

## THE UNRESOLVED ROOFTOP

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### Abstract

This study is prompted by the observation that an overwhelming number of buildings in the world have rooftops that are architecturally irresolute, under designed, uncharacterised; in one word: unresolved. In those instances, the level of design resolution of the rooftop is insignificant when compared to its corresponding facade. There is an evident, sudden drop in design tension and architectural investigation. Has this condition perpetuated through time, and is this trend continuing? What alternatives are there to the unresolved rooftop? This study seeks to explore the topic of the unresolved rooftop in architectural design, defining its features and origins and providing evidence of its visibility and presence in the world. It associates the design of the unresolved rooftop to the flat rooftop of the modernist era, and proposes it as a recurring theme and opportunity in contemporary architectural design. The study limits itself by suggesting three areas of investigation into the persistence of the unresolved rooftop in design practice and education and provides examples of counter-trends with the scope to stimulate a greater awareness of the unresolved rooftop and to promote change.

### Keywords

Unresolved rooftop, rooftop investigation, practice, education, generative design.

### Introduction

The outer surface of a roof represents the moment when a building confronts itself with the sky. It is a moment ripe with potential architectural expression and design integration, describing a building's relation to the vault of the sky. At rooftop level, the privileged access to the sky's elements, such as sunlight, solar energy, ventilation and view, is a call for a selective connection between the inside and outside of the building, a type of connection that is typically present in a building's main elevations and in pitched roofs, through the careful exploration of building tectonics, materials and opening typologies.

If, however, we look at buildings from above, we are likely to see an urban landscape of prevailing grey; undefined rooftops (see Figure 1).

We can appreciate a building's architectural richness as we walk along the street, only to see, if we look down upon it, the emptiness of its rooftop design content. In many cities, rooftops are asphalt-clad surfaces of poor architectural quality, assigned to the role of back-alleys. If it



Figure 1: View from above in: New York (a); Genova, Italy (b); and San Francisco (c) (Source: Author (a,b); photoeverywhere.co.uk (c) ).

is the case that buildings are three-dimensional artefacts, to be experienced not only from street level and within but also from above, then one cannot but question the lack of design resolution of the rooftop. The visibility of rooftops and the architectural opportunities that rooftop design offers calls for a critique into the degree of rooftop design integration and resolution. This, in turn, has the potential to stimulate architectural innovation and improve the quality of the built environment. This study proposes the unresolved rooftop (UR) as a recurring theme and opportunity in contemporary architectural design.

The study begins by qualifying the UR and arguing for its consolidation as an archetype. It then limits itself by proposing three lines of inquiry into its persistence in architectural design practice and education. These are: the designer's perception of the UR; the UR and design representation tools; and the UR and design conventions. As a means of proposing alternatives to the UR, the study then proposes examples of counter-tendencies in rooftop design. Finally, the study draws conclusions regarding emerging themes in UR resilience,

and proposes directions for change.

### Qualification of the Unresolved Rooftop

The 'Oxford English Dictionary' (OED, 2012) ascribes to the adjective unresolved the following meanings: 'irresolute', 'undecided', 'unsolved'; but also: 'undetermined how to act'. For the scope of this paper, the researcher associates the compound noun unresolved rooftop to a moment of a sudden drop in design tension and investigation within a building's design process, perceptible even by to untrained eye, irrespective of whether the roof is accessible or not. Buildings designs that have stopped pursuing architectural design exploration at the rooftop level leave the roof as an engineering matter with same, easily recognizable outcome. That is: a nondescript, inaccessible rooftop surface, or an exposed, accessible open air space in need of shelter; both conditions that are, in this paper, considered architecturally disengaged from the rest of the building and, hence, unresolved. It is noted that the UR tends to manifests itself in flat roofs. Typically, as the pitch of the roof increases, so does the level of its structural

complexity, its constructional finesse and architectural resolution (see Figure 2). We find, for example, that in the UR the structural system is typically of simple order, and the finishing of predominant utilitarian function. The finishing of most unresolved rooftops that we can observe today is of built-up ply or paint-on rubber membrane, concrete slabs, gravel or grass, and its constructional challenge is often reduced to weatherproofing. In the flat UR there exists poor architectural connection between the building's internal spaces and the sky.

Flat, unresolved rooftops are visible from higher-level floors and from elevated landscapes, a likely and familiar event, particularly in compact city environments and contoured topographies (see Figure 3). The irresolution and simplification of the flat roof cannot be explained by our inability to view the full form of a building, thereby questioning the disengagement that occurs at a creative level, within a building's

design generation and its development process.

If we search for literature that combines flat rooftop design, with the notion of irresoluteness, however, we find only tenuous references and have to seek other word associations. We find, for example, ample references to the topic of the flat roof in association with Le-Corbusier's five points in architecture (Colquhoun, 2002; Edward, 2003; Frampton, 2007), and to architectural archetypes (Thiis-Evensen, 1989). Nevertheless, most literature that addresses the issue of the flat roof and its alternatives does so in terms of recognition of its achieved status in architectural design. Such is the case of most books on rooftop architecture that favour to showing structural additions and adaptations to the rooftop, based on the essential notion of the ground floor re-proposed (Melet & Vreedenburgh, 2005; Schleifer & Serrats, 2010). Little is said on the selective opportunities offered by the outer skin of the flat roof and



Figure 2: Richness and complexity in pitched roofs, NYC (Source: Author).



Figure 3: Irresoluteness in flat roofs - Genova, Italy (Source: Author).

its structural and aesthetic potential. The emphasis, the researcher found, is placed on the acceptance of the flat roof as a state-of-fact, to be developed and adapted as open air space in which to dwell, or used as a flat ground surface to build upon. This notion is well expressed by Andrés Martínez, in 'Dwelling on the Roof' (Martínez, 1999) where the author reinforces the validity of open air roof-terrace dwelling by referring to vernacular, climate-responsive architecture. He does at times concede, however, on the role of roof shelter to temper such terraces (Martínez, 1999; p.17). In particular, the researcher found a proliferation of recent publications that discuss green roofs as the overall sustainable design resolution of the flat roof (Werthmann, 2007; Getter & Rowe, 2006). In addition, there are a multitude of guides and manuals on green roof design that suggest an add-on technology available for almost any flat roof surface (Snodgrass & McIntyre, 2010; Dunnett & Kingsbury, 2008). The researcher did not encounter, however, literature that convincingly questions the reductive nature of flat rooftop design or the potential drivers of its persistence in current practice and education. Conversely, however, the researcher found important examples from professional practice that show an awareness of the issue of the UR, and a push for generative design.

### The Unresolved Rooftop as Archetype

Examples of a drop in design tension between a building's flat roof and its corresponding facade may be found in diverse time periods and geographic locations. We find them in vernacular (see Figure 4) and project-led architecture. We find them in cold climates, where the function of its outer skin is limited to

encapsulating and insulating the building's occupiers, and in warm climates, where its open-air usage fundamentally offers the function and imagery of ground level.

It is in the modernist, industrialized era, however, where the association between the flat roof and irresolution becomes a recurring, prevailing theme. The applicability of new materials in the building industry, specifically reinforced concrete and steel, plays a central part in the creation of the UR as archetype. This is enhanced by the formulation of design manifestos and construction principles of the period's leading architects, who regard flat roof technology as an opportunity to integrate its imagery into a design program (see Figure 5). In 'Towards a New Architecture', Le Corbusier states (1924; p.61) that the advent of reinforced concrete has "brought about a revolution in the aesthetics of construction," which will allow for roofs to be suppressed and replaced by terraces. Concurrently, in the growingly dense cities of the new world, the use of steel pushes towards a vision of inconclusiveness and infinite vertical expansion.

As the UR consolidates and is replicated in building construction, so does the architect's validation of its reoccurrence in architectural design. At best, this resolves in the proposal of the articulated rooftop terrace; this is the case with most of Le Corbusier-inspired archetypal buildings with open-air rooftop spaces (which, however, arguably remain unattractive in cold climates, and in hot climates the need for sun shelter is soon felt.) At worst, this resolves in a weatherproof fix of the design-severed roof, as with most of Mies Van de Rohe-inspired archetypal buildings, and in modernist buildings that use flat roof technology as a building's practical but architecturally estranged

conclusion. Most modern cities offer the viewer this condition: different levels of rooftop design resolution that go from a bland simplification of the flat roof aesthetic, to its adaptation as an outdoor space or newly speculated real estate plot. All these outcomes, this paper suggests, atrophy the flat rooftop's functional and expressive potential in architecture (flat roofs, like pitched roofs, can command high levels of complexity and integration in a building).

For the scope of this study, there is evidence to suggest that this design tendency is continuing. The vast majority of current building designs that

incorporate flat roofs (the percentage of which could be calculated) neglect the rooftop as an integrated part of the building's design process and design outcome. Moreover, the body of examples from architectural design education that show flat roof designs indicate that this tendency might continue in future generations of architects. The reoccurrence of the UR, and its potential proliferation in the future, suggests underlying drives that are connected to how designers perceive the UR, the design tools used to represent it, as well as how we are expected to experience it.



Figure 4: Façade/flat roof contrast in vernacular architecture, Saana, Yemen. (Source: Ferdinand Reus, Wikipedia Creative Commons).

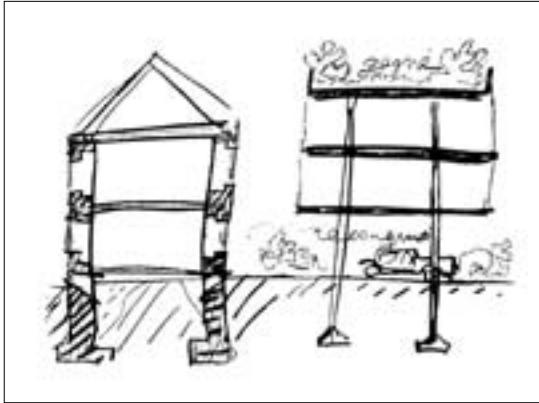


Figure 5: Ground level reposed. Concept sketch of Villa Poissy, France, by Le Corbusier. (Source: Andrés Martínez, 2005).

### The Unresolved Rooftop in the Design Process: Three Lines of Inquiry

This paper presents the UR as a sudden drop in design tension and investigation in architecture and as a visible, recurring theme in the built environment. Three lines of inquiry are proposed to study the UR resilience in design practice and education with the scope to promote change. These are:

- The designer's perception of the UR, which examines the relationship between the internal and external restrictions within the design process, and its outcome in terms of rooftop design investigation.
- The UR and design representation tools, which examines the connection between the UR and the current tools used for designing architecture.
- The UR and design conventions, which investigates the connection between the UR

and the designer-viewer conventions that govern a building's appreciation.

#### The designer's perception of the unresolved rooftop

This line of inquiry draws from the designers' experience during the design development phase, and aims to individuate, through a grounded research methodology, emerging themes that concern the UR generation during the design process. Under focus is the balance between a project's fixed external constraints (i.e. legislative, economic, environmental) and the more flexible and design-led constraints (i.e. spatial, functional, cultural, aesthetic) (Lawson 1990).

In design practice, initial investigations through a direct interview process at the firms of Bennetts Associates, London (P.Fisher, personal communication, June 18, 2012), Pelli Clarke Pelli, NY (D.Hesse, personal communication, October 10, 2010) and Costa Kondylis, NY (B. McCormack, personal communication October 6, 2010) suggest that, within a building's fixed constraints, the perceived value-for-money of flat roofs plays a decisive role in the formation of the UR. Furthermore, within a building's budget, rooftop design exploration and resolution is the first aspect to be sacrificed. What is more, in many instances the UR is the chosen condition to facilitate the rest of the building being developed with maximum economic resources and full design attention. Given the designers' uncertainty as regards a project's success in the real world, it begins to emerge that the UR economic implications can be controlled with exactness while its aesthetic acceptance is perceived as a given. Thus, for that reason, it is of lesser concern to the designer. The visibility of

the UR, however, suggests that the distribution of economic resources within a building's aesthetic and functional outcomes is prone to misinterpretation, thereby resulting in a missed opportunity in rooftop design exploration.

Fixed and flexible constraints have different impacts depending on whether the design process occurs in practice or in education and therefore, one would assume, on the designer's perception of the UR. In architectural design education, however, where students are asked to focus on the building's flexible constraints, and they typically have the choice to limit their concerns to the economic implications of their design decisions, the perception of the UR remains largely unchanged. The researcher's experience as a tutor in reviews and presentations in upper-level studios at schools of architecture with diverse cultural and philosophical background, in the period 2004-2012 (UL 2012a, 2012b, 2012c; Unife, 2009; VUW, 2012), has revealed a reoccurring resilience to rooftop investigation. Students need to be prompted to discuss about their approaches to flat roof design and this typically takes place towards the end of their design presentation, further suggesting that it also holds a secondary position in the building's design process. Consequently, students' flat rooftop proposals remain restricted to add-on solutions, with the provision of rooftop gardens or the installation of PV arrays, which are brought to the tutor's attention primarily to illustrate the project's environmental responsibility. These self-proclaimed design limitations, the researcher suggests, contrast the explorative-prone environment of studio culture. It reinforces the notion of the UR as archetype, deeply embedded and encapsulated within the

designer's unconscious, insufficiently questioned or challenged.

### The unresolved rooftop and design representation tools

The reductive nature and limitation of representation tools in the architectural design process has been thoroughly discussed in the writings of Bruno Zevi (Zevi, 1993), and Alberto Pérez-Gómez and Louise Pelletier (Pérez-Gómez & Pelletier, 1997). In this proposed line of inquiry, the way such tools are used is questioned specifically with respect to their implications for the UR. The representation tools in question are: elevations, 3-D representations, roof plans, and physical models.

Elevations continue to be used (and requested by clients, contractors, and studio tutors) as the quintessential tool to present a building's composition. While offering key information on a building's proportion, scale, and materials, elevations nonetheless further provide a distorted, facade-led building aesthetics. Their artificial horizon line misleads from an all-round, spatial understanding of the building in its making, discouraging rooftop design exploration. 3-D representations (whether drawings or computer images) are used selectively. They are, in other words, applied to the study of the building's design within the limitation of their own set frames. As such, they can be used to reduce or dismiss rooftop design investigation, or avoid acknowledging the UR's visual implications in the built environment. Typically, within the suite of orthographic drawings required, the rooftop is directly shown embedded within the site plan. Here, however, the focus is drawn away from the rooftop as an important part of the building's overall architecture, and placed towards the

relationship of the building's external contours with its surrounding ground level. In the site plan, the importance of rooftop design is minimised, subtly relieved of responsibility.

The way in which elevations, 3-D representations and roof plans are currently used in the design process, this line of inquiry suggests disfavours rooftop design investigation. Physical models, conversely, can play a crucial role in rooftop design, being contemporarily revealing of the UR issue and design generative. In design education, it is through physical investigation that designers can generate ideas and develop the making and understanding of space (Salama & Wilkinsons, 2007). Once the prime, mandatory representation design tool (in the Renaissance no significant building could be proposed without them), physical models compel a viewing of the building from above and beyond its immediate context. They stimulate building tectonics exploration (structures in physical models can be physically felt and broadly tested) and promote invention at the rooftop level.

Nevertheless, there is evidence to suggest that, as capacity to use digital representation tools increases in the design development process, so does the tendency to override physical models as a study tool (Bermudez & King, 2000; Caldwell, 2010). Conversely, we find studies that explore ways to bridge the gap between digital and physical modelling (Hadjri, 2010; Nassar, Mostafa, & Rifki, 2010). The divergence between drawn and digital images, and the physical model, the researcher suggests, has a direct outcome in rooftop design. By superseding the physical model there is a capacity for the designer to neglect rooftop design investigation.

Significantly, when prompted to produce a physical model of a flat roof building design, students tend to show the physical model without the roof. Instead, they elect to show the more interesting rich articulations that lie inside the model, as they would with drawings and digital images. The tabula rasa of the flat roof evidently represents an inconvenient challenge for students, a challenge, however, that also has the potential to provide them with the condition to transform the way their building is conceived.

A systematic investigation is required to explore ways to use representation design tools that will promote a greater awareness of the UR (such as the reinstatement of physical models as a fundamental tool for the design process) and new, informative methods that offer a greater awareness and control of rooftop design and its impact on the built environment.

### **The unresolved rooftop and design conventions**

In this line of inquiry, the aim is to investigate the connection between the UR and the conventions that govern a building's appreciation. The inquiry looks at the relationship designer-viewer relationship, more specifically, on how the designer sells a project and how that is expected to be consumed by the viewers. It is based on the assumption that, as with other art forms, architecture has conventional restrictions that determine its readability and appraisal, implying an unwritten contract between a building's designer and the viewer of that building (Holgate, 1992). Within these conditions, the appreciation of a building and the way it is supposed to be experienced is in its immediate proximity, disregarding the UR implications in the larger context. For example, it is conventionally assumed that a category

of building parts, such as its sides and back, will have restricted physical or visual access. Although visible, and potentially accessible, the UR is brought to fall into this category, leaving the building's main fronts and interior spaces, as the building's decisive selling parts. Such conventions are anachronistic to a spatial-temporal understanding of rooftop design, and contribute to further consolidate the UR. They continue, however, to hold ground in design practice and education, holding back the significant advances needed to promote change and make a difference in the visual experience of the built environment.

Image-led architecture plays a decisive role in the reinforcement of design conventions and the visual exclusion of the UR. In design practice, images are used to market a selectively framed architectural product (see Figure 6) that allows distancing from rooftop investigation (see Figure 7). In design education, elaborate effect-based graphic re-presentations continue



Figure 6: Image showing the new Engineering Faculty building Lincoln, UK (2011). (Source: Allies and Morrison architects, UK).

to attract what is perhaps disproportionate attention. In this sense, the architectural product is not only consumed in the real world but also “within a photographic image of itself” (Porter, 2000; p.6). We have evidence of this in the numerous examples of academic books, specialised architecture journals and design practice websites. There are always key, controlled selling viewing points that tend to exclude the UR. Flat unresolved roofs are shown only in the context of the urban landscape, in urban design schemes where the identity of an individual building is unrecognizable and blurs with other rooftops, or as an adaptation. It is a state of affairs that arguably feeds itself, with the expectations of the viewer corresponding to the interests and efforts of the designer. In this sense, the disengagement from the UR needs to occur within a research environment and in design practices that have the means to allow conventions to be radically questioned.

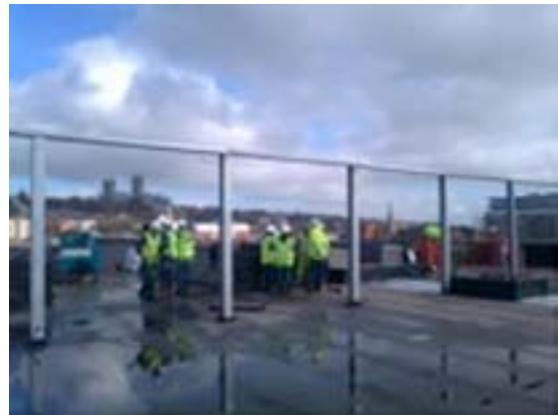


Figure 7: Finalisation of the Engineering Faculty gravel rooftop. Lincoln, UK, 2011. (Source: Author).

## Counter-Tendencies

The technological advances developed during the modern industrialised period allow us today to provide a building with a structurally sound and an environmentally selective envelope whilst fostering architectural expression and resolution. Like pitched roofs, flat roofs can offer a high level of design exploration and promote innovation. In providing examples of counter-tendency to the UR the researcher proposes two directions. These are: the reinvention of the flat roof in new buildings, and the UR transformation through integration of existing buildings.

### The reinvention of the flat roof in new buildings

In ex-novo design perhaps one of the most significant 'pushes' towards a visual, functional

and technological exploration of flat rooftop design can be found in the California Academy of Sciences (2008), by Renzo Piano (see Figure 8 and 9). Predominantly flat, the large roof design sensitively responds to the building's internal and external conditions. It does so structurally, through a frame of steel ribs that curve to accommodate the two tall exhibition spheres; and environmentally, through a vegetative carpet that thermally tempers the interior spaces and a cluster of round skylights that illuminate and naturally ventilate the spaces below. The design of the building is a collection of explorations of what the flat roof can be: the large skylight at the entrance of the building, for example, is developed as a carefully crafted concave-concave structure, rather than an add-on skylight component of the flat roof;



Figure 8: The California Academy of Sciences, San Francisco, (2008) by Renzo Piano. (Source: Author).



Figure 9: The exhibition spheres in the California Academy of Sciences, San Francisco, (2008) by Renzo Piano. (Source: Author).

the building's glass overhang integrates PV technology with the architectural program, proving shelter from rain and allowing for partial shade of the spaces below; and the vegetative carpet of 50,000 separate trays allows for the green roof to be 'sculpted' whilst retaining its water management function. It is crucial to state, however, that the roof is not dwelled, but only partly accessible to showcase these ideas, and to allow for a vantage viewpoint over the park. Arguably, we are far away from the notion of the ground floor re-proposed, and the visual connection between the green roof and the surrounding context is consequential to a "poetic solution of a constructive and functional problem" (Bucci, 2010; p.111).

In the Water Cube building in Beijing (2006), by the China State Construction and Engineering Corporation (CSCEC), PTW Architects and Arup (see Figure 10), the merge between façade and flat roof is made complete. This seamless unification is made possible through a thick and hollow wall and roof structural element that, at roof level, defies gravity through a complex optimisation of the spatial grid. The building is entirely enveloped by a total of 3,000 pneumatic ETFE cushions, inflated by low-pressure air, which are retained by an aluminium extrusion and supported by the structural element. While allowing for daylight to permeate into the building, solar energy that enters at the structural level can be used to heat the pools

and air that circulates within the cavity allows for cooling. The vital lesson from this example is that the flat rooftop is treated as a selective surface with a connotation and value that is equivalent to and in dialogue with the rest of the building. It reinforces the notion that contemporary technologies can allow a disengagement from the structural simplification of the flat roof typical of the modernist period, and allow the flat roof to begin to be treated as as an environmentally selective and aesthetically responsive surface.

Still under construction (to be completed by December 2012), the Cervantes Theatre, Mexico City, by Ensamble Studio (see Figure 11), illustrates yet another variation of the

inventive opportunity offered at rooftop level. The building's theatre spaces are entirely embedded underground. They are covered, starting at ground level, by an accessible plaza and a glazed surface, and surmounted by a large metallic canopy, dubbed by the designers as 'Dovela' (Keystone). More than a feat of technological innovation of structure and materials, the 'Dovela' is a sophisticated investigation into roof geometry, negotiating between the isotropic layout typical of the flat roof and the inclined surfaces of the pitched roof. The pitched metallic blades boxed within the 'Dovela' filter the harsh Mexican sunlight and collect the water within them, while establishing a framed view from the underside



Figure 10: The Water Cube, Beijing, (2006) by CSCEC, PTW Architects and Arup. (Source: PTW Architects).



Figure 11: The 'Dovela' of the Cervantes Theatre, Mexico City (under construction) by Ensemble Studio. (Source: Ensemble Studio).

of the 'Dovela', and from the buildings above. The roof of the Cervantes Theatre is in fact a layered system where each of its components, the thermal envelope at the theatre's roof level and the 'Dovela', plays a particular role in the roof's composition and in negotiating the ground with sky.

### Transformation of the UR through integration with existing buildings

Although an early project, the Offices for ING & NNH in Budapest (1994), by Erick van Egeraat Associated (see Figure 12), remains one of the most powerful examples of flat rooftop

integration within an existing building complex. The design is a one and a half storey addition to an existing monumental building in central Budapest. The two main components of the building's rooftop are a vast flat laminated glass surface acting as skylight, and a sculptural element nicknamed the 'whale' which functions as the board of directors meeting room. The glass surface is supported by a steel construction system, whilst the shape of the 'whale' is created through curved laminated wood ribs that are interspaced, according to location, by a glass or zinc skin. The 'whale' appears to be floating inside the flat glass surface. What is notable here is the organic

interplay that is generated between the building's interior and the sky. The integration is: environmental, through the profuse access of daylight; structural, through articulated building tectonics that is also visible from the inside of the building; functional, through the connection of the 'whale' to the inner spaces; and visual, through the visual connection to the 'whale' and to the panoramic view of Budapest and the roof itself. The example demonstrates the vital integrative role that rooftop design can

have for the entire building.

A more recent example is Diane von Furstenberg Studio Headquarters, in New York (2008) by Work Architecture, shown in 'Architectural Record' (Stephens, 2008). The headquarters house the company's flagship store as well as the administrative and work offices and a rooftop apartment. The design of the building maintains historic facades, while providing a diagonal staircase that vertically connects



Figure 12: The Offices for ING & NNH, Budapest, (1994) by Erick van Egeraat Associated (Source: Erick van Egeraat Associates).



Figure 13: The Covered Roof Terrace, Amsterdam, (1991) by Han Slawick (Source: Han Slawick Architects).

the entire building up to the rooftop level. This circulatory connection additionally allows for daylight to enter through the rooftop, deep into the interior parts of the building. At rooftop level, the connection is established by breaking through the existing flat rooftop surface with a multifaceted glass structure housing, showcasing the penthouse apartment.

Despite being a modest scale intervention, the Covered Roof Terrace in Amsterdam (1991),

by Hans Slawick (see Figure 13) can be most enlightening. The top floor apartment of a five storey building, the project is composed of a main supporting steel frame, and a barrel vault structure created through a set of curved laminated wood trusses. The vault architecturally concludes the building whilst environmentally selecting the sky elements at rooftop level, protecting its occupants from the wind and rain. The use of acrylic rather than silica glass to allow the occupants to take advantage of the UV benefits of the Nordic sun is a simple and yet fine example of the selective opportunities offered at rooftop level. The Covered Roof Terrace acts as a reminder of the importance of tectonic design and how, starting from the UR, few design gestures are sufficient to regain a physical and expressive connection with the sky.

In both new and integrative design examples, the researcher would like to place the emphasis on the building's relationship established with the sky, a renewed sensibility of the roof as an integral, visually accessible component of the building, as well as its aesthetic contribution to the site. In new building proposals, the designer has the opportunity to integrate the flat roof in a conclusive, architectural unity. In integration with existing buildings, the transformation of the flat UR establishes rediscovered levels of structural, functional and visual engagement within the existing building.

## Conclusion

In this paper the researcher has presented the UR as a visible drop in design tension and architectural investigation, and associated it with the flat roof of the modernist period. This

paper questions the resilience of the UR in current architectural practice and education and proposes lines of inquiry that have the ultimate purpose of stimulating a greater awareness of the UR and promote change.

In the three lines of inquiry various key themes begin to emerge. These are:

- In design practice, the perceived value-for-money of the flat UR tends to push design efforts towards other parts of the building, reducing rooftop design exploration and promoting the adaptation to the UR. In architectural design education, where economic constraints need not be a prevailing issue, rooftop design investigation continues to remain secondary, and with a limited range of proposals.
- The way current design representation tools are used, both in practice and education, discourages rooftop investigation. Alternative ways of using these tools need to be engaged, and alternative informative methods proposed to support a greater awareness of the UR and to promote change. In this direction, the researcher underscores the importance of re-instating the physical model as a fundamental study tool.
- Within the established conventions between the designer-viewer, and seller-buyer, the UR tends to fall under the category of 'back alley'. The visual access to the UR and the potential evolution of the flat rooftop, however, is in strong contradiction with this convention. The persuasive power of image-led architecture in practice and education significantly contributes to this tendency.

All the preceding themes are in need of thorough investigation. In this sense, the role of education and research can play a critical role in stimulating a greater awareness of the UR, challenging its persistence and promoting change. Examples of counter tendencies from practice show how a generative approach to roof design, rather than an adaptation to the UR can trigger a disengagement from the UR and promote a full, spatial experience of architecture and the built environment.

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### Simone Medio

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