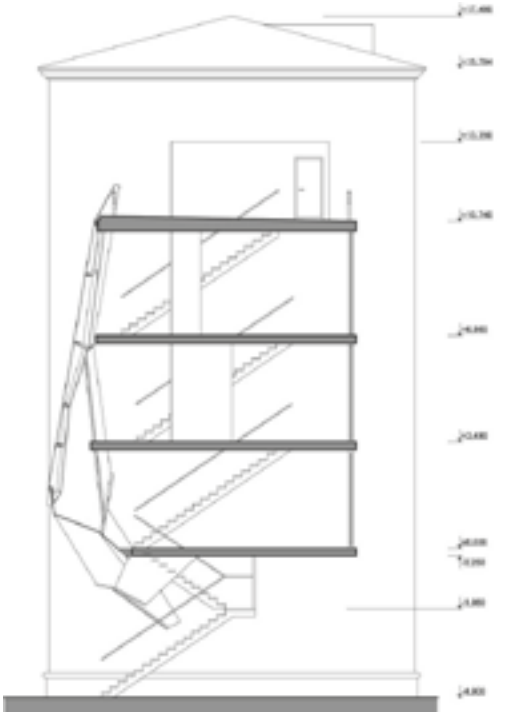


6

7

PARASITE HOUSE

02

Location:
Jerusalem, Israel

Function
Dwelling

Year:
2013, Not realized

Architect:
1st year student of Riseba

First-year students of Riseba University presented their projects of architectural parasites for the houses of Jeruzalemes streets.
Parasites are flexible and temporary buildings designed by architects or artists. Those small-scale and mobile architectonic interventions provide the idea of a new way of planning. (FAD, 2013)

1. Architectural model

1

LIVE BETWEEN BUILDINGS

03

Location:
Various

Function
Dwelling

Year:
2013, Not realized

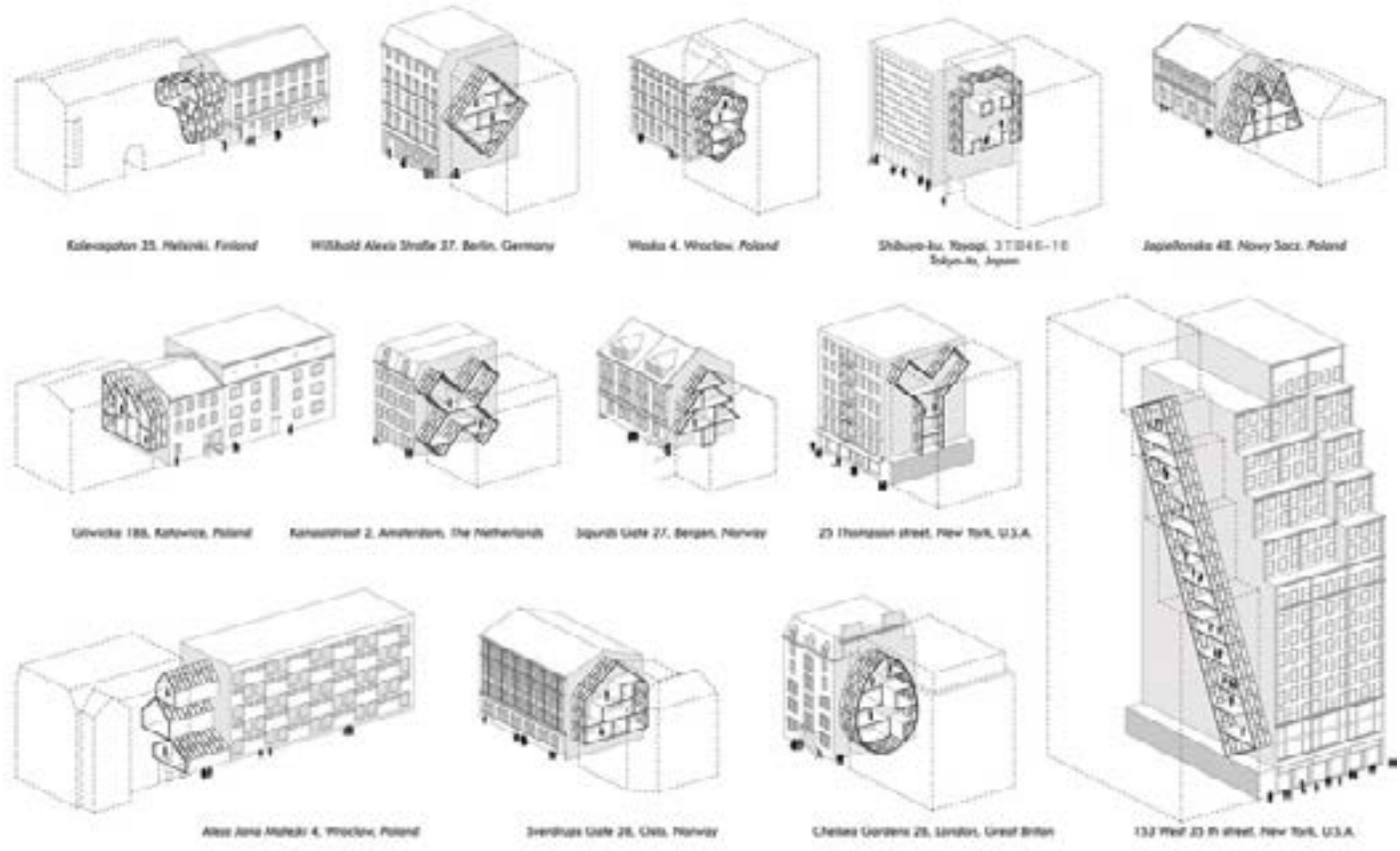
Architect:
Mateusz Mastalski & Ole Robin Storjohann

The competition “New Vision of the Loft” organized by FAKRO, a roof window manufacturer, aims to create a new way of living in the city.
Infills between existing buildings consisting almost entirely of FAKRO window technology enable a living close to city life while exploiting the qualities of the existing blind walls of the city. With minimal footprint and facade surface but maximum living quality, where light and space play a major role, this project contributes to a denser and sustainable city.
The images include various examples of houses, showing both the range of possible typologies and the available interesting infills in the urban fabric of cities worldwide.
(Furuto, 2013)

From left to right:
1. Section
2. Various prototype proposals


FAKRO

1


Kalevagatan 23. Helsinki. Finland
Hildebald Alexis Straße 37. Berlin. Germany
Wodna 4. Wrocław. Poland
Shibuya-ku. Yoyogi. 3T046-16
Tokyo-to. Japan
Jagiellońska 48. Nowy Sącz. Poland
Gliwicka 186. Katowice. Poland
Kanaalstraat 2. Amsterdam. The Netherlands
Sigurds Gate 27. Bergen. Norway
23 Thompson street. New York. U.S.A.
Aleja Jana Małłeji 4. Wrocław. Poland
Sverdrups Gate 28. Oslo. Norway
Chelsea Gardens 28. London. Great Britain
132 West 23 th street. New York. U.S.A.

2

ENERGY ROOF

04

Location:
Perugia, Italy

Function
Roof (Passage)

Year:
2009, Not realized

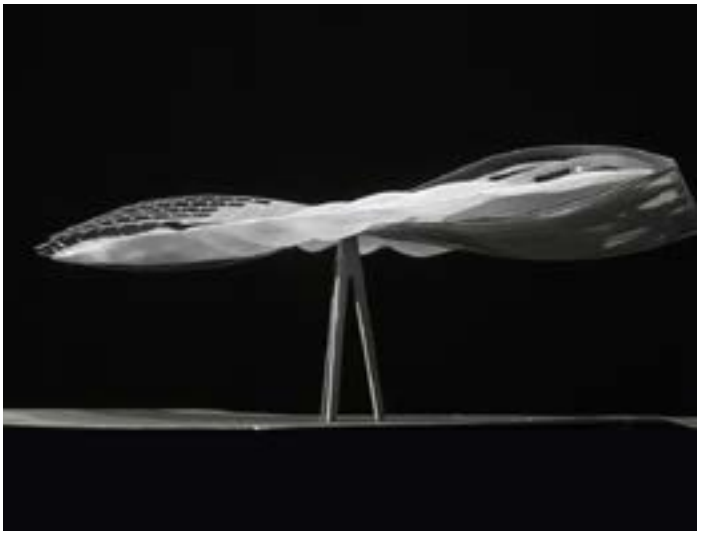
Architect:
Coop Himmelb(l)au

The Energy Roof assigns the entrance to the archaeological underground passage that connects the city center with a metro station.
The approximately 80 meters long roof design is driven by the generation of energy for the city. The orientation of the west wing is optimized for catching solar radiation, while the east wing captures the wind. The roof is consisting of three layers; the top layer which generates energy, the structural middle layer, and the bottom layer as a combination of laminated glazing and translucent pneumatic cushions.
Both the roof and the underground passage are energy self-sufficient. Sun-shading, energy generation and architectural integration are all combined in one element. (Prix, 2009)

From left to right:
1. Exterior render
2. Exterior render
3. 3D model
4. Layers
5. Section

1

2



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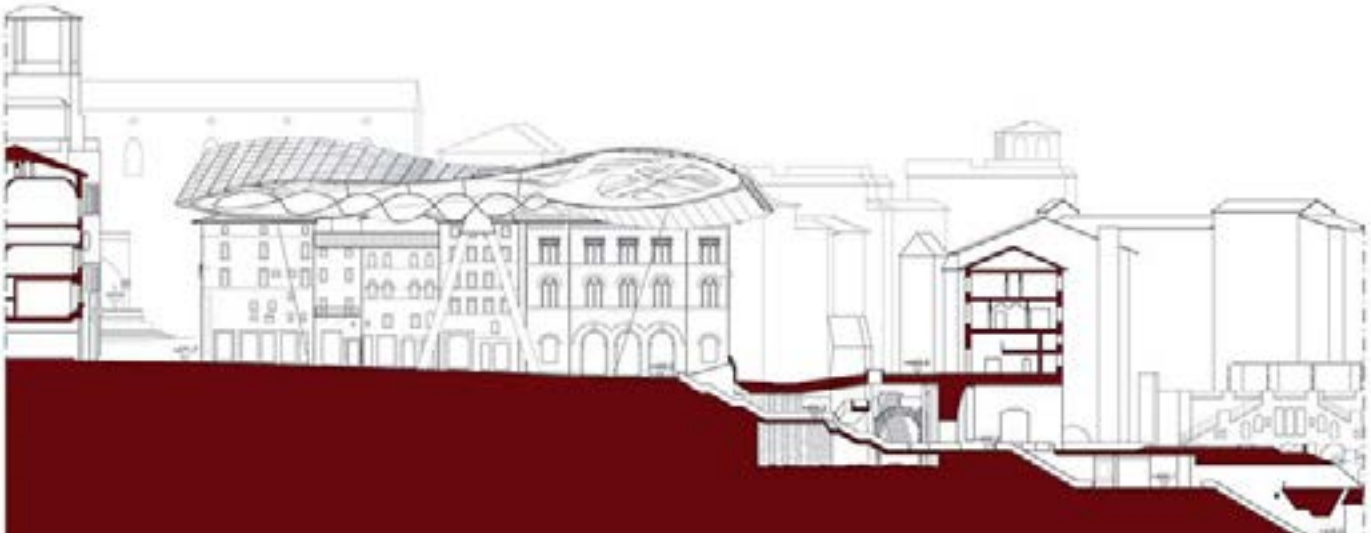


5

GARDEN AND HOUSE

05

Location:
Tokyo, Japan

Function
Dwelling

Year:
2013, Realized

Architect:
Ryue Nishiziwa

This five-storey townhouse providing a combined home and workplace is located in a dense commercial district, fronted by a stack of gardens. Because of the fact that the site was four meters wide, the building was designed with only glass walls to avoid narrowing the interior spaces even further. Despite the dark site conditions, the building is designed to provide an environment with maximum sunlight. (Frearson, 2013)

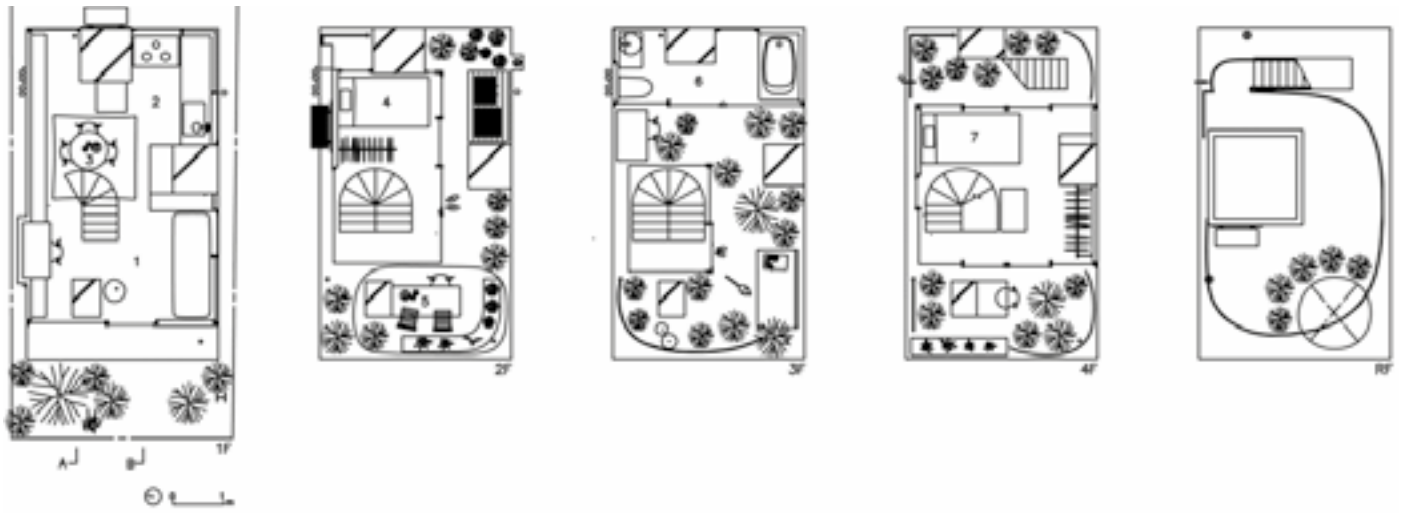
From left to right:
1. View of the roof
2. View from the street
3. View from the interior
4. Architectural model
5. Floorplans of all floors

1

2

3

4



1 living
2 kitchen
3 dining
4 bed room

5

EEN VOORKANT VOOR DE ACHTERKANT

06

Location:
Amsterdam,
The Netherlands

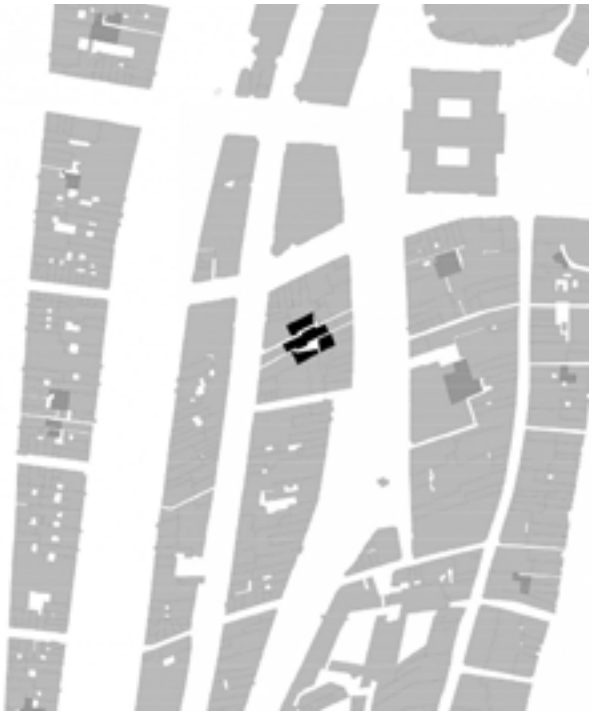
Function
Dwelling (?)

Year:
2015, Not realized

Architect:
Ivar van der Zwan

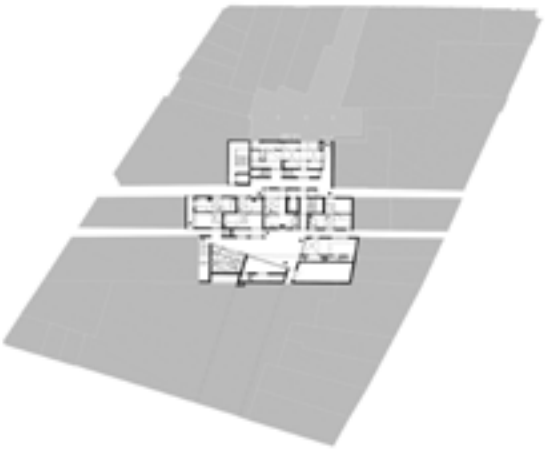
A new scenario for the invisible inner city of Amsterdam. This project illustrates an infill for the neglected, invisible zones in the heart of Amsterdam. It consists of twenty dwellings, combined with small-scale ateliers and shopping area. It depicts a scenario to further densify Amsterdam, but also a way to add a new, smaller scale to the inner city. (Van der Zwan, 2015)

From left to right:
1. Site
2. Architectural model
3. Floorplan
4. Setion
5. Elevation
6. Section dwelling



1

2



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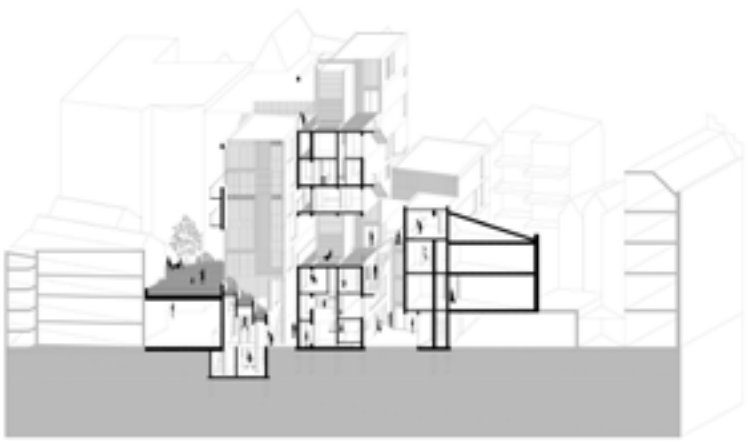


4

5

6

HEART OF THE DISTRICT

07

Location:
New York, USA

Function
Hybrid

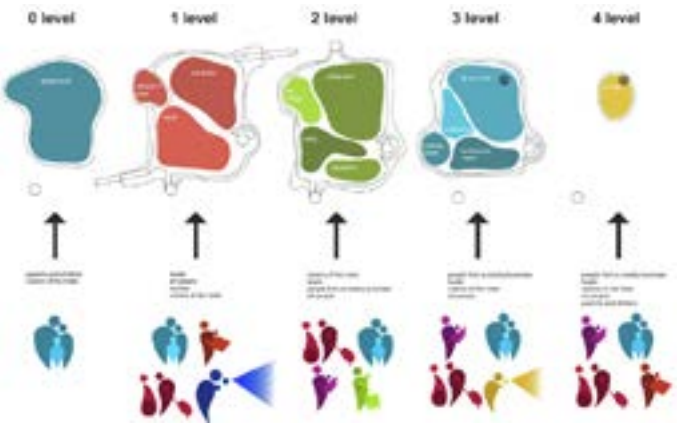
Year:
2012, Not realized

Architect:
ZA Architects

In this project ZA Architects aimed at developing a few new principles of hotel organization. Instead of separating visitors from the environment, the architects intend to embed peoples' lives local city life. For this reason, there is no hotel building. The architects propose instead to place hotel rooms placed in existing buildings (offices, residential). These spaces are connected with a web of hung pathways. A reason behind this design is to inhale life in this place by creating a new type of space, half street/half building, it is a vibrant suspended volume enclosing a number of public activities which will attract locals, city inhabitants, and tourists, to become the heart of the district.
The wide range of existing entities along the street will be used along with the new. From the heart levels, visitors are able to get to the pathway hung to existing building facades which lead to hotel rooms scattered on the old buildings. (Furuto, 2012)

From left to right:
1. Site
2. Dagram
3. Elevation
4. Top view
5. Diagram
6. Plan level 1
7. Section
8. Diagram section

1


0 level
1 level
2 level
3 level
4 level

2

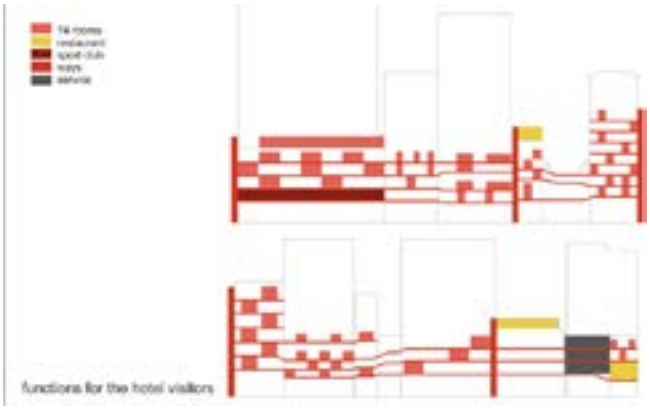
3

4

5

6

7


functions for the hotel visitors

8

KERET HOUSE

08

Location:
Warsaw, Poland

Function
Dwelling

Year:
2012, Realized

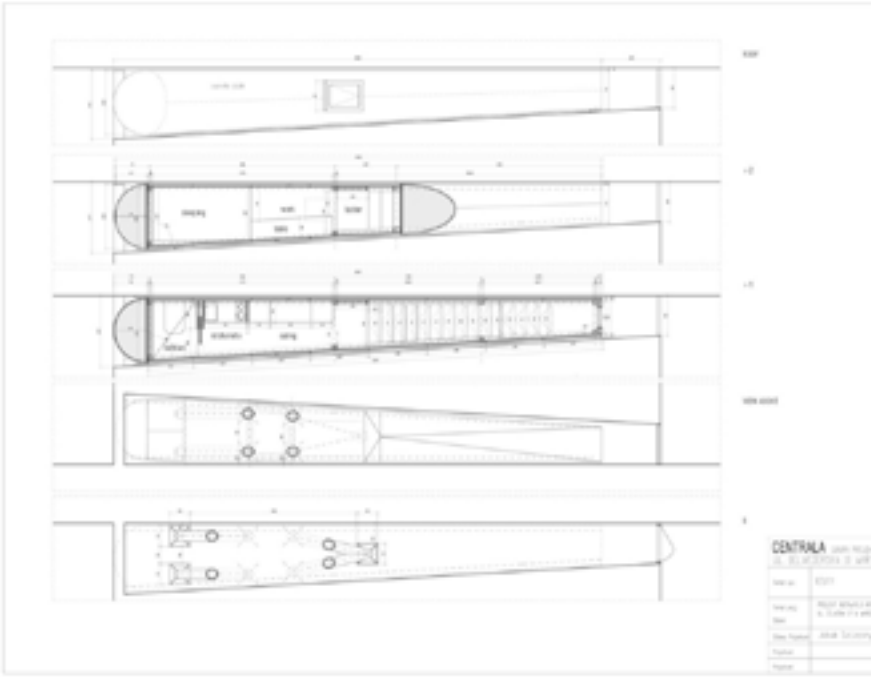
Architect:
Jakub Szczesny

In 2009 the Keret House was first conceived as a seemingly impossible vision of the architect. It is built between two existing structures, where the narrow infill is more of an art installation that reacts to the past en present of Warsaw. It consists of a semi-transparent windowless structure.
The narrowest point is measured 92 centimeters and 152 centimeters at its widest point.
(Rosenfield, 2012)

From left to right:
1. Exterior
2. 3D model
3. Floorplans
4. Interior
5. Section

1

2



3

4

5

HOUSE EXTENSION FOR A CELLIST

09

Location:
Chaville, France

Function
Dwelling

Year:
2010, Realized

Architect:
CUT Architectures

A Paris house is extended by squeezing a glass-fronted music room and a garage between the building and its neighbor. The glazed room is framed by concrete. (Frearson, 2011)

From left to right:
1. Elevation
2. Backside
3. Interior
4. Exterior
5. Plan
6. Section
7. Section

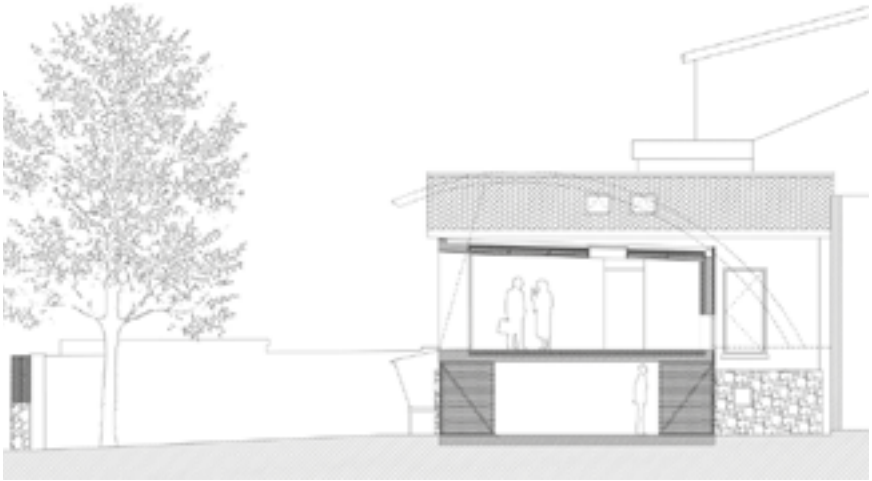
1

2

3

4

5



6

7

ATTACHED

THE PREFAB PARASITE

10

Location:

Function
Dwelling

Year:
2009, Not realized

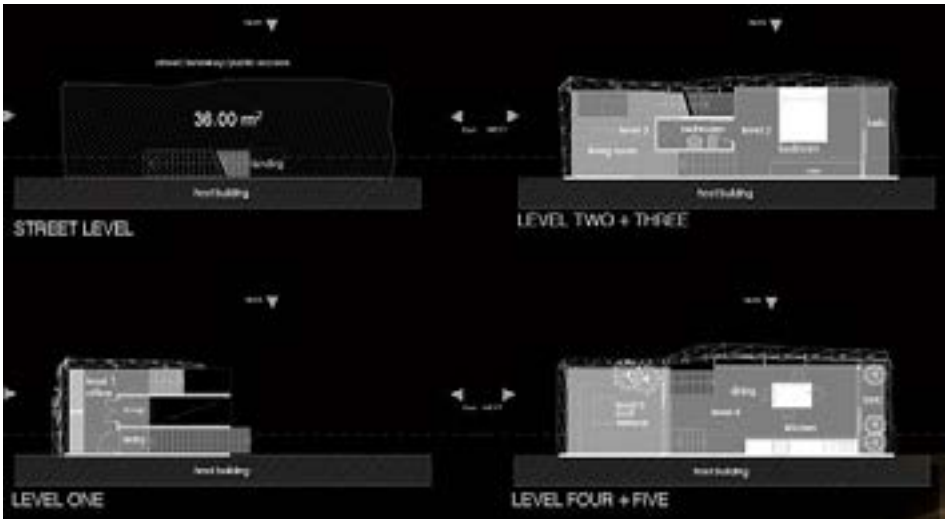
Architect:
Lara Calder Architects

This project is meant to populate the unused spaces found in urban landscapes. To achieve sustainable densification, the parasite will fittingly cling to old facades, bridges and rock faces. The project is designed by using a parametric 3D modeling software.
By using mounting plates attached to the back wall, the parasite will attach. (Cilento, 2009)

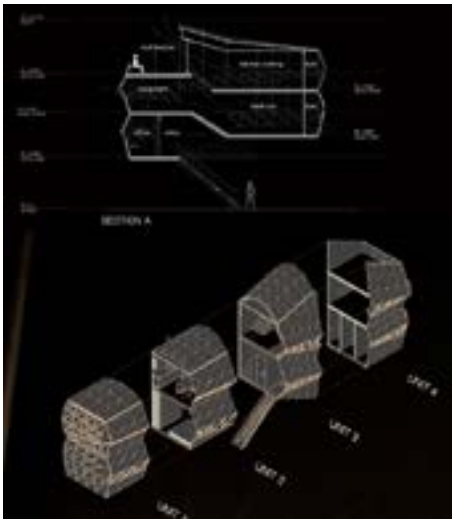
From left to right:
1. Exterior render
2. Exterior render by night
3. First floor
4. Section and exploded view
5. Elevations

1

2


36.00 m²
STREET LEVEL
LEVEL TWO + THREE
LEVEL ONE
LEVEL FOUR + FIVE

3



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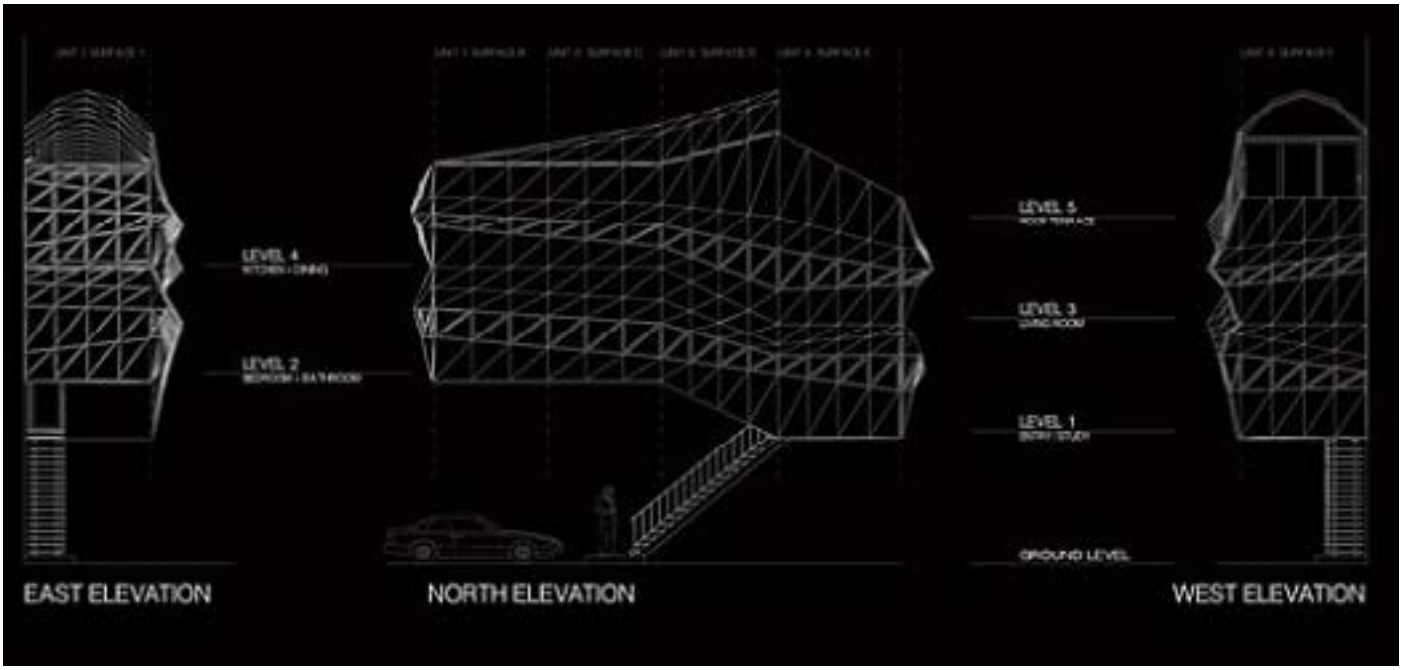

LEVEL 5
LEVEL 4
LEVEL 3
LEVEL 2
LEVEL 1
GROUND LEVEL
EAST ELEVATION
NORTH ELEVATION
WEST ELEVATION

5

URBAN RESERVE

11

Location:
Seville, Spain

Function
Dwelling (Expansion)

Year:
2011, Realized

Architect:
Santiago Cirugeda

This building is an example for citizens to build an own Urban Reserve. This personal and intimate action takes place outside everything politicians and professionals may plan, it follows ways that are labelled by difference, by independence, and it makes obvious that the citizen plays a very important role in the development and construction of the environment he lives in.
The para-architecture proposed in the action breeds itself with temporary intentions. (Junk Jet n°2 Speculative, 2008)

1. Exterior

NEIGHBORHOOD CENTER

12

Location:
Copenhagen, Denmark

Function
Meeting hall

Year:
2003, Realized

Architect:
Dorte Mandrup Architects

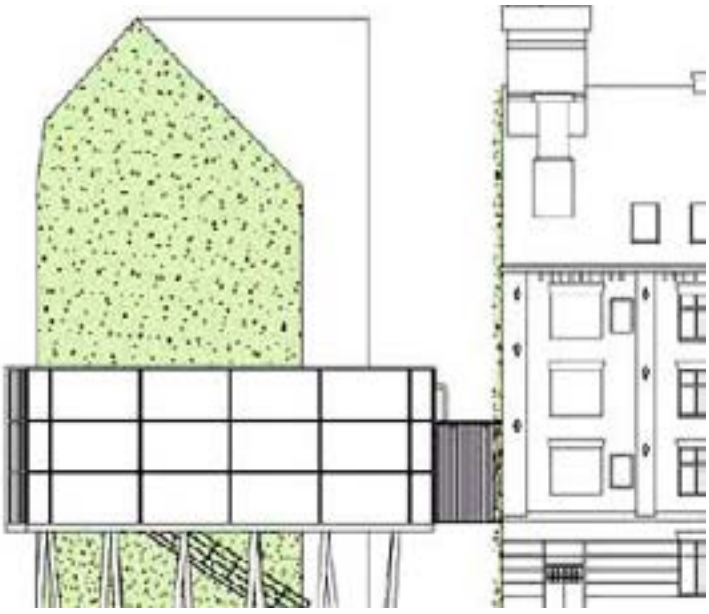
The renovation and expansion of the Neighborhood Center was part of a larger neighborhood renewal plan.
The main objective was to ensure an openness and accessibility for the public. The addition to the industrial building consists of a common two-storey meeting hall and was conceived as a “children’s treehouse” on trunks of oblique concrete columns. (Archspace, 2003)

From left to right:
1. Exterior
2. Structural: Oblique columns
3. Exterior by night
4. Section
5. Floorplans

1

2

3



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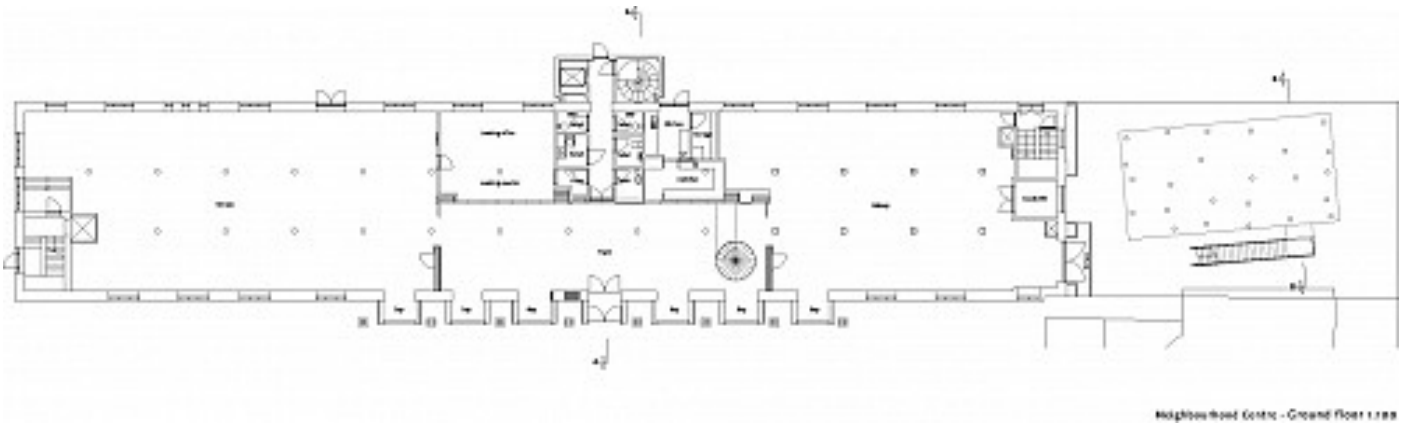


5

OASE NO. 7

13

Location:
Kassel, Germany

Function
Dwelling (Expansion)

Year:
1972, Realized

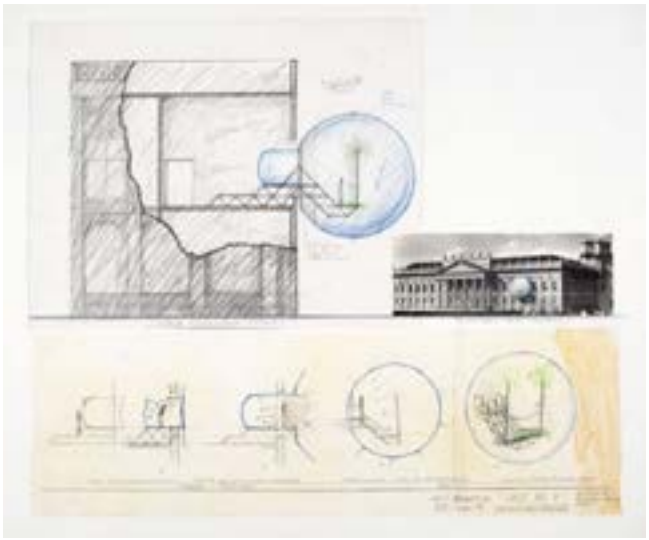
Architect:
Haus-Rucker-Co

This building was designed as part of the Documenta 5 Exhibition in Kassel in 1972.
Oase No. 7 is a transparent sphere with a diameter of 8 meters. It was placed in front of the main facade on the Friedericianum. It consists a steel section projected through the window from the interior of the building into the transparent sphere. At a slight distance from the facade, a tubular steel ring was fixed to this footbridge. This ring was crucial in the external support for the PVC foil shell, which formed a sphere when an air pump inflated it into shape. The work of the architects explored the performative potential of architecture through installations and happenings using pneumatic structures or prosthetic devices that altered the perceptions of space. (Callahan, 2013)

From left to right:
1. Exterior render
2. Exterior render
3. Section
4. Exterior
5. The group: Haus-Rucker-Co

1

2



3

4

5

CLIP-ON

14

Location:
Utrecht,
The Netherlands

Function
Dwelling

Year:
1997, Realized

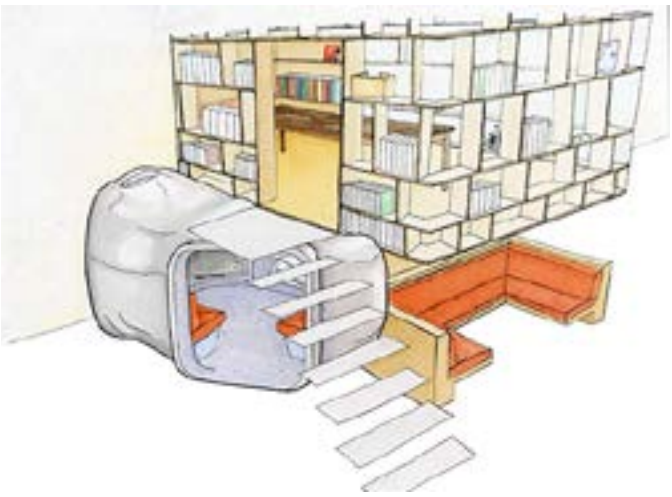
Architect:
Atelier van Lieshout

The cabin attached to the facade was wanted by the director of the Centraal Museum Utrecht, in which to work, sleep and relax. The solution made by Atelier van Lieshout was to devise a piece that is mounted with large bolts onto this museum's outside wall. The design is started with three basic elements of the extension, a table, a bench and a bed, and then they started building the space around these objects. The appearance of the addition is the result of the coincidental form of the space needed inside the structure (AVL, 1997)

From left to right:
1. Exterior render
2. Exterior render
3. 3D model
4. Interior

1

2



3

4

PARASITE

15

Location:
Stockholm, Sweden

Function
Dwelling

Year:
1998, Realized

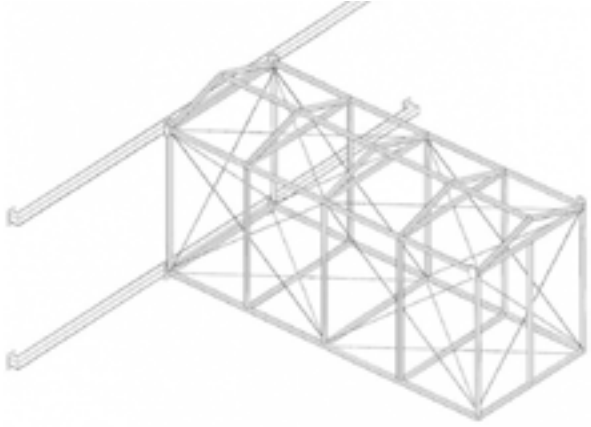
Architect:
Tea Mäkipää

The Parasite is a site-specific installation mounted to the illuminated facade of the centrally located Kulturhuset. The hut was pieced together from various found components. Furthermore, it was fed with electricity, water, and heat from the host building. This building displays an interlocking complexity that is already indicated but the pun in its name: on the other hand, there is the transfer of the biological term to an architectural form, which is “parasitic” on the main building, the host, and thus optimized. (Makipaa, 1998)

From left to right:
1. Exterior
2. Exterior
3. Structural diagram
4. Exterior

1

2



3

4

THE PIRATE BUBBLE

16

Location:
Geneva, Switzerland

Function
Dwelling (Extension)

Year:
1971, Realized

Architect:
Jean-Louis Chaneac

The French architect installed a parasite bedroom on the facade of a regular modernist residential apartment block in Geneva. The “parasitic sucking cells” are mobile, and created a complete contrast to the host building’s architectural style in every sense possible. With The Pirate Bubble, the architect wanted to experiment with a new architectural language, consisting of spontaneous, temporary and supplementary spaces. Within few hours they can be erected onto facades of buildings as a way of creating complementary inhabitable spaces. In that time concrete was the dominant construction material, but the architect used synthetic materials such as resin, glass fiber, reinforced polyester, and foam instead. The architect couldn’t manage to roll out the project on a bigger scale. (De Boer, 2014)

From left to right:
1. Exterior
2. Exterior
3. Interior
4. Assembling

1

2

3

4

RUCKSACK HOUSE

17

Location:
Various (Germany)

Function
Dwelling (Expansion)

Year:
2004, Realized

Architect:
Stefan Eberstadt

This project was designed to expand a living area with access to daylight and views. The “backpack house” is a kind of a lightweight walk-in sculpture with its own spatial quality. It is a room that can be suspended from the facade of any residential building adding nine square meters of additional space with built-in furniture. It consists of a steel cage with a light birch veneered plywood interior cladding. The addition is suspended from steel cables that are anchored to the roof or to the facade of the existing building. The entrance to the addition is via a window in the building. Besides a living space, it can be used as a bedroom or a studio space. (Meinhold, 2012)

From left to right:
1. Exterior
2. Exterior
3. Assemblage
4. Interior
5. Plan and section

1

2

3

4

5

EXCRESCENT UTOPIA

18

Location:
London

Function
Dwelling

Year:
2013, Not realized

Architect:
Milo Ayden De Luca

In this concept, parasitic dwellings for homeless people would cling to the sides of lamp posts. The main objective of the architect of this project was the thought to improve the life of those living on the London streets.
By creating tensile structures around the street lights, using cheap and basic materials temporary lightweight dwellings can be created. The design is inspired by the construction of sailing ships and in contrast with the surrounding structures in London. Not only street lights are used to support the addition, but also existing buildings and street furniture. (Chalcraft, 2013)

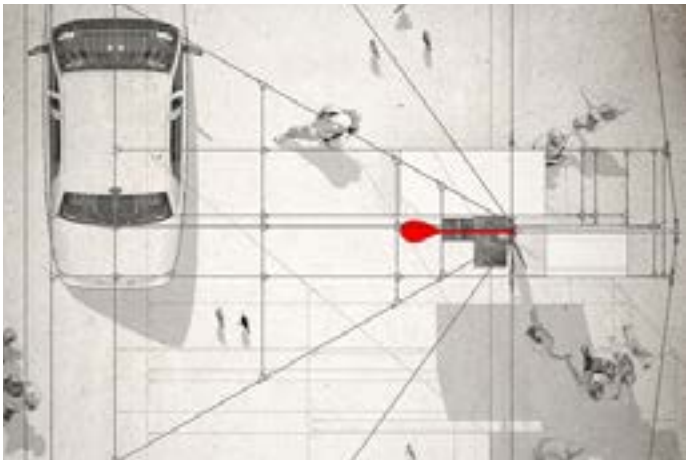
From left to right:
1. Exterior render
2. Exterior render
3. Exterior render
4. Exterior render
5. Top view
6. Side view
7. 3D model
8. 3D model

1

2

3

4



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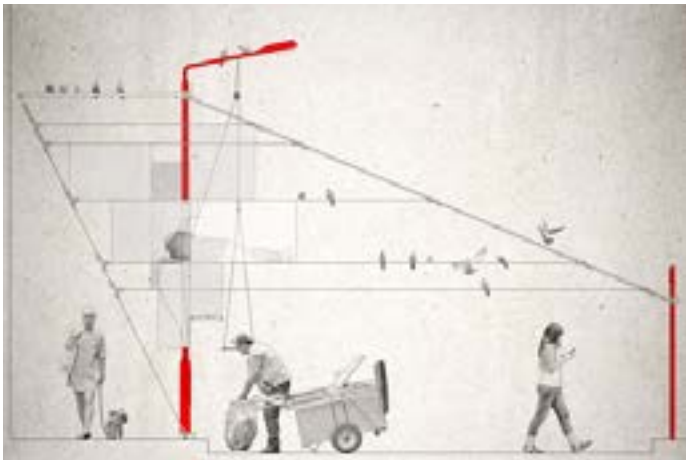

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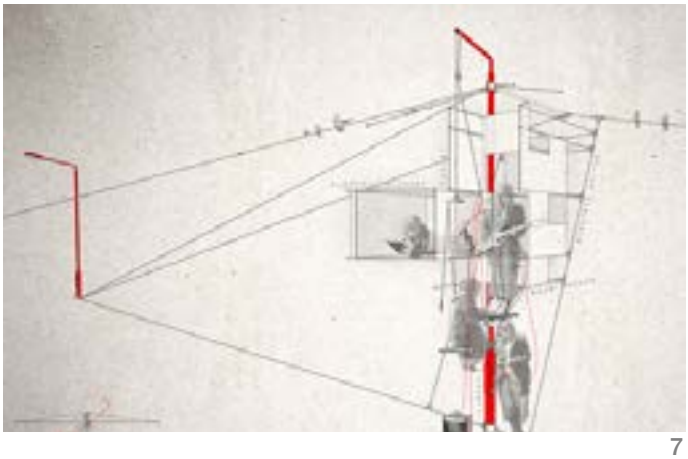

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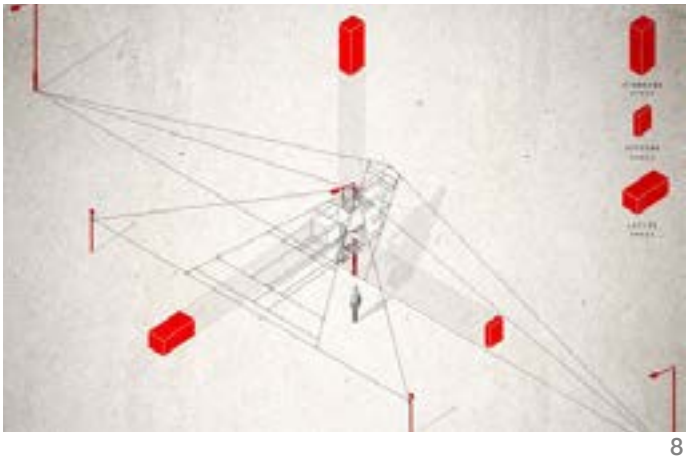


8

AME-LOT

19

Location:
Paris, France

Function
Dwelling

Year:
2011, Not realized

Architect:
Stephane Malka

This project of student housing inserts itself into urban interstice: the thickness of a blind wall. For the construction of this addition, no building is destroyed and no pollution generated since the addition consists of the wooden pallet. (Jarz, 2011)

From left to right:
1. Exterior render
2. Exterior render
3. Exterior render
4. Exterior render
5. View from the street
6. Diagram construction wooden pallet

1

2

3

4

5

6

MANIFEST DESTINY!

20

Location:
San Fransisco, USA

Function
Dwelling

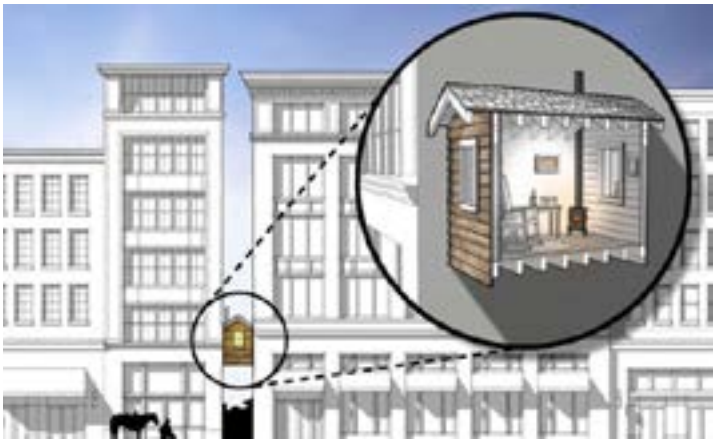
Year:
2012, Realized

Architect:
Mark Reigelman and Jenny Chapman

The architect of this cabin claims that this project demonstrates the rights of the urban explorer to find an unoccupied parcel of space in which to make a home. The project is not made for people to live there but to establish a new home front in the remaining urban voids of San Francisco. The frame of this cabin is made of welded aluminum. (Frearson, 2012)

From left to right:
1. Exterior
2. Section
3. Construction of the frame
4. Aluminum frame
5. Construction
6. Assembly

1



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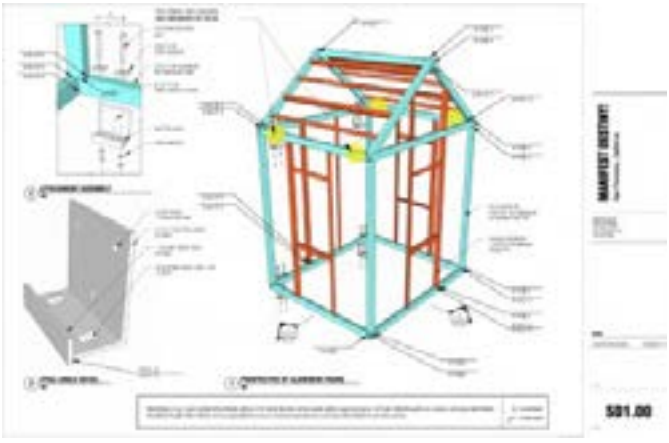


3

4

5

6

PARASITIC EMERGENCY HOMES

21

Location:
São Paulo, Brazil

Function
Dwelling

Year:
2010, Not realized

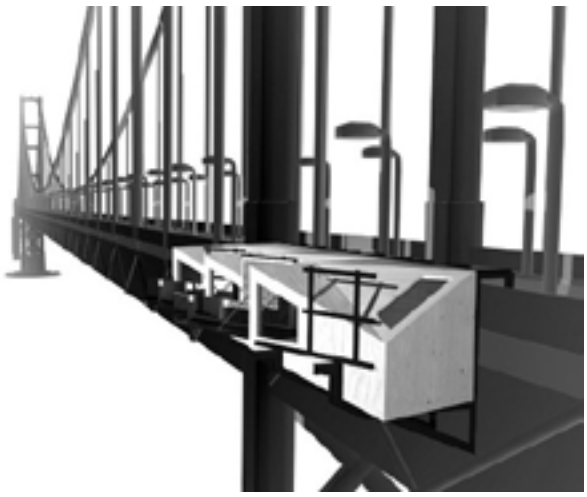
Architect:
Mike Reyes

The designer of this project decided to come up with an emergency shelter concept for the survivors of floods: a prefabricated modular dwelling that could be implanted onto an abandoned building. The emergency shelters are designed to rebuild a new community and help start future development. The box homes can be attached to the facades of other buildings. The designer envisions that these structures could be airlifted by helicopters to sites and clipped onto building facades using leverage. The boxes contain furniture and windows and can be made of recycled materials from local construction sites. (Yoneda, 2011)

From left to right:
1. Hanging on building facade
2. Hanging on building facade
3. Hanging on a bridge
4. Assemblage
5. Assemblage in section
6. Flat deployment

1

2



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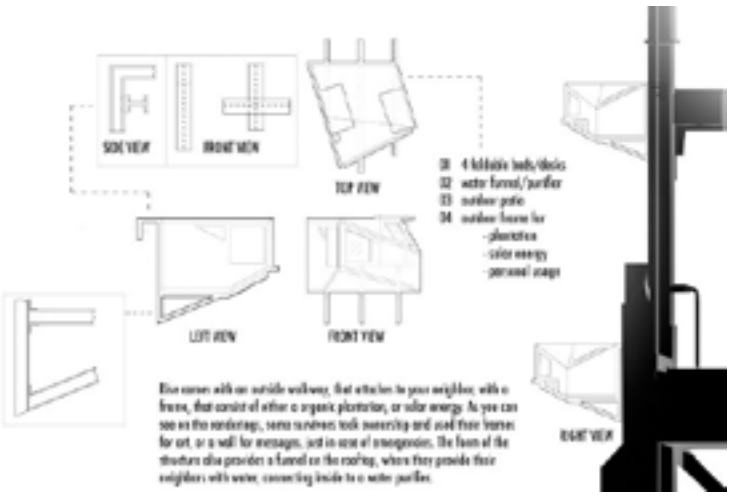
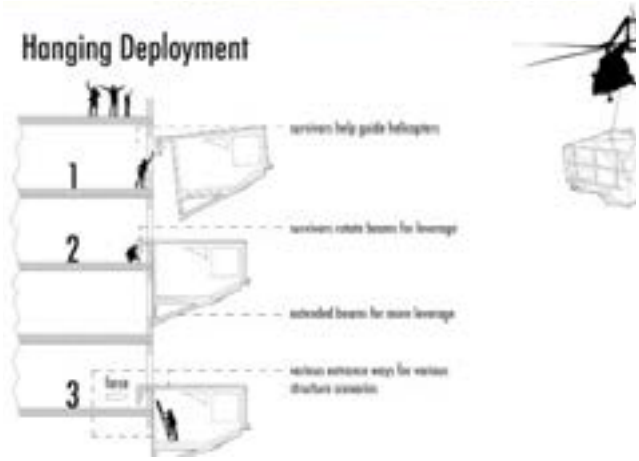
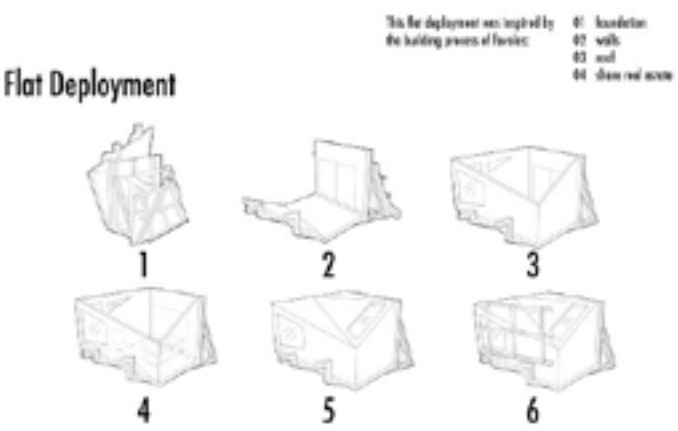

SIDE VIEW
FRONT VIEW
TOP VIEW
LEFT VIEW
FRONT VIEW
RIGHT VIEW

4


Hanging Deployment
1
2
3

5


Flat Deployment
1
2
3
4
5
6

6

CONVENT DE SANT FRANSESC

22

Location:
Santpedor, Spain

Function
Church

Year:
2011, Realized

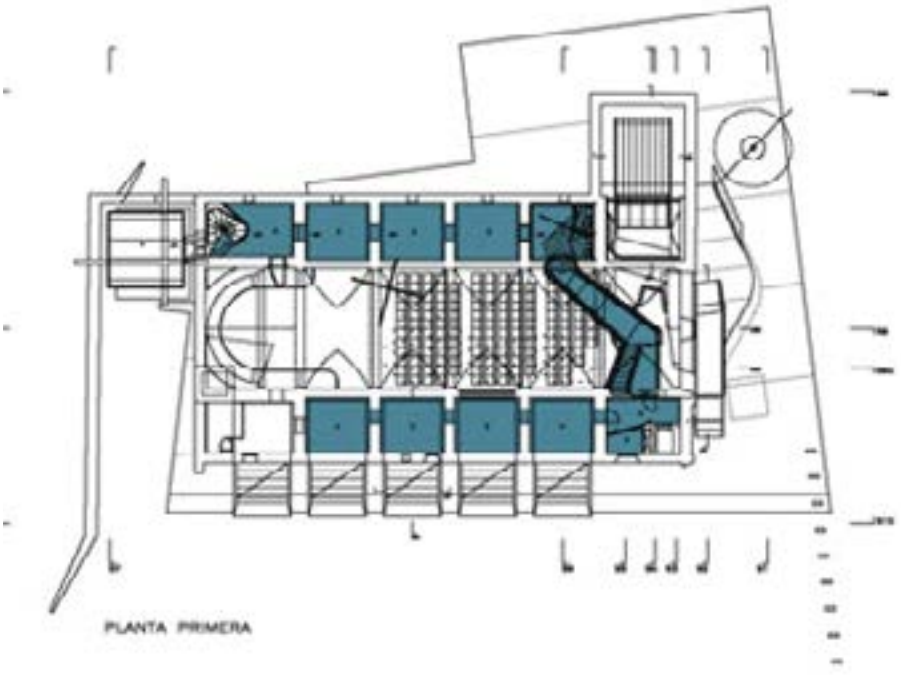
Architect:
David Closes Arquitecte

The intervention in the church was meant to convert the building into a cultural facility. The two phases implemented have allowed the building to be put to use as an auditorium and multipurpose cultural space. The building built between 1721 and 1729 was used as a convent until 1835. In 2000 the convent in ruins was demolished, only the church remained. New volumes were added for uses and requirements the church never had before: stairs to climb to the upper floors, toilets and equipment rooms. (Closes, 2012)

From left to right:
1. Exterior
2. Interior
3. Plan
4. Interior stairs

1

2



3

4

HOMES FOR THE HOMELESS

23

Location:
London, England

Function
Dwelling

Year:
2015, Not realized

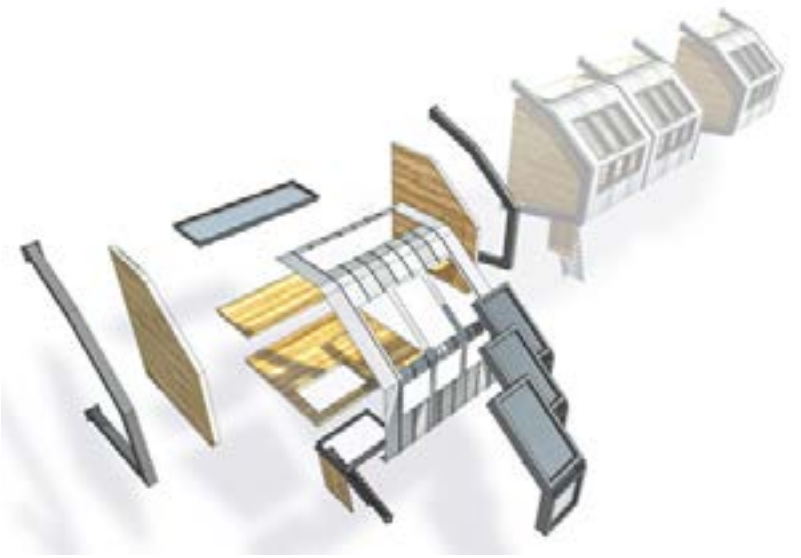
Architect:
James Furzer

The modular homeless shelters are developed to hang off the sides of existing buildings. The light-weight pods, each featuring a timber sleeping platform and fold-down seating, can be attached to external walls of existing buildings in London. The steel framed sleeping units could be made from scrap materials to reduce production costs and can be adapted to match the exterior color of the host buildings. The attachment can be done by a pair of metal brackets. (Mairs, 2015)

From left to right:
1. Exterior render
2. Exterior render
3. First floor
4. Second floor
5. Third floor
6. Section
7. Interior render

1

2



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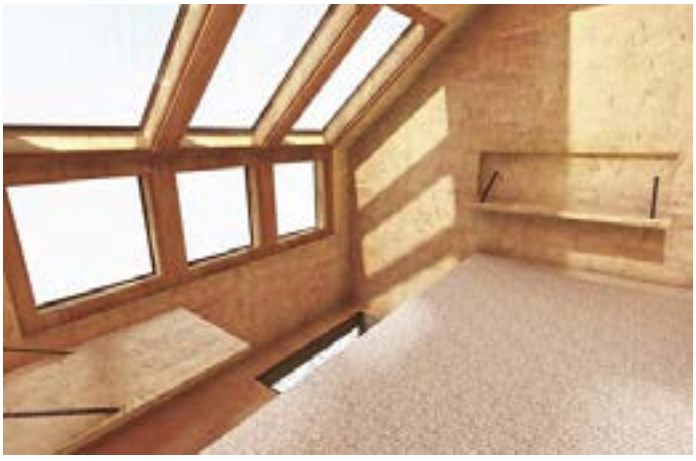


4

5

ON TOP

GREAT COURT

24

Location:
London, England

Function
Roof (Museum)

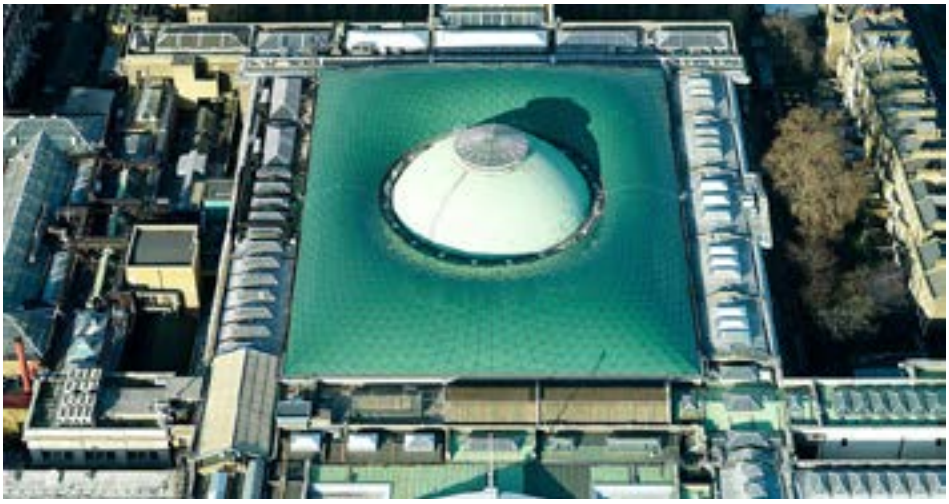
Year:
2000, Realized

Architect:
Foster and Partners

The courtyard at the center of the British Museum was one of London's long-lost spaces.
Originally a garden, soon after its completion in the mid-nineteenth century it was filled by the round Reading Room and its associated book stacks. Without this space, the Museum was like a city without a park.
The glazed roof is a state-of-the-art engineering. Its unique geometry is designed to span the irregular gap above the courtyard. The structure is designed in this way to reduce solar gain. (Foster + Partners (n.d.))

From left to right:
1. Interior courtyard
2. Roof
3. 3D Section
4. Detail

1



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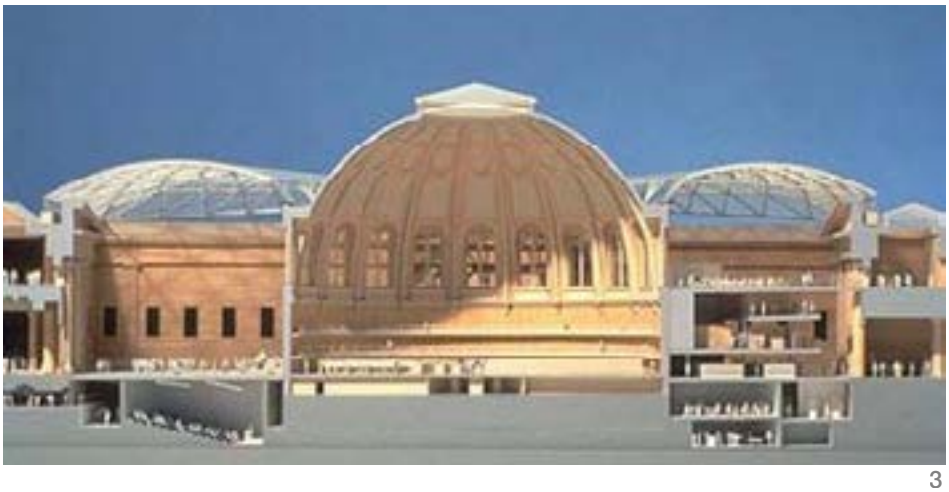

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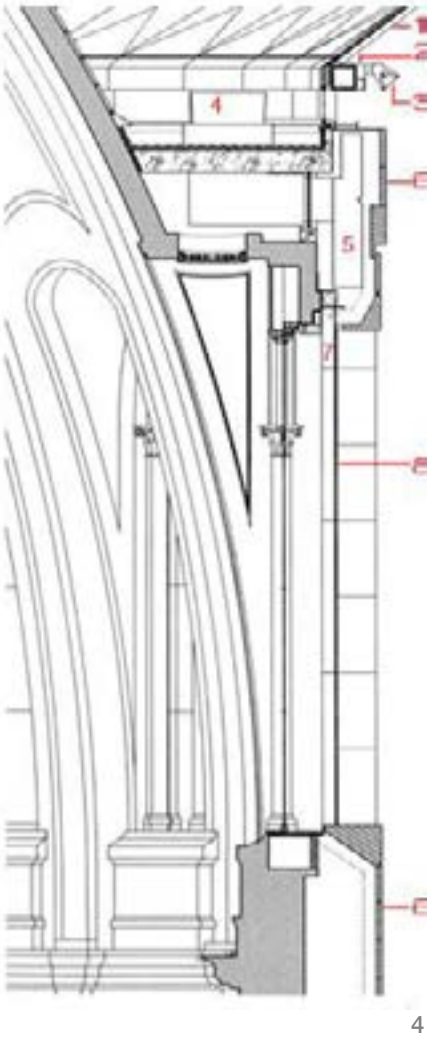


4

PARASITE LAS PALMAS

25

Location:
Rotterdam, The Netherlands

Function
Dwelling

Year:
2001, Realized

Architect:
Korteknie Stuhlmacher

Las Palmas acted in 2001 as a widely visible logo for its host building. The spaces within this industrial building were temporarily used for various exhibitions during several exhibitions. This project was a prototypical house aiming at combining the advantages of prefabricated technology and the unique design for a specific location. Some services and installations were linked to the existing installations. The assemblage of the prefabricated elements on the site took a few days. Nowadays this building is removed and stored waiting for new uses and sites. (KSA, 2001)

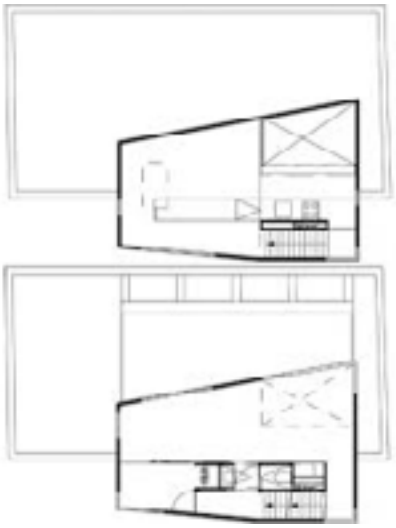
From left to right:
1. Exterior
2. Exterior
3. 3D Model
4. Assemblage
5. Plans
6. Sections

1

2

3

4



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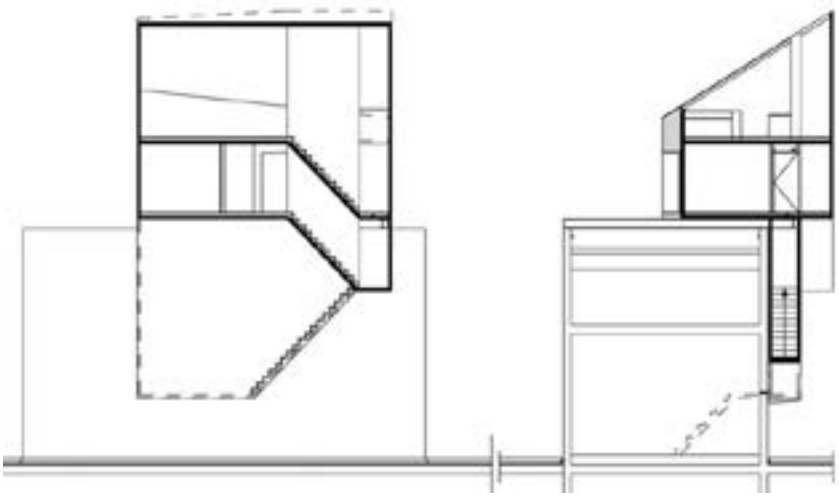


6

MUSIC SCHOOL EXTENSION

26

Location:
Louviers, France

Function
Music School

Year:
2012, Realized

Architect:
OPUS 5

The host building in this project housed a wide arrange of a program from 1646 till now. A monastery, church, prison and now a music school. The aim was to highlight the archeological heritage and to display a new image of the place.
Made of laminated glazed panels, the inside layer has been coated with mirror finish. A non-crossing attachment system holds the glass and leaves the fixing points invisible from the outside.
The panels on the other facade are made of prefabricated concrete panels of various heights and are cut out to follow the surface of the ancient masonry. (Opus 5, 2013)

From left to right:
1. Exterior (concrete)
2. Exterior (glass)
3. Interior
4. Interior
5. Plan
6. Section

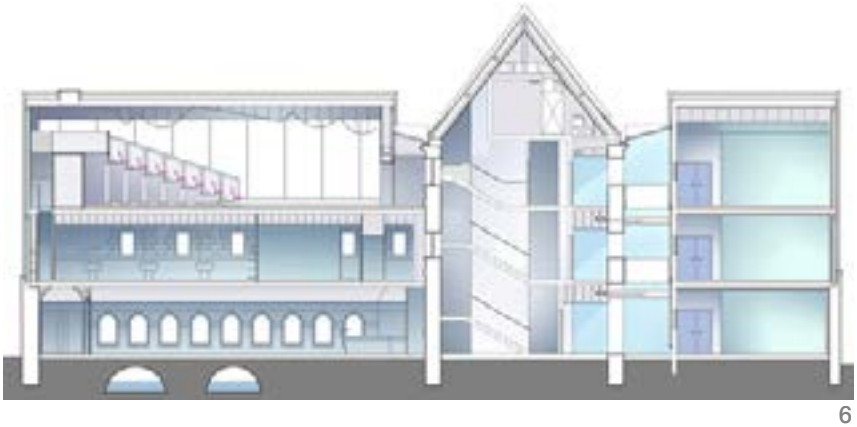
1

2

3

4

5



6

192 SHOREHAM STREET

27

Location:
Shoreham, England

Function
Industrial

Year:
2012, Realized

Architect:
Project Orange

Even though the host building, an industrial brick building, is not listed it is considered as locally significant. The brief was to provide mixed use combining a double-height restaurant/bar with a duplex studio office units accommodated in an upward extension of this building. This contrasting addition was the replacement for the original pitched roof. It is parasitic in nature, and it is engagement with the host building in a couple of locations 'where windows bite into the existing building'. The objective is to create a striking landmark, a symbol both of the area's past and its aspirations for the future. (Project Orange, 2012)

From left to right:
1. Exterior
2. Exterior
3. Interior
4. Exterior 'biting windows'
5. Exterior
6. Plan
7. Elevation

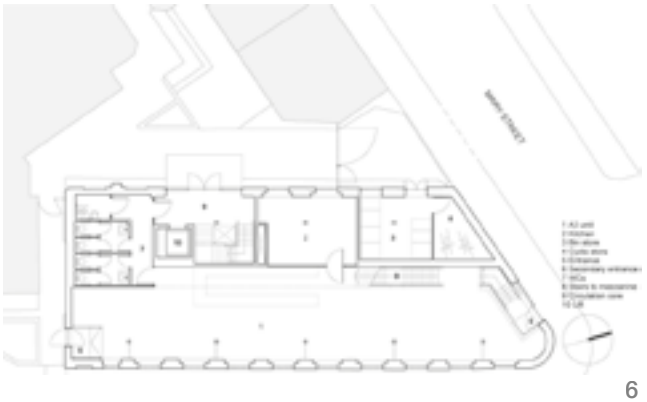
1

2

3

4

5



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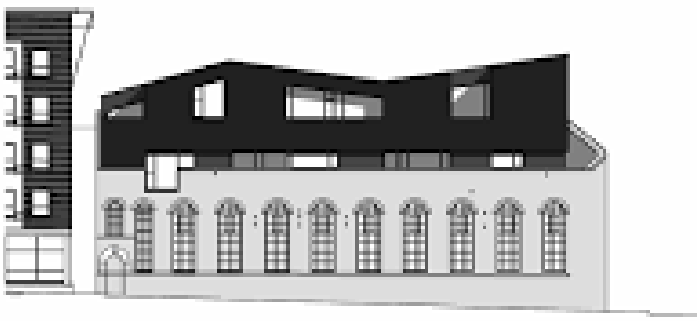


7

ELBPHILHARMONIE HAMBURG

28

Location:
Hamburg, Germany

Function
Hybrid

Year:
2016, Realized

Architect:
Herzog and De Meuron

The Elbphilharmonie now marks a location that most people never really noticed. To make the new Philharmonic a genuinely public attraction it's important to provide attractive architecture but also the attractive mix of urban uses. The Kaspeicher A, the host building, originally designed as a ware-house, now fulfill the function of supporting the new Philharmonic.
The glass facade is consisting in part of curved panels, is appearing as a giant crystal, with reflec-tions of the sky, the water, and the city. (Herzog & De Meuron, 2016)

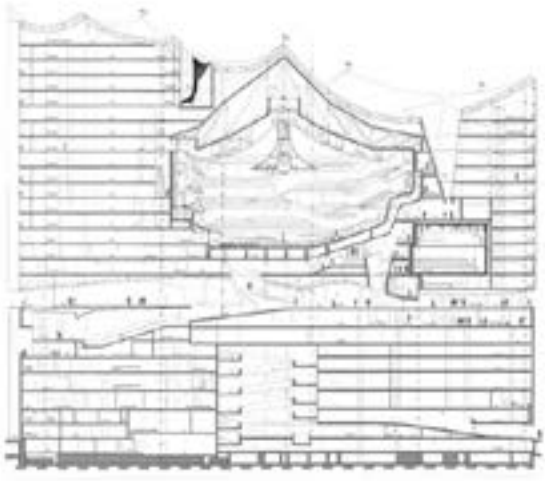
From left to right:
1. Exterior
2. Buffer zone two buildings
3. Roof
4. Cladding
5. Section
6. Glass curved facade with gaps

1

2

3

4



5

6

DETACHED

29

Location:
Athens, Greece

Function
Dwelling

Year:
2015, Not realized

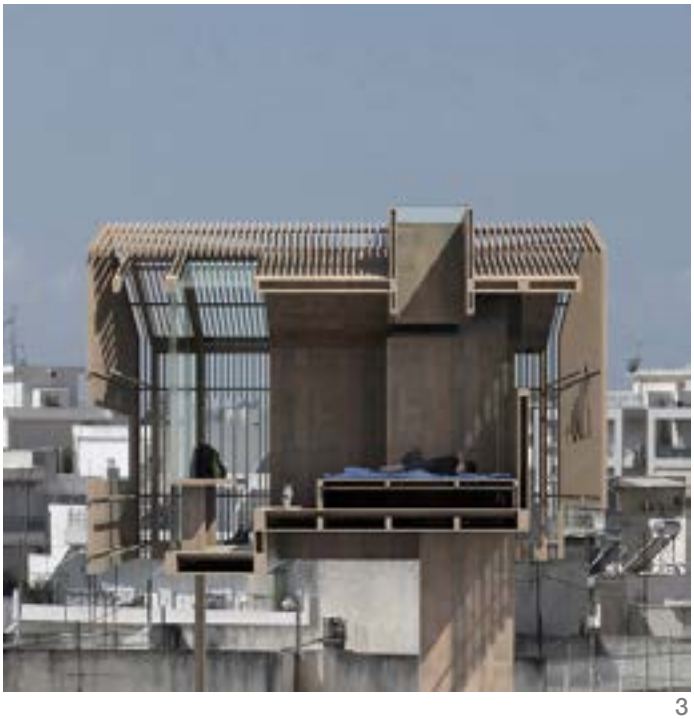
Architect:
Panos Dragonas and Varvara Christopoulou

As the world becomes increasingly urbanized, and digital mapping extends across deserts and jungles, there can be no more unexplored corners of the globe for a traveler to retreat to, say the Dragons Christopoulou Architects founders.
This prompted the Greek architects to develop a new structure that allows the contemporary city dweller to escape a taxing daily routine without venturing into the wilderness.
Their proposal, named Detached, comprises a small cabin of just nine square meters. It takes the form of a typical wooden shed but is also elevated above the city's rooftop landscape on four slender columns. (Frearson, 2015)

From left to right:
1. Exterior render
2. 3D Plan
3. 3D Section

1

2



3

MILITARY HISTORY MUSEUM

30

Location:
Dresden, Germany

Function
Museum

Year:
2011, Realized

Architect:
Daniel Liebeskind

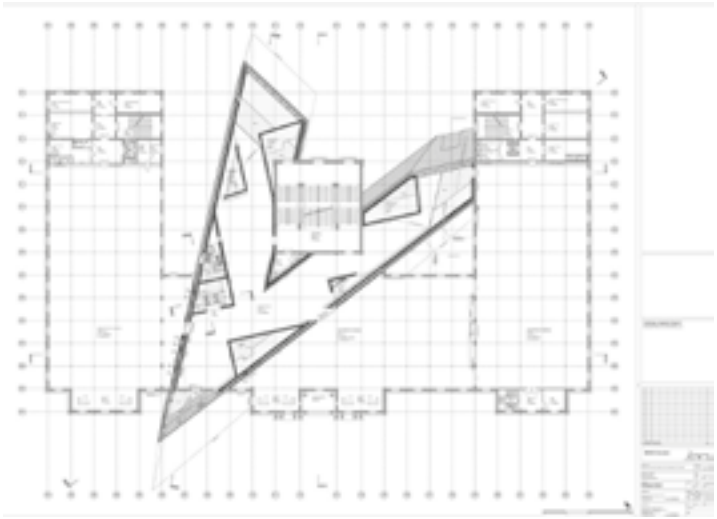
"It was not my intention to preserve the museum's facade and just add an invisible extension in the back. I wanted to create a bold interruption, a fundamental dislocation, to penetrate the historic arsenal and create a new experience. The architecture will engage the public in the deepest issue of how organized violence and how military history and the fate of the city are intertwined."—Daniel Libeskind, 2011

From left to right:
1. Exterior
2. Interior
3. Sections
4. Plan
5. Section

1

2

3



4


SECTION A-A
1 THEMATIC EXHIBITION HALL
2 FOYER AND SHOP
3 TEMPORARY EXHIBITION
4 CHRONOLOGICAL EXHIBITION
5 TECHNICAL ROOMS
6 HISTORIC STAIRCASE

5

NATIONAL MARITIME MUSEUM

31

Location:
Amsterdam,
The Netherlands

Function
Roof (Museum)

Year:
2011, Realized

Architect:
DOK Architecten

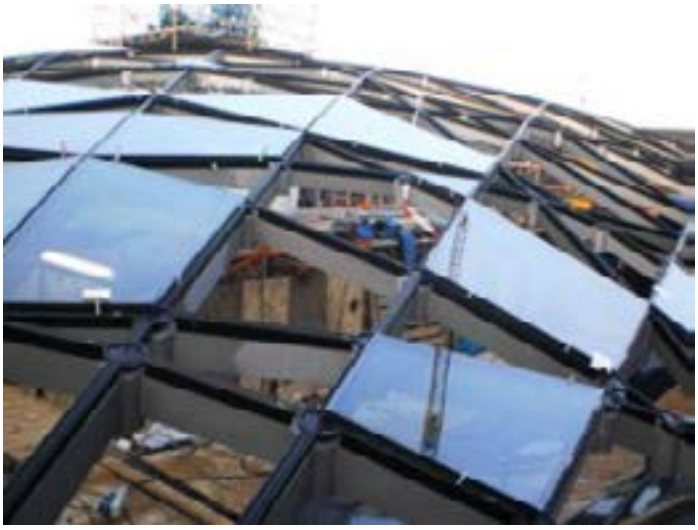
The 17th century-built Maritime Warehouse in Amsterdam underwent a retrofit to make its interior courtyard a suitable space for cultural activities throughout the year.
The renovation of the building with a new glass roof was completed in 2011.
In preserving the building for its new interior, the architects used the structure and features of the building to keep its character within its surrounding. The requirements for covering the courtyard was set by Monumentenzorg and were very strict: causing the least possible infringement on the monument and creating a semi-outdoor climate in the courtyard. The design of the roof is based on the navigation rose on historic nautical maps and is an example of integrated design. The glass has a sun-shielding coating which ensures additional climate control and an open band along the edge of the roof structure allows for natural ventilation. (Vinnitskaya, 2012)

From left to right:
1. Interior and roof
2. Interior
3. Assemblage roof
4. Node
5. Detail

1

2

3



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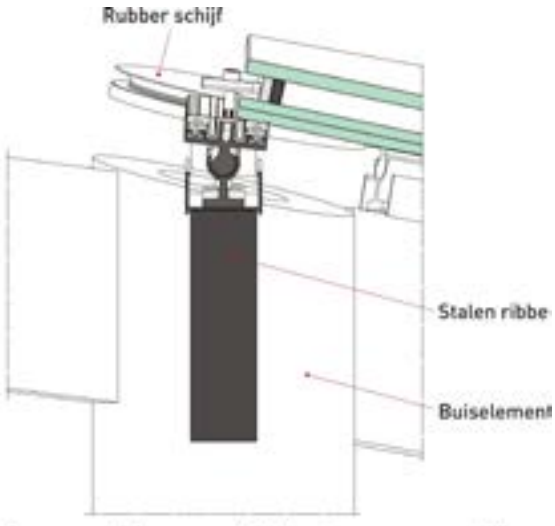
5



Doorsnede knooppunt (deels opengewerkt)

6

MUSEUM DER KULTUREN

32

Location:
Basel, Germany

Function
Museum

Year:
2011, Realized

Architect:
Herzog and De Meuron

The addition on top of the Basel Museum can be considered as a scaly crown. Within this crown, a new gallery floor to the building is added. A steel framework supports the roof, creating a column-free exhibition area. To avoid decreasing the size of the courtyard by building horizontally, the building has been given a new roof. The cladding is made from blackish green ceramic tiles and refracts the light when the skies are overcast and creating an effect much like that of the finely structured brick tiles on the roofs of the old town. (Frearson, 2011)

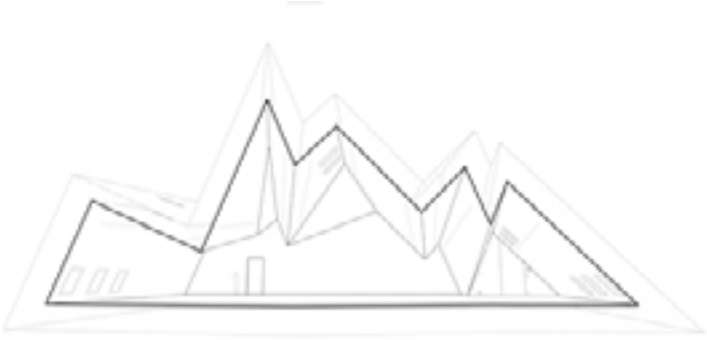
From left to right:
1. Exterior
2. Exterior
3. Exterior
4. Gallery interior
5. Section roof
6. Section

1

2

3

4



5

6

SINGLE

FUTURO HOUSE

33

Location:
Various

Function
Dwelling (Ski Chalet)

Year:
1968, Realized

Architect:
Matti Suuronen

The Futuro House looks more like an alien spacecraft than a building. Designed as a ski chalet, it was marketed to the public as a small prefabricated home. Because of the plastic construction and futurist aesthetic, this house became identifiable with both the future and the past. The supporting legs were of metal, the habitable space was from fiberglass-reinforced plastic, a relatively novel material. For a ski, chalet plastic performed well as insulation, and could easily be molded into the circular form. The architect believed the Futuro House's low production costs and adaptability made it an ideal solution to housing shortages across the globe. The production ended in 1973 after building less than hundred were built, the manufacturing and purchase of the building became expensive due to an oil crisis. (Fiederer, 2016)

From left to right:
1. Different Futuro Houses
2. Exterior
3. Exterior
4. Interior
5. Plan
6. Section

1

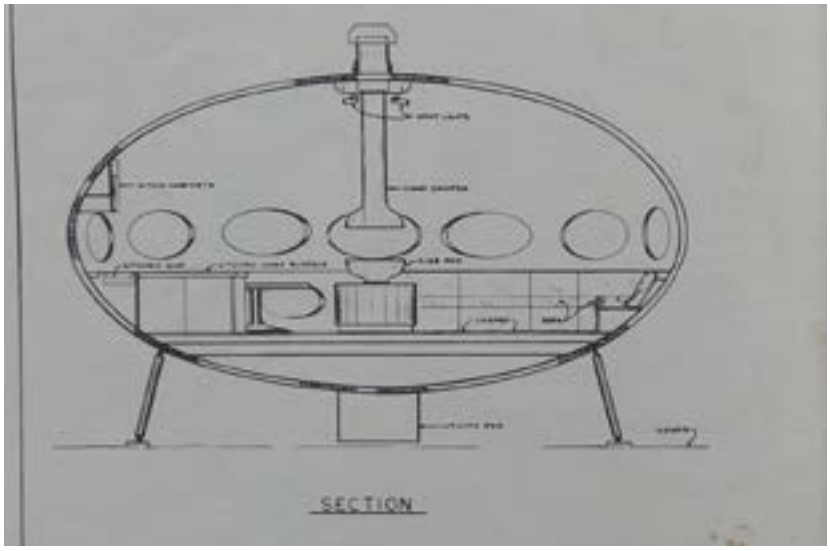
2

3

4


SHELF
VANITY
BEDROOM
BED
SHELF
BATH
SHELF
RETRACTABLE STAIRS
FIREPLACE
WOOD
STEREO VISION
KITCHEN
LIVING
DINING
LOW
BAR STOOL

5


SECTION

6

THE EDEN PROJECT: THE BIOMES

34

Location:
Cornwall, England

Function
Biomes

Year:
2008, Realized

Architect:
Grimshaw

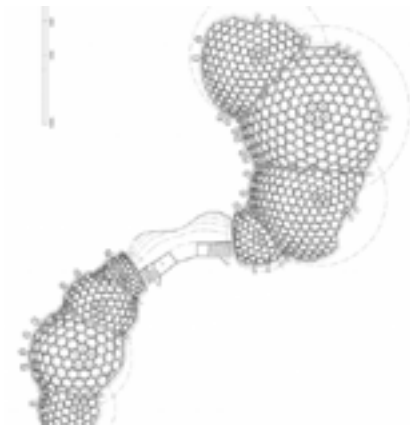
The Biomes building consist of two Biome buildings of several domes joined together, and are joined by a Link building.
The architects were inspired by dome designs of Buckminster Fuller.
In the face of the constantly shifting landscape, Grimshaw hit on the idea of soap bubbles, as a perfect wat to build on the uneven shifting sands of the pit. Each dome consists of two layers, the outer layer made from hexagons and the inner layer comprises hexagons and triangles bolted together. Because of the leightweightness of the steel structure, they are more likely to blow away than blow down and are tied into the foundations with ground anchors. The hexagonal and pentagonal windows are made of three layers of ETFE, once inflated they create a two-meter-deep pillow. It transmits UV light and could last for over 25 years. (Eden Project, 2008)

From left to right:
1. Exterior
2. Skin
3. Interior
4. Plan
5. Section

1

2

3



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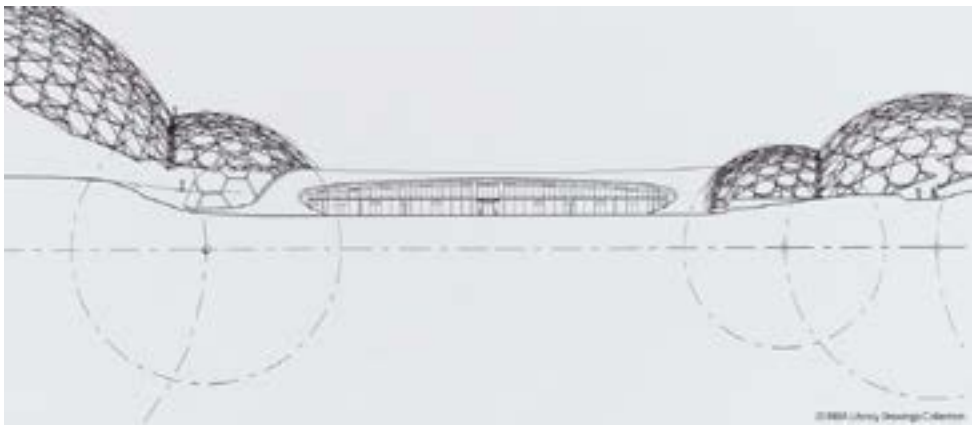


5

Conclusion

The notion parasitic came from the characteristics of this kind of architecture like “clamping itself onto another structure” or “living on the host’s expense”. The negativity around this notion doesn’t summarize the intention of this kind of architecture, that’s why mutualistic architecture, which is also a form of symbiotic architecture, is a better term to use. In some cases the intervention could act as a catalysator for the rehabilitation of an area.
Buildings that are built without taking into account the potentials the urban fabric can serve are parasites because they are the buildings that exploit the city.
For the functioning of a city, it’s important to keep distance from the individualistic thinking, because everything in a city is related.

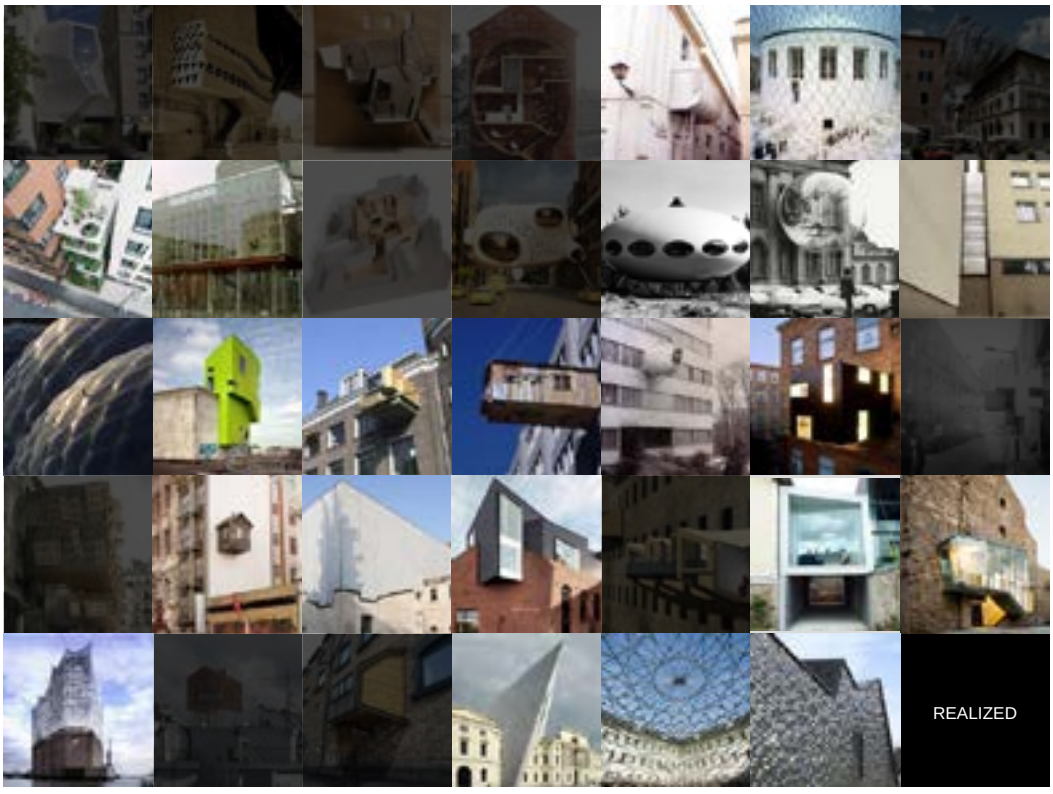
Overall research question

“How to design an architectural intervention, which could be implemented on various urban cracks, while taking the opportunities that existing constructions may provide into account?”

Technical Research Question

How to design an architectural element attached to an existing building, consisting of a lightweight structure?

In order to answer the research question, it is important to obtain results from the Database.
In the previous chapters it was explained for which reasons such an intervention is placed: the function of the intervention and the intentions behind it.
To have an overview of how an intervention is made, it is important to reflect on which projects have actually been built and which are not:



From these Database results, there is a clear difference in scale, the larger projects are namely a part of the “on top” category.
A few of these projects concern a unique roof construction for a monumental building, like the National Maritime Museum and The Great Court of the British Museum.
In addition, it also concerns an extra floor on top of a building. It can be concluded that the reason the larger projects are in the category “on top” to distribute the mass over the entire structure instead of a facade or a few columns.

A reason for the fact that “in-between” or “attached” projects are in smaller scale can be due to the fact that heavier is not structurally possible.
No special materials were used in the realized projects, except for Oase No. 7, where a PVC foil is used, fiberglass is used for the Pirate Bubble and Fiberglass reinforced plastic is used for the Futuro.

For bigger interventions, it is extremely important that the construction is sustainable since it is not built temporary compared to some of the smaller interventions.
From this, it can be concluded that “in-between” and “attached” interventions are merely built in smaller scale since structurally this has not been taken into account during the design and construction process.

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Figures

Figure 1: https://img.buzzfeed.com/buzzfeed-static/static/enhanced/webdr06/2013/9/11/17/enhanced-buzz-2126-1378934130-0.jpg

Figure 2: http://userscontent2.emaze.com/images/4445e218-1236-43be-9607-7c9ebef226b0/890e1801-ade4-44d9-b3da-16ae4e041011.jpg

Figure 3: http://zabor.net/wp-content/uploads/2015/07/za_bor_office_parasite_01.jpg