

Holistic and Integral Approach to Residential Renovation

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Abstract: *Dating back to the dawn of the human race, the man has always sought safety and comfort not simply as a shelter, but also to raise a family. This is why the prehistoric settlements were built in a form of groups of houses that people used to share with one another. These days, due to the social development, we need to create homes and different spaces with unique functional properties. The evolution of our society's has shaped the living environment in a way that it's always constantly changing not only its functions and, but its size as well. These are, precisely, the aspects of the modern dwellings introduced into this article.*

Index Terms: residential design, renovation, dwelling process

I. INTRODUCTION

As active members of this society, we must act. And to act, we must be able to translate knowledge into useful concrete objects that respond to a set of expectations. Beyond the different states and scales that objects could have, the goal is to methodologically address the collapse between the theoretical and the practical world, and drive the negotiation process between the conceptual world of ideas and the real, experienced and sensory world. The most valuable tool we have developed to mediate this collapse is design. To improve the quality of urban renovation projects we need to promote a more holistic and integral approach, which apart from technical solutions takes into account architectural, social and historical aspects. We need to be aware of the social responsibility in relation to building projects, as the built environment plays an important role for creating a well-functioning society. The aim of residential design regeneration takes into consideration not only the architectural and urban planning aspects but also social factors, and the new demands on habitat and sustainability in the urban areas. This multidisciplinary approach is especially interesting. The experts, which will take part in this process, must rely on the relationship between social aspects, architectural issues and technical solutions. The projects may vary - from transformation of houses to generating possibilities for shared use of space or even to imagine a new employment of space; recovery of public spaces between buildings, energy rehabilitation and so on.

For us an urban regeneration should be understood not only the new construction complies is in line with sustainable energy and environmental requirements, it could also be giving a 'second life' to abandoned or poorly maintained buildings. The our society is changing strongly influenced by different factors - the need for collaboration of different cultures, ethnicities and religions, a radical change of lifestyle, most often caused by advances in technology and the rapid obsolescence of production processes and buildings.

Some of the most important goals for contemporary specialists could be:

- Use a holistic approach regarding the impact or limits of all the aspects related to the buildings, its context and its use.
- To think of a new ways of how to organize different functions in a city.
- To preserve the architectural identity.
- To design in accordance with contemporary needs.
- To improve the energy efficiency of the buildings.

Possible solutions of course depend on the specific problem, but the most logical approach to rethink the dwelling process for us would be:

- Creating new collective use of spaces,
- Providing new private uses.
- Improve urban design,
- New public facilities,
- Self-sufficiency,
- Renewable energy.

Some of those approaches have already been made, which encourages us to use them as a successful example for the future.

II. SOME EXAMPLES

A. Transformation of old, abandoned public or industrial buildings into residential

In architectural practice we can see some very successful examples about this how a completely unnecessary, inefficient and dull building could be used in new, interesting and functional way.

Abandoned factories often look like abandoned castles: often very big in size, with remained silos left to remind us of days long past. Maybe there's why architect Ricardo Bofill purchased this building in Barcelona and initiated a two-year renovation for transformation of this abandoned cement factory it into a building with spectacular architecture (fig.1).

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The building that originally consists of 30 silos, engine rooms and a lot of underground structures was transformed into Bofill's architectural offices, archives, a model laboratory, exhibition space, his personal apartment, guest rooms, and beautiful gardens.



Fig. 1 Abandoned cement factory, Barcelona, architect Ricardo Bofill

Bofill used as an inspiration Brutalist and Surrealist elements, possessed in the factory. A lot of eucalyptus, palm trees, olive trees and cypresses was planted in the factory's front lot.

Bofill leaves the original ceiling heights of the interior. The architect's personal apartment was situated in the main building. The final interior design have been kept simple. [16].

The Factory is a brilliant example of this kind of "green thinking in architecture": sometimes it is better to give a second life to already existing buildings, rather to build a new modern one from scratch.



Fig. 2 Student Housing Complex, HRTB Arkitekter AS

In Oslo, HRTB Arkitekter AS transformed an old grain elevator located along the Akerselva River into a 19-story student-housing complex known as Grünerløkka Studenthus (fig.2). Using bright panels of colored glass, the architects managed to add a bit of whimsy to the concrete, battleship gray exterior, while leaving most of the original structure intact.

The unique building becomes an architectural icon, and it won the City of Oslo's Architectural Prize in 2002.



Fig. 3 Gigantic Coal Gasometers Transformed into Thriving Communities in Vienna

A brilliant example of a successful way of renovation is an Austrian revitalization project led by Jean Nouvel, Coop Himmelblau, Manfred Wehdorn, and Wilhelm Holzbauer for a transformation of four gigantic gas tanks into spectacular and thriving communities (fig.3).

The city of Vienna called for new ideas for revitalizing of this structures in 1992. The architects Jean Nouvel, Coop Himmelblau, Manfred Wehdorn and Wilhelm Holzbauer participate with their project, and between 1999 and 2001 the reconstruction begins.

After the renovation into the buildings was implemented 615 new apartments, a student dormitory, a day care center, multiplex, many shops and restaurants, an events hall, and the Vienna National Archive [10].

Today the gasometers form a modern and unique city center, very well recognized both from community and from tourists.

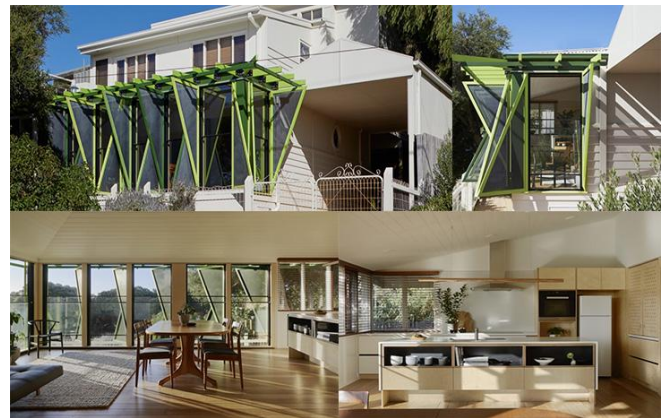


Fig.4 An old post office, OOF! Architecture, Images by Tatjana Plitt

A former post office has been revived as a beach house in Breamlea, Australia. OOF! Architecture created this project for clients who had already adapted the post office into a home, but were frustrated with the building's lack of connection with the outdoors (fig.4). As a former post office, the original building had boxy dimensions and few views of the outdoors. To connect the home with the landscape, the architects removed the existing high-silled windows and cut the entire front of the house open to create a veranda-like

space on the ground floor [8].

In the renovation process the architects used low maintenance natural materials. The opened front of the house up to waterfront views introduces more natural light and ventilation to the interior and improved energy savings.



Fig.5 Paramount House, Breathe Architecture

The Paramount House is an adaptive reuse project in Surry Hills, Sydney, Australia, designed by Melbourne-based Breathe Architecture. The architects remade an 80-year-old warehouse into the chic hotel, using sustainable practices in more than one way (fig.5).

Within the restored brick and timber shell, Breathe Architecture inserted structural and architectural metalwork, concrete, recycled timber floorboards, low-VOC finishes, locally designed tiles and furnishings that are entirely made in Australia.

In addition to the renovation of the historic building, the architects also used locally sourced materials wherever possible and installed a 7-kW photovoltaic solar array on the roof deck to supplement the building's energy needs.

This project is a great example for successful revitalization of historical buildings in a sustainable way.

B. Regeneration of old, abandoned dwelling buildings



Fig. 6 AREA Real Estate, Lake Flato Architects and OCO Architects

The project AREA Real Estate of the firm Lake Flato Architects and OCO Architects (fig.6) is a great example of an urban adaptive reuse project that will end up transforming hundreds of lives. The mixed-use housing project revitalises a neighbourhood just off the San Antonio Riverwalk, which has blossomed from a plot of run-down vacant since 2004

buildings. These heavily vandalised buildings had become a local "ghost town" full of transients and ripe with crime. The new owners and developers AREA Real Estate brought in local design firms Lake Flato Architects and OCO Architects are committed to renovate the buildings into apartments, retail, and office spaces. The design team's decision is to adapt the existing superstructure, preserving its industrial qualities, and to connect the site's Broadway Street façade with retail and office use. [17].



Fig. 7 Growing home in Indonesia, Studio SA_e

Another dramatic renovation was made by the Indonesian architecture firm Studio SA_e, which transformed a home in Jakarta from a strictly residential building into a multifunctional dwelling that accommodates residential, office and entertainment spaces (fig.7). The first reconstruction of the building occurs three years later after the young couple purchased the 387-square-foot two-bedroom building when the couple realized that they needed to expand their living space for their growing needs. The couple expanded the built footprint of their home to the corners of the plot and added a second floor to make room for a ground-floor office at the front of the house. During the second reconstruction, the home was expanded to incorporate the neighboring house to accommodate four additional bedrooms and living spaces. The third reconstruction, made by Studio SA_e, divides the home into three sections: living, working and interacting.



Fig. 8 Modular office SMA254, SMA Architecture Studio

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An interesting example of a reconstructed residential building turned into a workspace for an architecture firm is the project SMA254 of the SMA Architecture Studio in Hanoi (fig. 8).

The architects used stacked cubic modules with different proportions to create spatial interactions and visual connections throughout the space. All the spaces, comprising two main floors and in-between mezzanines, are linked together. Thanks to the used modular approach currently function of the building easy can be changed. The architect's team achieved a variety of goals, including modern living space with ample natural light and ventilation for maximum energy savings, and optimum spatial flexibility. All the walls, iron and steel elements were painted white to create a feeling of spaciousness and reflect light throughout the height of the building.



Fig. 8 Green office space, Studio 102

Architecture firm Studio 102 transformed a vacant twin house in southwest Hanoi, Vietnam, into a living-working space for consulting firm Mein Garten (fig.8). The architects managed to effectively reduce the building's energy consumption, while the use of reclaimed materials, natural ventilation and the optimization of natural lighting enabled the team to cut the construction costs. The various elements used in this project, such as water, verandas, terraces and walkways bring people closer to nature and meet the Mein Garten's design attitude.

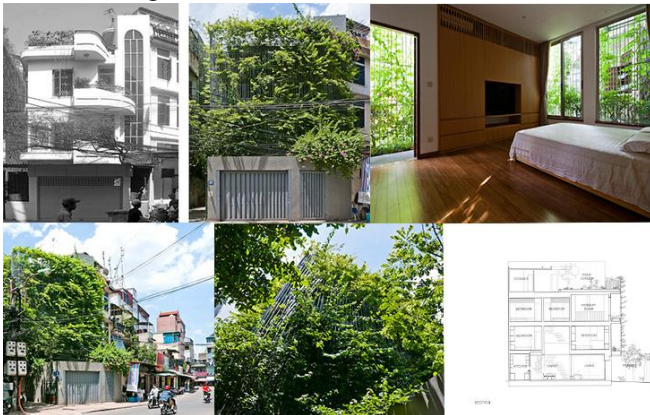


Fig. 9 Green Renovation project, Vo Trong Nghia Architects

The example for innovative design that brings nature back to the built environment is Green Renovation project of the Vo Trong Nghia Architects, located in the bustling city of Hanoi (fig. 9). Typical of this project is cascading green

facade used to transform an unappealing 15-year-old single house into a bright and airy home. The walls were knocked down to open the house back up to daylight and ventilation, and to create an airy, open-plan layout. The steel trellis which serving as a security precaution, was covered with green climbing plants to add fresh air, provide a privacy screen, and create an attractive green waterfall-like façade. An air ventilation layer was inserted beneath the raised ground floor to prevent the common Hanoi problem of rising condensation in humid environs. The addition of a roof garden protects the building from the harsh West sunlight and provides an area to grow vegetables and flowers. Vo Trong Nghia Architects hope that the Green Renovation's will inspire even greater green development in Vietnam and serve as a model for greening tropical cities.



Fig. 10 House TP, dmvA

As with the previous example, in project of the House TP (fig.10) was used again removal of walls and an open-plan layout to improve access to sunlight and make the home feel larger. In addition to access to natural light and views of the outdoors, the transformed property also enjoys space for greenhouse in the rear. The only remaining part of the removed back walls is a single steel beam that inspired the Belgian architecture firm to design a "floating" greenhouse.

The regeneration of this dwelling improves the quality of both the interior and exterior living environment.



Fig. 11 Plugin House, People's Architecture Office

In addition to innovative design, we can also see a socially conscious design in People's Architecture Office's project, the Shangwei Village Plugin House (fig. 11).

The experimental dwellings were made with a modular building system of prefabricated panels and can be assembled with unskilled labor using just one tool in less than a day. These customizable homes can slot into existing structures to make formerly uninhabitable spaces both livable and attractive for far less than the cost of a typical renovation. The architects decided to rehabilitate the series of centuries-old structures having been left vacant for decades by inserting new construction — with added structural reinforcement — inside the existing structures using high quality materials that drastically increase energy efficiency and economies of scale ensure the Plugin House remains inexpensive.

The Plugin House System solves a serious problem with the rehabilitation of the destroyed abandoned buildings while at the same time raises living standards by adding efficient units for heating and cooling, modern kitchens and off-the-grid composting toilet systems.

C. Regeneration and transformation of unusual objects

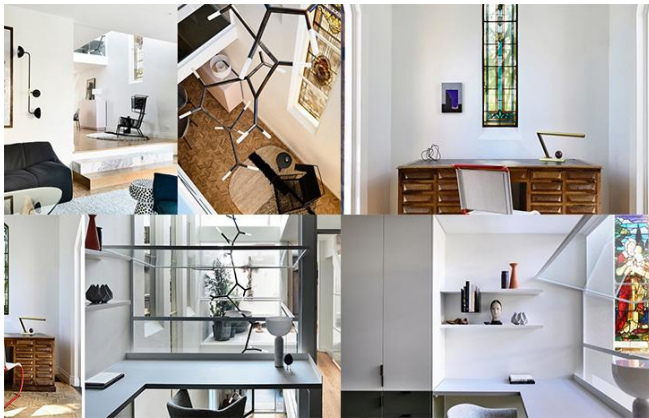


Fig.12 Church transformed into a family home, Doherty Design Studio

A church, built in 1910 in Hawthorn, Australia has been revamped into a lovely light-filled house for a family of five by Doherty Design Studio (fig.12).

The church had been already extended with an apartment as part of a larger residential complex before Doherty Design Studio decided to make this renovation. Some elements of the house of worship's past were retained, such as the ivy-covered brick facade, arched doorways and windows, and original timber beams. Recent restoration combined contemporary design with features representative of the building's past.



Fig.13 Church converted into modern family home, Zecc Architecten

Another good example of reuse of unusual objects is Zecc Architecten's work in Netherlands. They repurposed and converted two abandoned churches located in Utrecht into refined and modern residences. The newly built walls that shape the living quarters have clear proportions and modern lines. They are completely combined with the original structures of the old church building, while retained stained glasses create interesting colorful accents in space as a counterpoint to contemporary furniture and artwork.



Fig 14 Old water tower turned into modern home, Bham Design Studio

Located in the Belgian village of Steenokkerzeel, this 30 meter (98.4 ft) water tower was originally built between 1938 and 1941. It was in service until the 1990s and was even used as a watchtower by the Nazis when they took over Belgium in World War II.

Architect Mauro Brigham of Bham Design Studio decided to repurpose this old water tower, simply known as *Chateau d'eau*, into a livable home. The tower has been transformed into a high-tech, modern residence that offers all the facilities of a typical house. The water tower home comes fully equipped with the latest IT technology and an advanced domotics system that allows one to control various facets of the home like the intensity and color of lights, temperature of each room and volume level of music.

To create a distinctive family home with its identity, many of the original architectural elements of the building, such as concrete ceilings and stairs, are preserved. (fig. 14).



Fig. 15 Old public bus salvaged to create affordable housing in Israel

A great example for unusual and original solution was made from two women from Israel. They went to a scrapyard, bought an old public transportation bus and decided to turn it into an affordable living space. Housing access is a big issue in Israel, so the pair wanted to create affordable housing while also diverting waste from landfills.

The original layout of the bus was used in interior design, - the existing windows, doors and wheel arches gives unique atmosphere. The property has fully equipped integrated bathroom, rear bedroom, storage, a kitchen and even air-conditioning.



Fig.16 Double-decker bus transformed into home, Daniel Bond

Another similar idea was made in Canterbury, Kent from Daniel Bond who bought the double-decker bus from e-bay for just £3,000 and spent a further 8,000 kitting it out. He turns the vehicle into a real home for only four months.

The bus was accomplished with a double bedroom, a bedroom for two kids, kitchen, TV lounge, bar, toilet and bathroom. Everything has fully supplemented with plumbing running, and connection with electricity to power lights and appliances.

The vehicle was completely stripped from innards, damp-proofed, the insulation was fitted, it and a partition walls was put to create the different rooms.

The heating of the vehicle runs on diesel while the rest of the bus is powered by battery or by connecting to a mains plug.



Fig. 17 Boeing 727-200 house in Hillsboro, Oregon

This aircraft renovation is a successful example of the fact that some things that seem totally inappropriate for a special activity could fulfill it in a comfort way.

Aviation enthusiast Bruce Campbell built high altitude home in 1999. He purchased the decommissioned military aircraft for \$100k, and spent over \$220k worth of work completed on its interior. The owner notes that the structure is "highly fire resistant and provides superior security".

Despite the fact that it is an unusual living object in the aircraft are provided all the necessary amenities, needed for a comfortable life.

III. CONCLUSION

However, the direction of our society's evolution has shaped the living environment in a way that it's always changing not only its function, but its size as well.

These days, due to the social development, we need to rethink spaces and buildings that surround us in a way that combine their unique functional properties.

The modern dwellings can be created not only as a new and modern one. Re-using the already existing facilities give a unique opportunity for preserving their value while employing challenging architectural solutions.

Nowadays we must focus on the limited resources intrinsic to the provision of social, affordable and sustainable architecture and the impact of such scarcity in whole world, and in big sites as well.

The experts, which will be involved in this process, should rely on the relationship between social aspects, architectural issues and technical solutions.

As such, it is very important to provide sustainable building projects, in order to capture and disseminate good practice in both a EU and overseas context.

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