

**THE REPUBLIC OF TURKEY
BAHÇEŞEHİR UNIVERSITY**

**UNFOLDING ROOFTOPS IN DENSE URBAN
AREAS FOR A BETTER LIVING**

Master Thesis

ŞEBNEM CANA KAÇAR

ISTANBUL, 2015

**THE REPUBLIC OF TURKEY
BAHÇEŞEHİR UNIVERSITY**

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Supervisor: Assist. Prof. Dr. E. ÜMRAN TOPÇU

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To the urbanites,

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Lastly, I am not even sure if the English language, or any other language, would make it possible to thank in words but, I wish to thank to my family. I cannot imagine how supportive they were, even in their hardest times. I am not sure, if I truly know how lucky I am for having this loving and inspiring family. Thank you.

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Şebnem Cana Kaçar

ABSTRACT

UNFOLDING ROOFTOPS IN DENSE URBAN AREAS FOR A BETTER LIVING

Şebnem Cana Kaçar

Master of Architecture

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Starting with industrial revolution, the effects of rapid urbanization are seen in cities all over the world. Today more than half of the world population is living in cities, and this ratio is increasing. Hence there is a scarcity of land in the city centres, and the cost of land has risen dramatically. This situation indicates that every part of a city has to be utilized in the best possible way. In the past, urban planners and architects have realized the importance of utilizing spaces in cities, and designed multi layered cities as early as 1950s. However these initiatives remained as design intentions on the paper and have never been put into practice. Although the benefits of layering the city are obvious in terms of circulation and space utilization. The idea of layering has been hard to apply to the whole city because of economic and logistic concerns, but the design idea is applicable in particular areas of the city. Currently the most unutilized entities in cities are the rooftops. The disappearance of green areas and public spaces has been harmful rather than advantageous to the human being, psychologically and physically in the long term. But it is possible to regain those areas and more, in favor of the city by utilizing the rooftops. This thesis is an attempt to emphasize the importance of utilizing, designing, reusing and “unfolding” rooftops for a better living in cities.

Keywords: Unfold, Rooftop, Roof, Roofscape, Utilization, Urban

ÖZET

DAHA İYİ BİR HAYAT İÇİN YOĞUN ŞEHİR BÖLGELERİNDE ÇATILARI AÇMAK

Şebnem Cana Kaçar

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Endüstri devriminden günümüze süregelen hızlı şehirleşmenin etkileri bugün neredeyse tüm şehirlerde görülmektedir. Günümüzde dünya nüfusunun yarısından fazlası kentlerde yaşamakta ve bu oran hızla artmaktadır. Dolayısıyla kent içi arazi sıkıntısı çekilmeye başlanmıştır ve merkezi konumlarda arsa fiyatları artmıştır. Bu durum kentlerde her alanın en iyi şekilde değerlendirilmesi gerektiğini vurgulamaktadır. Geçmişte şehir plancıları ve mimarlar şehirdeki alanları iyi kullanmanın önemini anlamış ve 1950'ler için çok katmanlı şehirler tasarlamışlardır, ancak bu tasarımlar kâğıt üzerinde kalmış ve hayata geçirilememiştir. Fakat bu katmanlaşmanın yararları sirkülasyon ve yer tasarrufu açısından açıkça görülmektedir. Katmanlaşma fikrinin bütünsel olarak şehirlere uygulanması ekonomik ve lojistik nedenlerle kolay olmasa da bu fikrin tekil olarak uygulanabilmesi mümkün görünmektedir. Binalarda en az kullanılan mekânların başında çatılar gelir. Kentlerde yeşil alan, kamusal alan, gibi yerlerden kısılarak şehirleşmek fayda sağlamaktan çok uzun vadede insana fiziksel ve psikolojik açıdan zarar vermektedir. Ancak bu gibi alanları ve daha fazlasını çatıların değerlendirilmesi ile şehre geri kazandırmak mümkündür. Bu tez, daha iyi bir hayat için, çatıların faydalı hale getirilmesinin, tasarlanmasının, kullanıma katılmasının ve “açılmasının” önemini ve ne gibi ihtiyaçları karşılayabileceğini anlatmayı amaçlamaktadır.

Anahtar Kelimeler: Açmak, Çatı Üstü, Çatı, Çatı Görünümü, Faydalı Hale Getirme, Şehir

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LIST OF ABBREVIATIONS

DESA : Department of Economic and Social Affairs

LEED : Leadership in Energy & Environmental Design

PV : Photovoltaic

UN : United Nations

UNESCO: United Nations Educational, Scientific and Cultural Organization

1. INTRODUCTION

Industrial revolution changed the lifestyles in every parts of the world. People started to migrate from the countryside to cities, since then the migration continues. Modern cities of the world tend to grow faster than the previous years. The density is increasing while the borders of the cities are developing conurbations. For the first time of the early 21st century, more than half of the human population choose to live in cities. The trend seems to be continued that way in the future. As more people move to city, there will be more need for land, better transformation networks, more time and effort for better infrastructure.

In time, while it is experienced by the 21st century people, land will be more expensive than the cost of the building. Therefore the growth need to be vertical instead of horizontal, since the most common problem in cities is the need for space. None of those are taken into consideration and buildings erect carelessly most of the time. As a consequence it is not possible to say that current cities are well designed, and there are many entities have been left out. There are a lot of idle parts in towns, but the most untapped entity is the rooftops.

Intense studies for better future cities are done and put into practice with guidelines, by developed countries. These initiatives are about sustainability of a city and the aim is to have zero carbon emission cities, which is good for the future of the natural resources, the ozone layer, etc. but the very same legal guidelines for constructions do not attach importance to the efficient space use which is also important for a sustainable city. It must be understood well that the term of sustainability is not only about carbon emission or self-efficient buildings, but also about using sources and energy in the best and the right ways. This means when constructing a building, it is better to design for the possibilities that are upcoming, in order to have greener and more sustainable environment.

Not just in developed countries, but also in developing countries, some urban renewals going on in very different cities. In general of the world, the public and green areas are decreasing in the towns because of the rapid urbanization. Hence welfare, lifestyles, and daily or weekly habits of users are changing in an unpleasant way. It is easy to observe

the public and green areas are disappearing one by one in short time periods. Unfortunately, in a real world it would not be possible to keep the green in the centre of a city, once the need of space is outweighed.

To keep the balance of green in city centres utilizing rooftops is important but unfolding them is more than important, for a better living in many aspects for the future.

“How to unfold the rooftops?” is the main question of this thesis. However the study have to start from the bases of the particular construction element. As it is known rooftops are not very well studied parts of the buildings. Even the design process would not go beyond green roofs, saddle roofs and flat roofs. Most of the suggestions are repetitive in terms of design and approach to the issue. All of the sources are associating rooftop design with a green roof for a sustainable design solution and not considering the physical and psychological context of that area. Most of the studies are stuck on the same idea and not moving forward.

Most basically roof is a part of the shell, it functions as a shelter, and it protects the building from climatic effects. Nevertheless, this does not have to be the only function this entity provides to users. The technologic improvements lets designers to use better isolation materials to meet the shelter need of a user, therefore roofs do not have to be designed as they have been designed before. They could be designed as a garden, farm, nursery, community area for the dwellers, etc. the examples are numerous, and some interesting ones are mentioned in this thesis.

When the research was done, the dilemma between the current land use and land need was emerged in the light of the studies. Hopefully this thesis will be a contribution to underline the needs of cities, and design accordingly.

1.1 SCOPE OF STUDY

This study examines the important role of rooftops by investigating movement of urbanization, demographic studies and the needs of urbanites. The research shows that the cities will keep growing, however they also show that natural resources would be inadequate to support the mega cities (cities with more than 10 million inhabitants). There would be two possible aspects of future cities. First, more people will be living in higher buildings. Second, utilizing existing buildings in their best and unfolding them according to the needs of urbanites.

This study starts with the definitions of fold and unfold. Deleuze's fold definition plays a key role for this thesis. This chapter is essential to show the intentions for the rooftops and the best terminology to describe the very same intentions was the "unfold". Therefore this term could be a bridge to explain tangible assets in a philosophic way.

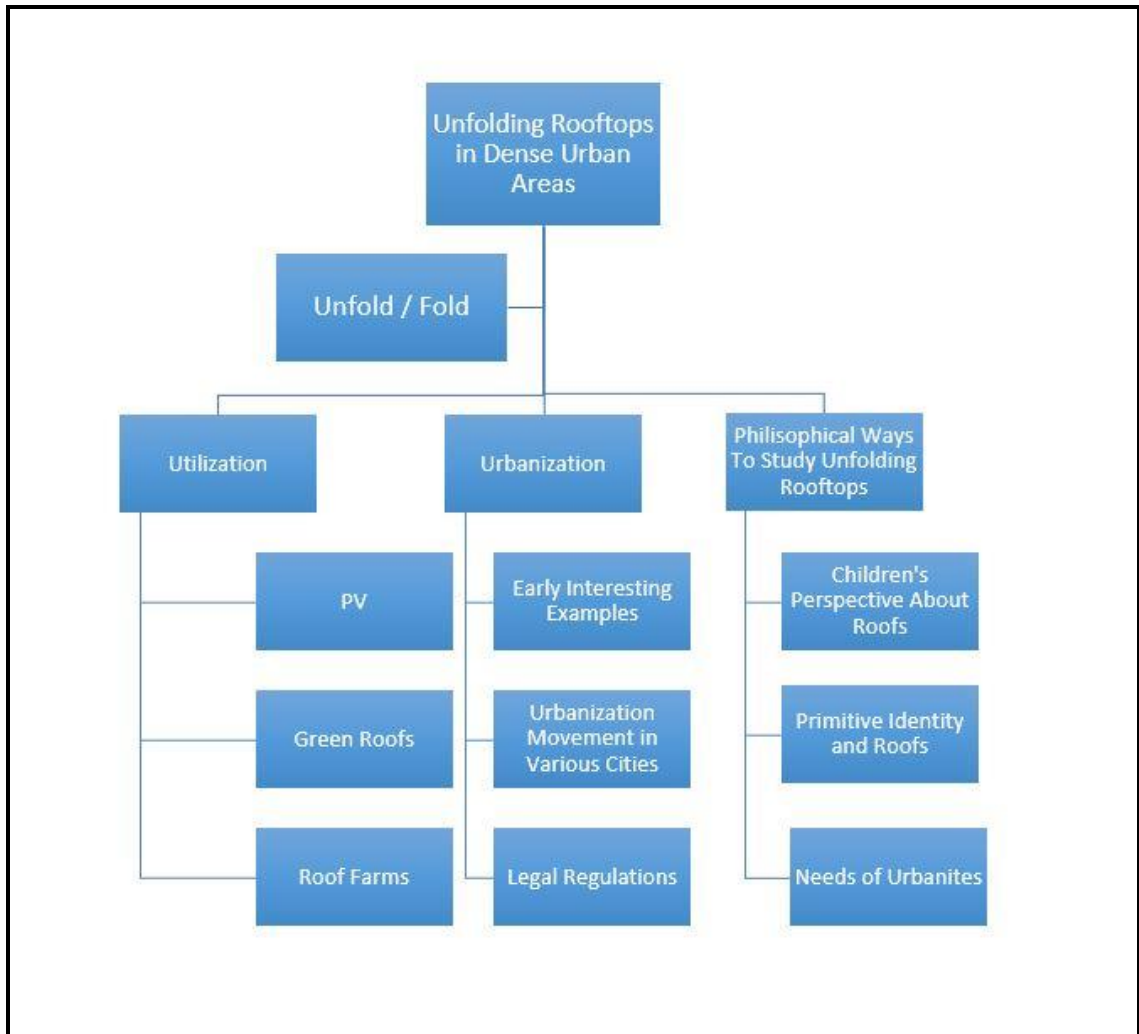
The phases of urbanization in different cities that are mentioned in the thesis explains the existing urban profiles and changes with urban renewal projects running through in order to explain the current urbanization trend. The trend seems to be different in different parts of the world, but only common thing is the increment of the population. It is forecasted that the most of the increment will be on the south hemisphere. By evaluating only that input, it is safe to say that the cities from the world will have different needs for the rooftops. There are many other aspects but demonstrating this one is crucial for the study in order to utilize and unfold a rooftop accurately.

The following chapter is about the early intentions for the future cities. Even in 1920s there were more complex design suggestions for that time's near future. There are many examples of early urban planning and architectural examples, but these ones have significant design principles that distinct them from the others. The illustrations that are taken into account have layered streets, basements, and rooftops. It is seen that every part of the city is used in different ways and utilized. The elaborated design ideas in the examples could be the key proposal for not only the future cities, but also for the future of the cities.

The study continues with the legal regulations about rooftops in Istanbul and some European cities to comprehend the possibilities of current rooftops. How could be the current rooftop of a building look like with today's regulations and technology?

Thesis continues with the rooftop utilization ways. This part discusses the ways of utilizing current rooftop. Utilizing and “unfolding” current rooftops for the sake of human being is the main concern of this study. It is because the importance of those entities have not comprehended yet. Another aim is revealing the strengths of utilizing rooftops in dense urban areas and to bring up a new approach for utilization of the rooftops.

Table 1.1: Scope of the study



Source: Model developed by the researcher

1.2 METHODOLOGY

This thesis is a meta-analysis. The research is based on information from books, seminars, journals and demographic data, analyzing and combining the results of different studies available on this specific topic. Most of the inquiry is based on written documents. The reason of that was the special condition of the topic. Firstly the topic is not well studied before, but there are many indirect issues that could be related with the rooftops. It was crucial to collect those studies and analyse them, and reveal the predicted relations.

From the viewpoint of objectives, this thesis research can be classified as descriptive research, by attempting to describe the effects of first wages of the urbanization on the current cities and rooftops, the importance of roof to the primitive identity, how it is possible to trace in the present time and among the history. Also the real meaning of the roof to the people. This research is also a correlational research, firstly because attempting to discover the relationship between rooftop and its ability to meet deep needs of the human being. An Explanatory research, when trying to clarify and show the reasons of the relationship between children, primitive identity and rooftop, or the needs and how would they have met by the rooftops. This research is also an exploratory research, the researches about rooftops and roofscapes are not well studied, and the existing studies are mostly repetitive, there are many researches on green rooftops for example, but there are not many different aspects that are addressed. This study tries to avoid repeating the previous studies but also doing this research in the light of the existing researches.

The thesis is concerned about the urbanites that live in dense urban cities and their needs in order to unfold the rooftops. But it was not possible to have a data collection with a questionnaire, because the thesis is not limited only for one particular city, and it should not have been. It is seen in history of urbanization that, for instance industrial revolution changed the whole living on the earth, and expecting increase on population may bring an intense change in the widespread of the world. So that it was more than crucial to inspect the examples from all over the world and formalize the research accordingly.

2. UNFOLD: UNFOLDING ROOFTOPS

Unfold is the key word for this thesis. Gilles Deleuze is the one who coined this term for the first time with fold. It is developed in Michel Foucault and Gottfried Wilhelm Leibniz's studies. They have defined the term in various ways.

In one sense, it is an interior and exterior issue; in other words inside is the fold of the outside according to Foucault's approach. The subjectivity of the concept takes an important place when explaining the interior and exterior. Deleuze explains this in his book titled Foucault:

The outside is not a fixed limit but a moving matter animated by peristaltic movements, folds and foldings that together make up an inside: they are not something other than the outside, but precisely the inside of the outside.

Also fold is not something singular in his words, it is the unity of other folds.

Thus a continuous labyrinth is not a line dissolving into independent points, as flowing sand might dissolve into grains, but resembles a sheet of paper divided into infinite folds or separated into bending movements, each one determined by the consistent or conspiring surrounding... A fold is always folded within a fold, like a cavern in a cavern. The unit of matter, the smallest element of the labyrinth, is the fold, not the point which is never a part, but a simple extremity of the line.

Unfold does not mean the opposite of the fold, even though the language recommends as it is. Unfold is also a few fold. When fold is a kind of decrease, unfold is a kind of increase in a sense of development. Deleuze explain the definition of unfold in *The Fold-Leibniz and the Baroque: The Pleats of Matter* (1993) as;

Folding-unfolding no longer simply means tension-release, contraction-dilation, but enveloping developing, involution-evolution... The simplest way of stating the point is by saying that to unfold is to increase, to grow; whereas to fold is to diminish, to reduce, to withdraw into the recesses of a world. Yet a simple metric change would not account for the difference between the organic and the inorganic, the machine and its motive force. It would fail to show that movement does not simply go from one greater or smaller part to another, but from fold to fold. When a part of a machine is still a machine, the smaller unit is not the same as the whole.

This study, as Deleuze's unfold, suggests to unfold the rooftops, and re-gain these entities in an improved manner. The rooftops need to be ready for upcoming potentials, if they are going to be unfold in future or today. It is essential to consider this option for the future of the cities, since the horizontal growth is not possible.

Unfolding may not have the same meaning with utilizing in this case. Utilizing can be defined as: making a use of something, or to make best use of it. But unfolding a fold element could be defined as improving or developing the current state of the element in deeper ways. For instance utilizing a rooftop, which is located on a street with many trees that cast a shadow to the rooftops, by using solar thermal panels would be a "rooftop utilization" but not a roof unfolding. In different words, utilization is a part of unfold, it is something that is featured by unfold. On the other hand utilization is a crucial part of unfold, therefore it has to be studied as well.

In order to link unfold and utilize, unfolding rooftops might be thought as utilizing them by adding the needs of the dwellers or users. This could be by setting new functions to the roofs, taking advantage of the rain load and save the rain water with green roof technologies, etc. there are many ways to utilize a rooftop, and it is possible according to the examples from the world. However unfolding a rooftop should not considered as building an article on roofs. An additional structure may not be necessary for setting a function to an entity.

The following example demonstrates a kind of unfold (Figure 2.1). Rooftop is unfold by penetrating to the landscape. Meydan Mall is in Istanbul close to one of the centers of the city, where the inhabitants choose to visit shopping malls on the weekends just because they provide open and closed areas at the same time. Possibly the shopping malls are attractive to the people because there are different functions clustered, such as retail, restaurants, attractions for children, cinema, etc. But the most interesting part of this significant shopping mall is the penetration of its rooftop to the landscape, where a green area is needed in that particular area. The best part of the shopping mall is, it attracts people, therefore the park on the rooftop is being used and utilized. So that, there is not a possible way for it to become idle.

Figure 2.1: Meydan Mall



Source: Detail inspiration, 2011, [online] http://www.detail-online.com/inspiration/sites/inspiration_detail_de/uploads/imagesResized/projects/780_620-8140-downloadansichten-Einkaufszentrum_Meydan_Gesamt.jpg [accessed 20.11.14]

Meydan Mall's rooftop had been utilized with intensive and extensive green roofs. As it is mentioned before this is not a revolutionary system to be used. However the context that the shopping mall exists, lets this echoed utilization to be a kind of unfold.

3. UTILIZATION: UTILIZING ROOFTOPS

Sigfried Giedion has written his thoughts about future roof utilizations in his book “*Building in France, Building in Iron, Building in Ferro concrete*” (1995) in the following words:

The broad surfaces at the top level of the large cities will be used for sports, gardening, and eventually probably also for landing strips for aircrafts. For hygienic reasons alone, steep roofs will soon be forbidden in large cities. Flat ROOFS will serve recreational purposes and offer points of the rest for the eye accustomed to today's disruptions.

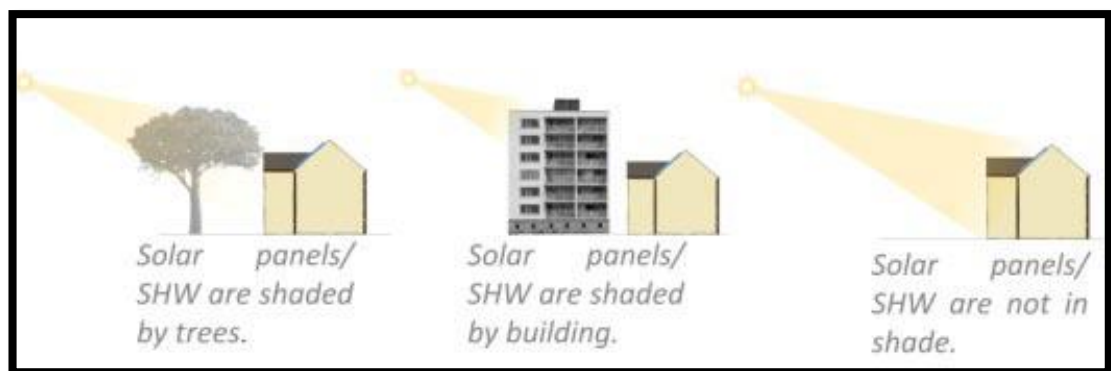
Giedion's thought proves to be accurate when thinking of today's conditions of the cities. His words were right indeed, however they might be incomplete. The urbanites and people from different places are expecting the roofs to externalize the characteristic of the city. It is observed that, roofscapes do not appear the same in all of the cities. If all of them looked alike, then it is obvious that, one of the most important kind of utilization was missed.

Today there are few roof utilization techniques listed. According to *The Fifth Elevation, “A Forgotten Space – What Could Be The Most Effective Use Of Roofs In Dense Urban Areas?”* written by Mehrdad Borna and Sophie Pelsmakers (2010), utilizing rooftops in order to generating energy is not that efficient. The study takes place in a dense area of London. A particular test site was chosen which could be able to provide most of the possibilities. The city block which was chosen, has different kinds of buildings such as, residences, retail, offices, education, public buildings, hotels, restaurants.

The study was interested in the energy consuming rates of those building with the aim of testing energy efficient technologies in the scope of building guidelines. It has been seen that, especially with the application of PV (Photovoltaic) panels and solar thermal systems, the energy output would not redeem the effort that has been put. The most influential reason for that is the regulations in law and streetscape. For example, in conservational areas and listed buildings, the view of the building from the streetscape is the primal concern. Therefore the use of panels or green roofs are controlled by the

legislation, they should not be visible from the streetscape. For the other types of buildings there are not many regulations, but the cityscape must be appropriate for particular technologies such as solar panels. The shades of trees, higher buildings, etc. should not obstruct the function of this particular type of installation especially for the climates just like London's (Figure 3.1). The necessity of energy is obvious, but it is also necessary to utilize entities according to their context. The climate of London may not be suitable for PV or its substances. The advantages and disadvantages of a particular utilization needs to be well calculated in order to redeem the results.

Figure 3.1: Possible solar panel conditions in dense urban areas



Source: Borna, M. E. & Pelsma, S., 2010. *The fifth elevation, a forgotten space – What could be the most efficient use of roofs in dense urban areas?*. [Online] Available at: <http://www.iiirr.ucalgary.ca/files/iiirr/264.pdf> [accessed 20.04.2013]

Intensive or extensive, green roofs do not require sun light. There are also legal regulations for conservational areas, which can be historical or protected, and the installations may show variations according to the structure of the buildings. But intensive green roofs have the ability to increase social interaction between dwellers, but they are very heavy installations and needs maintenance more than the other utilization systems. On the other hand extensive green roofs are possible to use in order to mitigate the negative environmental impacts. The extensive green roofs have been used on many types of buildings that helps reducing clean water use.

The rooftops are capable of maintaining city's characteristic, increasing social interaction, generating clean and renewable energy, supporting future formations for low-cost communities, etc. Despite as it is commonly done, designed rooftops, roof gardens or terraces are not the only ways of utilizing the rooftops. As it is mentioned in TOKI dwellers example, there could be utilizations that would not need any technical installations and those utilizations heads to *unfold*.

There are many advantages of unfolding rooftops in dense urban areas, however they all seem to be untouched in most of the cities from the world. The singular examples of unfold rooftops are increasing however they are not enough to make an impact for the cities.

Unfolding rooftops should not only be thought as designing rooftops in a pleasant and aesthetic manner. There are approaches and utilization techniques that are not studied on an academic level, or they are not directly about rooftops. The utilization of those entities must not be limited in few groups, the utilizations may vary not only with their functions, but also by the need that the function meet. There are many possibilities and examples that would allow people to live in a better way. All of the attempts on the topic are mainly for the welfare of humanity.

4. URBANIZATION AND ITS EFFECTS ON ROOFTOPS

People tend to live in urban areas more than the suburbs since the industrial revolution and consequently a dramatic increase has been seen in the urban. “Mega-cities” with have more than 10 million citizens have been increased in just 20 years. In 1960 there were only two cities, Tokyo, (Japan) and New York, (USA) which had more than 10 million dwellers. In 1975 the number of cities increased to three with Mexico City, Mexico. In 2007 the cities, with population over 10 million has become nineteen including Istanbul, Turkey according to the studies of UN (United Nations) DESA (Department of Economic and Social Affairs) in 2009.

In 2008, first time in history, more people started to live in cities than rural areas. As for today 54 percent of world population live in cities. This number is increasing day by day. Cities are attracting more and more people with the possibilities that it is providing.

As a consequence a city of 21st century is very different from a city of 20th century. One of the most interesting things about big cities is they develop conurbation with the neighbouring cities, they are mostly standing still, however the cities keep getting more and more crowded. Consequently modern cities are getting denser in every dimensions. Also there is another side of the coin. Cities are building in just couple years from nothing. Sadly the densification is not simple as the mathematics of this situation. Some part of a city with higher density consume less energy on several infrastructural services per population, than the areas with lower density. Another point is, LEED (Leadership in Energy & Environmental Design) advices, if expanding on a particular area is necessary, expanding vertically is better to preserve the soil and avoid hardened ground. It is known that hard ground in a very large scale causes flood with inadequate infrastructure, therefore it is essential to keep natural ground cover or soil in the city.

On the other hand higher density might cause some severe undesirable effects. They could put great pressure on public spaces, transportation services, infrastructures, if they are not well calculated or if the green spaces are not re-organized for new developments. Dense urban areas have negative effects on social interactions, not only between human beings but also wild life and nature.

Nonetheless all the input mentioned above pushes urban designers to plan vertically. Most recent constructions are high-rise buildings in most of the cases. It is easily spotted that the urbanization style has changed since 19th century, however mostly buildings only got taller. Of course there are constructional and technological developments, but functionally the levels are repetitive. For instance in a high-rise apartment building, there are only residential levels, and maybe a car park floor under the ground level. Nothing else is included the design for more than 15 floors. This is perhaps mostly because of the optimal use of the land, nevertheless it might not be as optimal as designers thought.

There is a need to be close to the street level for the users of high-rise buildings. Especially in Hong Kong, where the high-rise mass houses erected, people have a strong need to be close to the ground level. However it is not possible to gather all those dwellers on the same ground because of the inadequate land. Building affordable houses for low income groups must not mean they cannot have a gathering area for social interactions, sports or even just for outdoors.

It is safe to talk about two kinds of high-rise buildings that are constructed frequently: high-rises that are affordable, and luxury residences. In Turkey, residence has a different meaning than home, it means a type of dwelling that gives services just as a hotel if the resident has such a requirement. The difference between square meters of common areas are dramatic, when the design aspects of those two types of buildings are compared. The lack of common areas cause bad implications on people's well-being and social interactions. It is not optimal to design public housing with the current style in order to be affordable, even if buildings designed as they are, there are still entities that could be re-gained to the dwellers, such as forgotten rooftops.

The poorest designed parts of the building blocks are the rooftops. In spite of the technology, they are still thought of as a part of the shell. There is a design paradox seen in this frame. Employers or investors want their land used optimally, they would not agree designers to plan a level, which would be an idle space, for the project. Therefore why do the employers let designers to leave rooftops idle? There is a missing circle at this point which cannot explained properly.

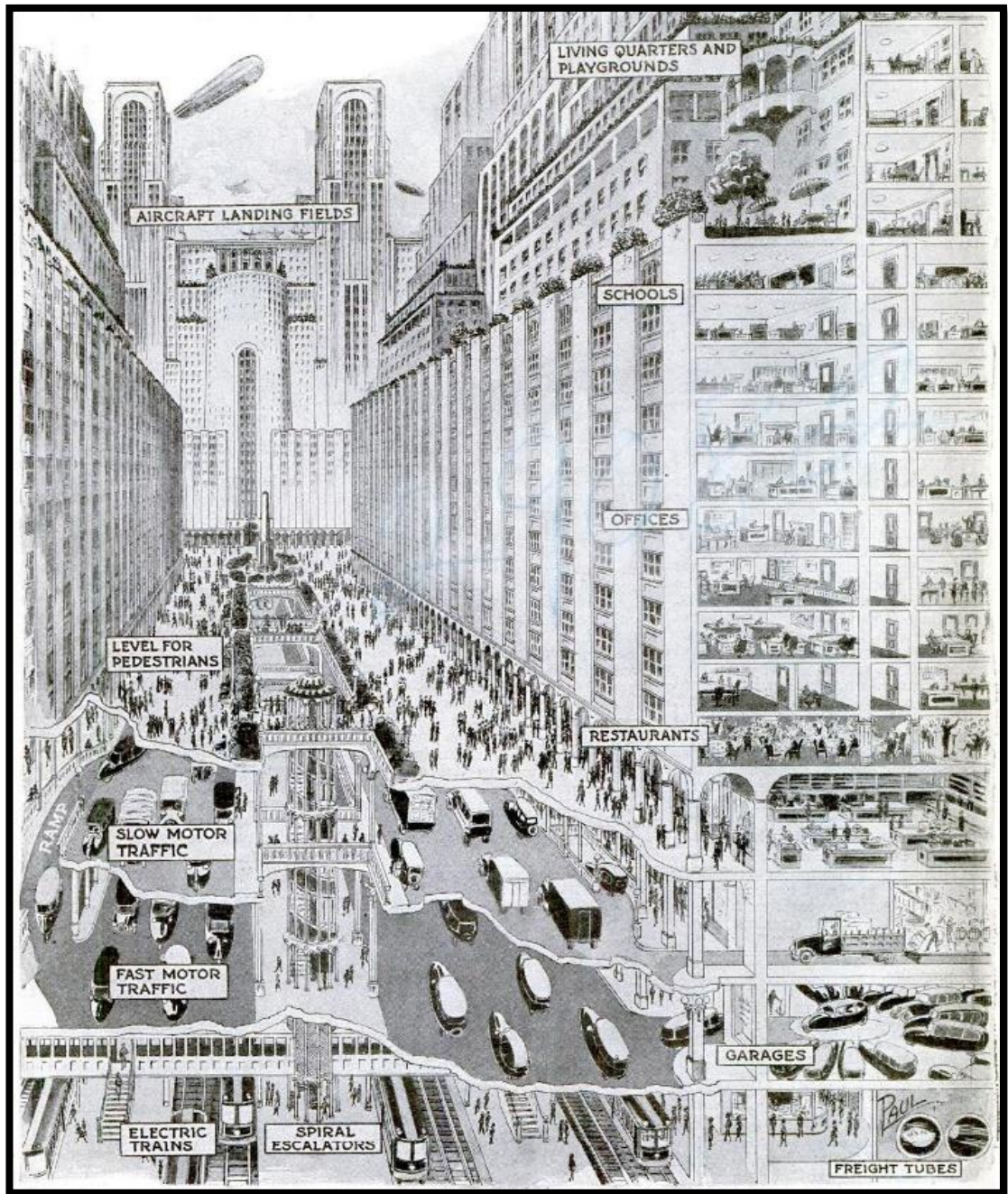
4.1 SOME EARLY INTERESTING INTENTIONS OF URBANIZATION

As it is known urbanization is a function of industrial revolution and urban growth had been seen in two periods. The first period took place in Europe and North America, between 1750s and 1950s. City dwellers increased from 10 to 52 percent and from 15 to 423 million according to the United Nations Population Fund. The second period of the urbanization is between the 1950's to present. The predictions of demographic changes are dramatic: according to UNPF only in less developed regions the number of urbanites will go from 309 million in 1950 to 3.9 billion in 2030.

Today the increase in population is clear, but for the early periods of the urbanization it must have been more than clear. It must have been more than clear to observe the raise of the city dwellers in early periods of the 20th century. This statement can be proved by looking on the studies of the urban designers and philosophers of that time. The illustrations are very detailed and elaborated. Drawings show multiple layers of buildings and the city itself. For instance a building was not spared merely for one function. The buildings on drawings resembles today's shopping complexes, such as Zorlu Centre, Kanyon, Astoria, etc. those complexes are clusters of shopping mall, offices and residences. The resemblance is only in the way of gatherings of the different functions, but in the early intentions of urbanization the drawings are more detailed and thought on. The streetscape and roofscape is very different even from the most civilized city. They seem like they are working very well, and most standing out point is the utilized rooftops.

In the example architect Harvey Wiley Corbett designed more complex cities for the late 20th century, and his demonstrations took place in Hugh Ferriss' book *The Metropolis of Tomorrow* (1925) and in *Popular Science Monthly Journal* (August, 1925), Corbett's illustrations were given a place. (Figure 4.1)

Figure 4.1: Corbett's metropolis of tomorrow illustration (1929)



Source: *Popular Science Monthly*, 1925. *Popular Science*. [Online] Available at: <http://www.popsci.com/archive-viewer?id=YScDAAAAMBAJ&pg=40> [accessed 7.12.2014]

The drawings of future cities in 1900's are extraordinary. The futuristic technologies, machines that are not familiar and additional functions for upcoming future are recalling a science fiction movie. The demonstrations are the foreseen products of future

communities, which is in fact the community of today. Even today the perception and intention for the future is the same.

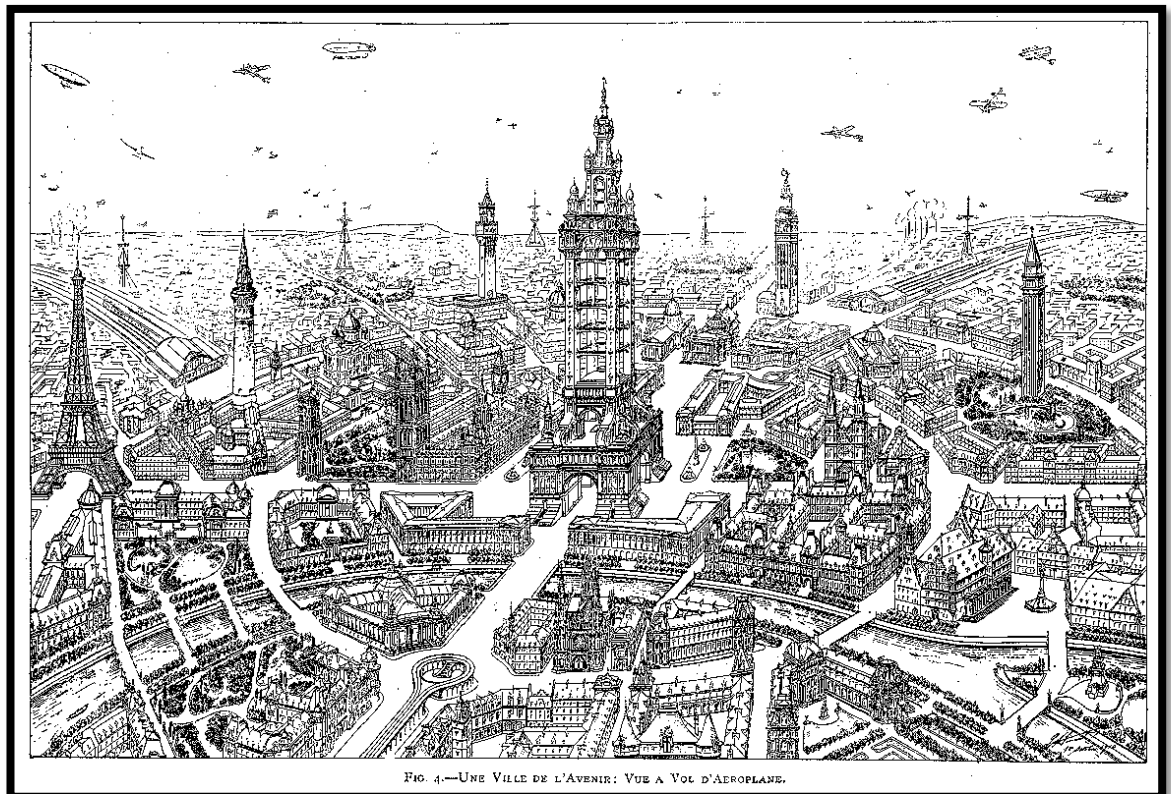
Demographic inputs show that the land will not be adequate for the future urbanites, and this statement has been problematic for over two centuries. Therefore how could it be possible to preserve cities much the same? It is possible to trace previously done studies on urban design for the dense cities. Also the cities of today are getting denser in their fastest. What could be the reason that cities have not evolved like the demonstrations above?

Another interesting example is the illustrations of the French architect Eugène Hénard (Figure 4.2). It is probably better to mention that he had some serious studies on streetscapes and the flow of the traffic. He concerned more with the streets and green areas than the buildings. However he has similar demonstrations with Corbett, of future cities. His intentions seem to be more singular than Corbett's drawings. Hénard's Paris illustration has also many high-rise buildings juxtaposed on the boulevards.

On Corbett's and Hénard's drawings, the different levels for railway, slow, fast traffic, and pedestrian zone is visible. Also there have to be non-visible layers such as, sewage, clean water, gas, electricity infrastructures. A perfectly designed city such as illustrated by Corbett or Hénard would cost a lot for a government when these possibilities have not thought before and when there are no preliminary preparations for a very dense city.

On the other hand natural resources are drying up, this means a dense city like Istanbul has to obtain natural resources from its surroundings, and consequently other cities which are around cannot provide enough source for the urbanites.

Figure 4.2: Eugène Hénard's idea of the great cities of the future



Source: Reps, J. W., 2002. *Urban Planning, 1794-1918: An International Anthology of Architects, Conference Papers, and Reports*. [Online] Available at: <http://urbanplanning.library.cornell.edu/DOCS/henard.htm> [Accessed: 5.12.2014]

As seen, those architects had an intention to make space for the following future communities, and his intentions ended up building in more levels underground. These attempts are partially succeeded, so it is possible to see similar intentions in today's cities as underground car parks, tunnels, metro lanes, etc. If it is possible to extend a building's functions and growth to underground, so why not to extend the functions to the rooftops similarly?

4.2 URBAN ROOFTOPS OF DENSE PARTS OF THE CITY

According to the Oxford Dictionaries, roof is *a structure forming the upper covering of a building or vehicle*. Therefore it is a part of the shell and in some quarters it is called the fifth elevation. Besides its constructional features, it is a radical spatial experience, an elevated layer that do not have walls, most of the times. This entity lets experiencing the city in a very different and pleasant way.

The novelist Emile Zola describes nineteenth century rooftops as if they are landscapes in his novels. Urban roofscape also resembles a kind of rainforest canopy, which allows a different kind of an experience upon the buildings. It is a contrast to the chaotic and crowded streets of a city just like in jungles. It can be an easy escape from the city. Rooftop, the fifth elevation, provides romantic, and almost poetic possibilities to the urban dwellers.

However rooftop is not as well designed as the other four elevations. Rooftops also fit the terminology that Frank Dovey uses in Rivlin and Others (2008); loose-fit which are usually un-designed, unregulated and because of that which can allow different functions. If there is not a certain design or function of an entity, so it could be evolved in a space that satisfies the user's needs and wants. A rooftop as a loose-fit entity can be a good unfold for a rooftop. It is because a loose-fit space could be evolved into anything that the user wants or needs.

For instance, TOKI Dwellers the Survival Manual, prepared by Boğaçhan Dündaralp, Lale Ceylan, and İpek Kay (2012), shows TOKI Bezirganbahçe dwellers how to transform loose spaces into loose-fit. TOKI (TR-Mass Housing Development Administration) dwellers that are mentioned in the title of the manual are mostly families from low-income groups which moved to cluster housing buildings, because they were living in squatter houses which were demolished within the scope of urban renewal in Istanbul. In this context, their life styles have been changed dramatically. When they were living in houses which were close to the ground, soil, etc. now those families are living in building which has 15 or 20 floors, and the flats inadequate for the families to live. The manual suggests the dwellers to turn common areas, inside or outside of the building, into

spaces that are highly flexible. As a detail; the manual suggests to share the apartment hall as a dining room when the dwellers invite guests for dinner or as a temporary children play ground, when the weather is cold to play outside. In this example apartment hall turns into a loose-fit space and unfolds to the dwellers.

The same design intention could easily be applied to the rooftops. Utilizing rooftops standing alone is not enough for the users. The main goal is to add a touch to the user's lives by unfolding those entities, and reminding those idle spaces to the users. Even in the TOKI Dwellers the Survival Manual example, the rooftops were forgotten. The need of space is usually seek around the ground level. But there are more loose spaces up on the rooftops waiting to be unfold.

4.2.1 Legal Regulations About Rooftops In Istanbul, Turkey

As it is known there are master plan legislations in all over the world. In Istanbul guidelines carry out according to the constructions location. There are very strict regulations about the silhouette which appears in Bosphorus and the historical peninsula Haliç. Therefore, the guidelines about elevations and roofs are even stricter than the other sides of the city. Nevertheless the limitations mostly have sanction on smaller constructions, such as building of a residential apartment, renovations of old buildings or elevation changes. The areas which do not appear in silhouette of the city are not regulated intensively, although there are still limitations.

Istanbul is in the seismic zone, therefore the soil type and the location is highly important when deciding the height, foundation type, etc. of a construction. Climate is another fact that is effective when distinguishing the slope of the roof. Istanbul is not a city that does not have too much rainfall or snow loads on roofs, this is why the slope of the roof would not pass 45 percent. Also it is possible to have a flat roof in Istanbul, since the weather is not giving extra loads to the rooftops.

When designing the roofs, guidelines regulate the uses of the attics in public buildings, but not in residential buildings. When it is possible to use the entity, between roof and

last floor, as exhibition galleries, meeting rooms, fitness centre, cafeteria, etc. it is prohibited to use the attic besides placing water tank, using the entity as a mechanical floor, etc. in residential buildings. However it is allowed to have a roof garden on flat roofs and use the roof as a common space, also it is allowed to build a small shelter next to the stair enclosure not to exceed 10 percent of the whole roof area and not to approach the front elevation more than 3 meters. In brief, it is possible to use the rooftops for common spaces in residential and non-residential buildings.

The guidelines about rooftops in Istanbul is not very limitative if the rooftop is desired to be utilized. Therefore it is possible and easy to unfold a rooftop in the centre of Istanbul if the building is not listed and not on the skyline.

4.2.2 Guidelines About Rooftops In Different Cities Of Europe

European cities are given wider sections to rooftops in guidelines. Edinburgh and Graz are two cities that have historical and modern faces at the same time, resembling Istanbul in these two ways. In Graz and Edinburgh planning guidance, visibility from higher parts of the city is highly important for the design of the rooftops. Both of the guidelines concerns on not to give any harm on historic skyline and damage the characteristic of the city. Therefore the skyline, which is the side view of the roofscape, has a big role in shaping the characteristic of a city.

London is another example to the European cities that wants to have more high-rise buildings. London has also a very strict planning guidance. It has very important zones, and buildings, and on the other hand there are areas that are developing in the sense of getting denser. This is the Canary Wharf, the finance centre, and business district of London. As it is known, Canary Wharf was one of the busiest docks in the world until 1960s. Many of the docks from the world shared the same fate, and likewise many of them redeveloped in years, to different functions.

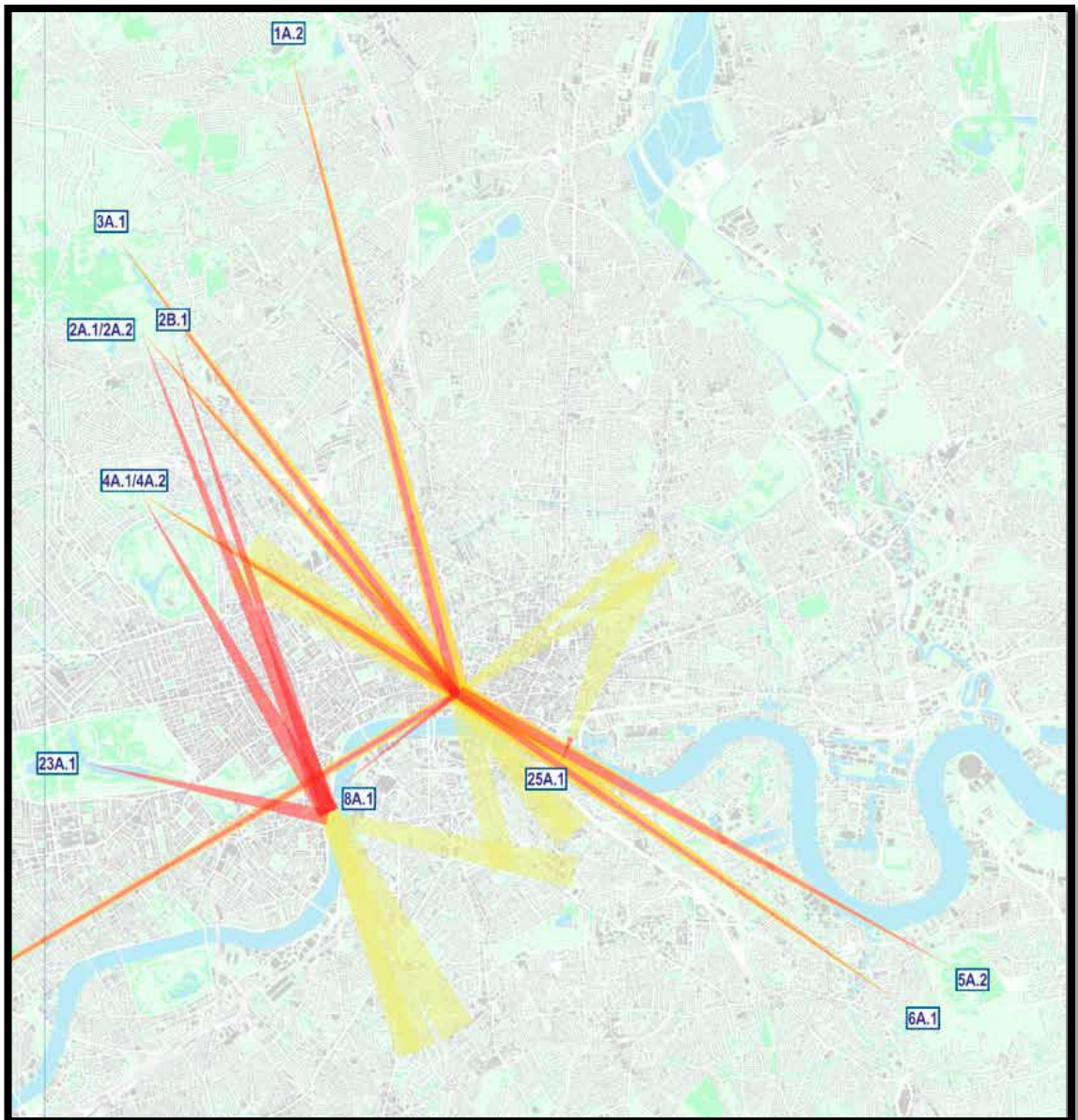
London's densification is an issue that handled with care. It has been calculated and thought on the future of the city, and made interfaces, which is London has to be a denser

city in the future. But the urban planners did not let another urban sprawl. The old buildings, the silhouette of the city, and the parks had to be preserved as agreed. It is possible to think that there are not many historical buildings in London because of the fires that the city have been through. But there are many listed buildings in the town and the construction guidelines are very strict when those buildings were thought as an example.

One of the most important issue on the urbanization in London, which is London View Management Framework. It seeks to “designate, protect, and manage” by preserving major landmarks and several views of London. In other words, there are not any high-rise buildings or any building that cuts the view on the lines which are shown on the map below (Figure 4.3).

For the protected areas building heights and the roofscapes are highly important. The contemporary developments wanted to be well integrated to its surroundings by its material, heights, scale, and form.

Figure 4.3: Protection of strategic view points



Source: New London Architecture, 2014. NLA. [Online] Available at: http://www.newlondonarchitecture.org/dls/TB_B1.pdf [Accessed 5.11.2014]

The effort to preserve the view, skyline or roofscape is nothing but a proof that shows the importance of the rooftops when setting a character to a city. So that the rooftops also provide something more than space in cities.

4.3 THE LINK BETWEEN ROOFTOPS AND THE CHARACTERISTICS OF A CITY

Rooftops are merely considered as a part of the shell. But is it safe to say that? Not only the rooftops but also the buildings are the part of the intangible externalizations, just as Juhani Pallasmaa (2000) has written in “*Stairways of the Mind*”.

We have almost forgotten the task of our houses is not only provide physical shelter and bodily comfort. A house does not solely constitute our “third skin”, an externalization of our bodily functions; it is also an externalization of our imagination, memory, and conceptual capacities.

Buildings that are built are not only to provide shelter, they are not “machines for living” in a tangible meaning. If that was so, than none of the architects would consider their designs to have an aesthetical value. These kinds of clues lead the study to the link between characteristic of the city and building’s most visible part, rooftops.

The link between city and rooftops, is not a well-studied issue. However there are literally two points of views that emphasize this situation. First, the protection of the roofscape especially for cities that have a historical value, second, the observation decks.

Urban designers, architects, historians, and also politicians are seem to be sensitive about preserving the cultural heritage. Their sensitivity develops from different reasons. For instance, a politician would like to preserve cultural heritage to attract tourists more, in order to increase gross national product. As another example, Paris wants its rooftops to be protected by UNESCO (United Nations Educational, Scientific, and Cultural Organization) and the mayor of 9th arrondissement Delphine Bürkli, mentions rooftops as “forgotten heritage” (2014). The examples and generalizations could be enlarged. Though, the main idea of protecting the roofscape is protecting the characteristic of a city. This is the feature that is visible from the streetscape and bird’s eye view.

On the other hand observation decks are particularly an issue to be studied. They are the evidences that roofscape means more than a party of shells. Today there are many observation decks around the world in dense cities and their numbers are increasing. The

most popular observation decks are situated on the well-known buildings like Empire State, Willis Tower (Sears Tower) (Figure 4.4), Sapphire, Burj Khalifa, etc. and landmarks such as Eiffel Tower, Space Needle, etc. All of these examples are highly popular and the significant for a tourist that visits city, also they are cultural values. What makes an observation deck very important to someone who is interested in experiencing the city? Presumably the building itself and chance to see the city from the top. But then again why it is important to see a city from the top?

Figure 4.4: Observation decks of Sears Tower



Source: *Seas Tower in Chicago. 2012*

<http://cdn.designrulz.com/wp-content/uploads/2012/10/Sears-Tower-in-Chicago-0221.jpg>
[Accessed 2.12.2014]

The characteristics of the city arise to the rooftops of buildings, creating the roof scape. Therefore there is another subject to be considered while utilizing rooftops. There needs to be regulations that protects the character of a city, also allows for possibilities for

further utilizations. Visibility from the top is highly important for a city, as mentioned in previous chapters of this study, such as guidelines about rooftops. It has been shown that the rooftops which are in the surrounding area of a high building have to be even more careful with the design. But nowadays, especially in dense cities, every part of the urban fabric is visible and even the highest building has a possibility to be visible in future. In other words, the cities of today are visible from all angles, therefore all of the rooftops have to be designed as if they are on the eyesight.

4.4 LOST CONNECTION: WHEN THE ROOF WAS HIGHLY IMPORTANT FOR PRIMITIVE IDENTITY

The primary purpose of an early manmade structure was to be protected from the climate or predators. The first structures could be defined as shelters. The pre-historic life was very different than today according to the findings of the archaeologists. The constructions were need based. And most of the time there were no construction at all, pre-historic people were using caves as shelters, which probably made them feel secure. To achieve that feeling one had to find himself in an enclosed entity. From the pre-historic era until now, there is one thing that has not been changed, the roof's definition of a space. In Robert Gifford's *Environmental Psychology: Principles and Practice* (1996) this is explained as:

What makes a room look enclosed? The obvious answer is that room appears enclosed when it has walls, floors and ceilings, which "establish space". However, is one of these elements more important than another? Do the elements each add to the perception, or do they work as combinations? One study found that the percentage of ceilings is three times as important as floors is establishing the perception of being enclosed, and walls are twice as important.

The ceiling, or roof in this case, is more important than the other elements that define a space. Therefore a roof basically meets more needs to a human being than walls and floors. But what makes the roof is forgotten is a mystery.

Another study had done by Juhani Pallasmaa about stairs shows a different kind of feeling that roofs arouse. “*Ascending stairs culminate in Heaven, whereas descending stairs eventually lead down the Underworld.*” (Pallasmaa, 2000). In real life, ascending stairs culminate in Rooftops, while descending stairs lead down to the basement. Pallasmaa has studied these issues in *Stairways of the Mind*, and there are additional examples that support this chapter. For instance climbing up the stairs is a symbol for reaching to the mastery, improvement, and self-knowledge, also seven steps lead the individual to the philosopher stone in the alchemical allegory. Sometimes number of the steps are also important to the symbolism, however the destination point is significant for this study. In the reality, stairs lead up to the rooftop or attic, therefore the feeling that the rooftops give is a pleasant, satisfying, and positive senses.

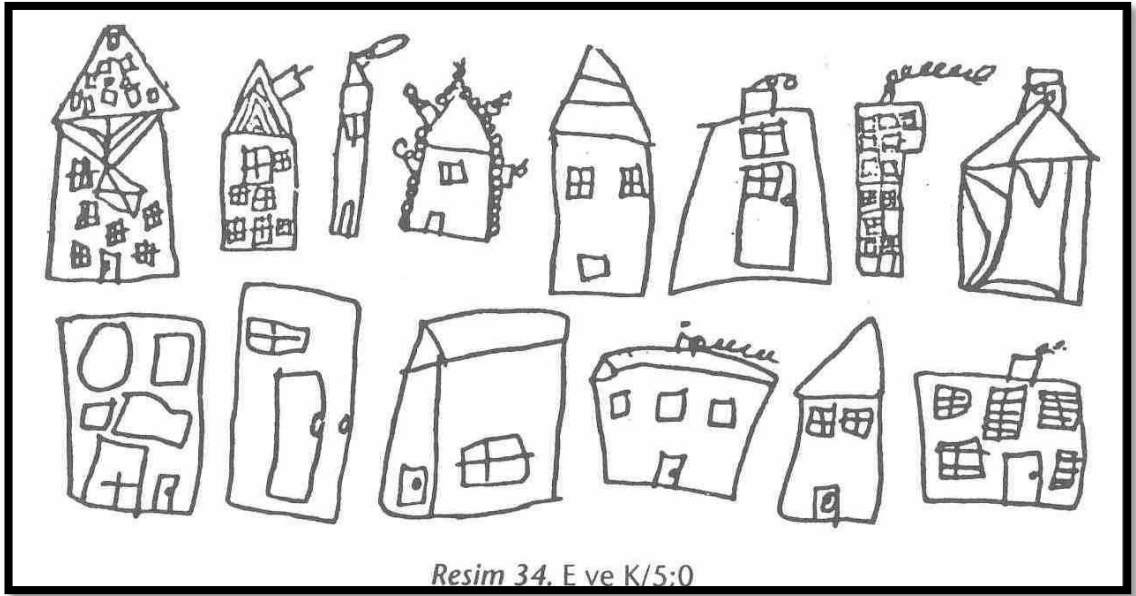
Pallasmaa’s (2000) study is mostly about stairs, then again it is possible to trace rooftops. He discusses stairs in different topics. The chapter called *Cinematic Stairs* is one of them. This issue studies the demonstrations and the figurative meanings of ascending and descending stairs. He describes the movements in these words in *Stairways of the Mind*:

Ascension implies an exit from the social stage and a withdrawal into privacy, but it can also signal movement into a prohibited realm, a way to disclose a secret, or the final journey to purification, judgement or amnesty. Descending a stair to the main floor in a film is usually related to entry into the public sphere and self-presentation. Descending a staircase into a cellar signifies an entry into realm of fear and menace.

The issue may handle with another approach, which is the destination points of a stair. Therefore ascension to the rooftop symbolises an escape from an unwanted or crowded space to a private area, which de-stress the individual. The rooftop has a tranquilizer effect on people, which is very important for an urbanite.

On the other hand, it is still possible to trace the primitive identity by observing children in certain ages who are unaffected by the elements that create the 21st century human being. Jean Piaget’s and Gaston Bachelard’s studies on children show that children has the need of shelter more than adults. Children’s drawings of their homes or dream houses is shown the importance of roofs (Figure 4.5).

Figure 4.5: Children's drawings



Source: Yavuzer, H., 2000. *Resimleriyle Çocuk*, 6.ed. Istanbul: Remzi Kitabevi.

When the roof is a significant part of the children's imagination, how it is possible to perish in the adulthood? In children's drawings it is possible to see different kinds of rooftops, mostly saddle roofs, and they are designed with chimneys or roof tiles, which means they were paid special attention.

Bachelard (1960) studies "home" in two different approaches in the *Poetics of the Space*, philosophical and psychological. Even as in the stair example of Pallasmaa's, home and roof are also connected. The primitive identity is mostly free in the "home". Therefore it is also possible to trace the importance of the roof for the primitive identity by examining studies about home. According to Bachelard home has a power to unify people's thoughts, dreams, and memories. And home makes it possible to dream in safety. His psychological approach tells that, besides of home's unifying power the whole unit differs in the vertical from the roof to the basement, just as Pallasmaa echoes. Physically roof is understood as a shelter, a protector, because of the climatic facts. But Bachelard says that, philosophically roof symbolises rationality, and leading to the peak of the roof, the mind clears up.

The reason that the childhood's importance is told by Bachelard's (1969) description of childhood in *The Poetics of Reverie* as following:

Childhood is a human water, a water which comes out of the shadows. This childhood in the mists and glimmers, this life in the slowness of limbo gives us a certain layer of births. What a lot of beings we have begun! What a lot of lost springs which have nevertheless, flowed! Reverie toward our past then, reverie looking for childhood seems to bring back lives which have never taken place, lives which have been imagined. Reverie is a mnemonics of the imagination. In reverie we re-enter into contact with possibilities which destitute has not been able to make use of.

Childhood is the purest stage of the human life. Children's perspective, their instinctive approach, and the ways of observation are different from the adults, in a way that makes it possible to understand primitive identity. Because of their incredible ability to learn and absorb, it is hard to trace the needs and expectations from a shelter or a home. As a consequence younger children who do not know much about the external factors, such as culture, daily life, etc. could be better subjects to observe the primitive identity.

In children's drawings, roof is a significant part of the buildings, so that they could also be highly important to the primitive identity that all of the people have. The pre-historic hut types and children's paintings show the basic, instinctive shelter type. It is a struggle to understand that when this connection had broken.

5. SOME EXAMPLES OF UTILIZED ROOFTOPS IN DIFFERENT CITIES OF THE WORLD

This chapter will demonstrate the ways of rooftop utilizations in terms of rapid urbanization. Different parts of the world have different climate, different dwelling types, and different land forms, therefore they have different needs.

5.1 THE CASE OF NEW YORK CITY, ROOF FARMS

Perhaps New York is one of the densest cities in the world. In large scale it is true that most of the roofs are covered with smoking areas and HVAC systems, water tanks, nonetheless on different buildings different issues are going on.

Buildings, which have observation decks (Empire State and Rockefeller Plaza, also One World Trade Centre will have once it is completed) are a kind of utilization for the rooftops. It is providing people to see the skyline, the city from a higher point, therefore, just as it mentioned before visitors and also local people have chance to see the culture of the city in one go. It is true that New York City is a trade capital, however it is also one of the most visited cities in the world. In this case it is abnormal to have only two (going to be three when One World Trade Centre's construction finished) buildings which have public observation decks. Even though they are not inexpensive attractions, there are always long waiting lines to get tickets and elevator lines for these two buildings. Obviously they are preferable activities, and there is a high demand for observation decks.

In Brooklyn, there is another issue. Annie Novak; cofounder and director of Eagle Street Farm brought the rooftop farm idea (Figure 5.1). There are herbs, chickens, vegetables and fruits on the roofs of Brooklyn. At first it looks like a green roof design, even though it is, there are different agendas beyond isolation, and carbon emission. There are lots of benefits of rooftop farm. Novak and interns of this project, managed to gain an organic garden, local vegetables, a market, recreation area, etc. to this neighbourhood.

Figure 5.1: Eagle Street rooftop farm



Source: Hanson, D. and Marty, E., 2012. Breaking Through Concrete: Building an Urban Farm Revival. Los Angeles: University of California, p. 108

A farm in rural area; provides vegetables, fruits, eggs, and milk, but it would never be a gathering area for dance classes, or a place for school trip. In city, functions differentiate. Novak's farm is providing space for yoga classes and other special gatherings to take interest in to the garden. Furthermore children who lives in cities has very limited knowledge on greens and dairy products. This farm also can work as a living laboratory. Besides, names like Jamie Oliver draw attention to the improper diet of the children by targeting the school food and he tried to educate children and families about the food, at that point, in his reality show, it is shown that most of the school children do not know where the potatoes or apples come from. Most of the people know where the food comes from, however we know very little about our food. The potato is not just a potato anymore. The seed firms are modifying the genetics of these organisms, greens are not natural anymore, in addition inorganic extensions are not just coming from the seeds, soil is getting polluted with GMO (Genetically Modified Organisms), and inadvisable fertilizing. This is why the "organic" word is becoming more and more popular. In

Novak's rooftop farm these issues are very important, also for participants. The team take care of the farm and growing organic food for a very little community.

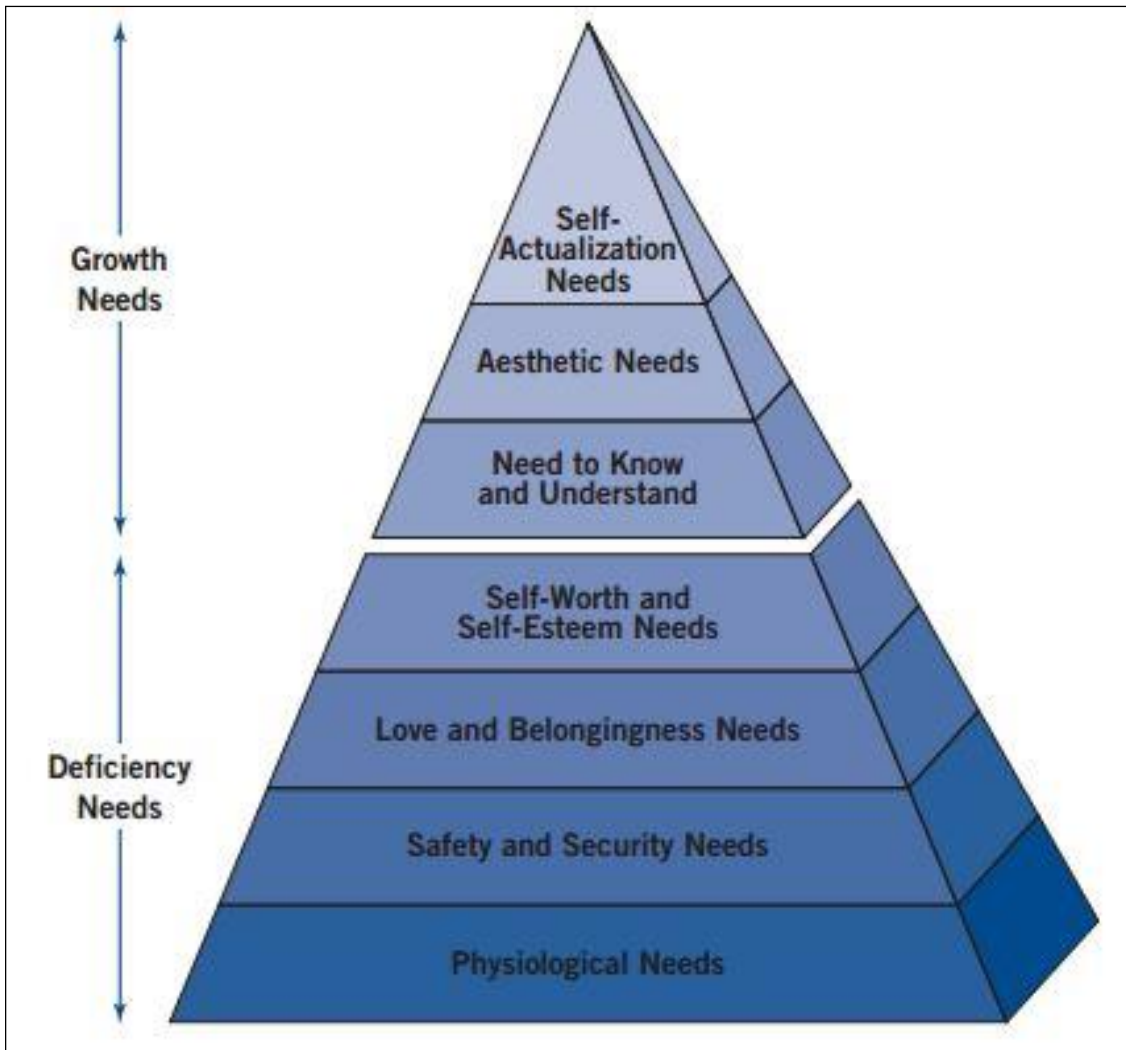
It is very interesting that only one roof could have an effect on, different people from different age groups. In Hanson, D. & Marty, E. (2012) Novak says:

We want to serve as a basis for potential, everything we do here on a small scale can be blown up in any way. It's like a demo for everything. Because we are in New York, we have a broad reach. If I am doing this in a city, I want to have that connection to as many people as possible. Otherwise I would rather just be farming in upstate New York.

Beyond the organic farming on Eagle Street Farm, the main phenomenon, in terms of utilizing a rooftop in this case, is increasing the social interaction. The urbanites of Brooklyn are able to buy their greens, or eggs from a market. The thing that makes this rooftop farm crucial is, experiencing the farming, working hard for the procedure and the satisfaction in return, being a community, gathering for social activities, getting to know more people, etc.

The utilization in this case possibly meet the most of the needs in Abraham Maslow's Hierarchy of Needs Pyramid (Maslow, 1987) (Figure 5.2).

Figure 5.2: Maslow's hierarchy of needs pyramid



Source: *Maslow's Hierarchy of Needs*. 2009.

http://www.cengage.com/resource_uploads/downloads/0495570540_162121.pdf

[Accessed 2.12.2014]

Maslow's pyramid is argumentative in particular levels in psychology, also the content of the needs depends on the background of the individual. However for a group of people, who live in the same area, and looking forward to spend quality time, and accomplish to do something solid, the Eagle Street Farm possibly meet both Deficiency and Growth Needs.

5.2 UTILIZING FOR POOR REGIONS, AND RIGHT OF ASYLUM

Demographic studies show that roughly in 35 years, the natural resources will stop being adequate for the population in the world. The studies also show that the population increase will mostly affect the south hemisphere. This is where South America, Asia, and Africa continents located. In other words most of the population increase will occur in poor regions.

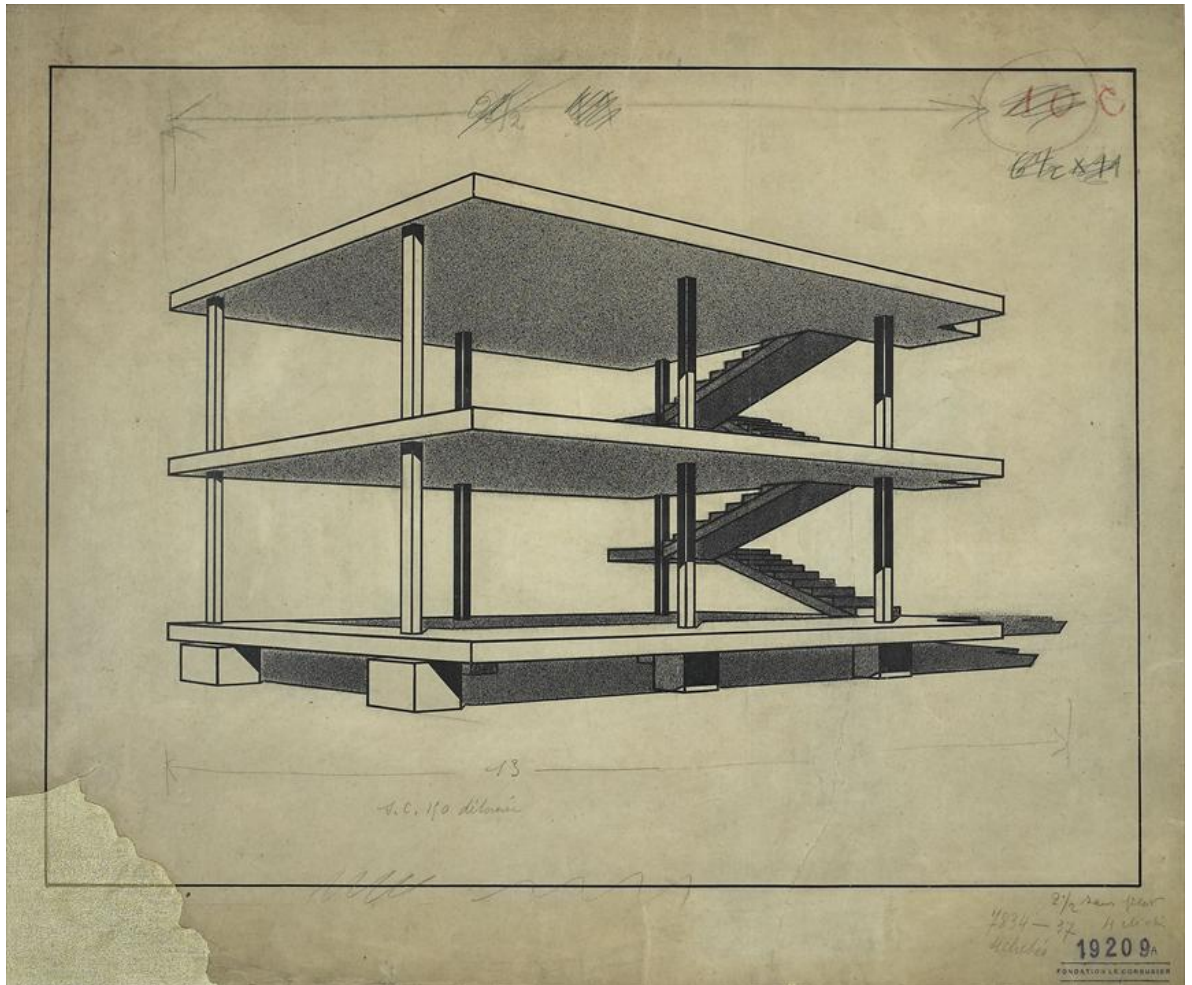
In civilized countries the right of asylum or right of housing stabilized by law, but in other countries this could not be possible even if it was in the law. Overbalance of the population, and migration to certain areas or cities makes this situation more difficult to fix. As a result most of the people from low-income group does not live in proper residences. Although there is another side of this problematic. People build their own informal dwellings. In some cities, because of the rapid urbanization and with the help of migration, squatter housing is permitted. However those housing turn into communities and then regions in some parts of the world, and the infrastructural problems hit those cities. Caracas, Venezuela is one of them.

Caracas used to be a city with 1 million population in 1950's, in 2000's the inhabitants of the city rose to 6 million. In 50 years the city grew 5 times more. Also Caracas is located on a valley between mountains, therefore it is not very easy for a city to grow rapidly towards the mountains, and nonetheless this is what happened in the end. According to Alfredo Brillembourg, the founder of Urban Think Tank/ U-TT, the reason of this urban sprawl is the architects and urban planners who could not foresee the upcoming growth properly and in a right way. To not to fall into the same mistake, planners have to get involved with the seconder cities which have 1-5 million population.

A mayor of a city or prime minister of a country does not have a right to forbid people from migrating to a dense city. When the upcoming growth is considered, best solution is creating at least a base for poor regions for them to be able to keep build informal dwellings and supply the future inhabitants, infrastructure for cities.

Brillembourg inspired by Le Corbusier's design idea, La Maison Domino (1914) (Figure 5.3), and he tried to apply the idea in Africa. Both of these projects could be given as example to utilizing rooftops that allows further developing.

Figure 5.3: Le Corbusier's Maison Domino



Source: *Maison Dom-Ino*, 1914,
http://www.fondationlecorbusier.fr/corbuweb/morpheus.aspx?sysId=13&IrisObjectId=5972&sysLanguage=en-en&itemPos=103&itemSort=en-en_sort_string1+&itemCount=215&sysParentName=&sysParentId=65 [accessed: 2.12.2014]

The Maison Domino is a design that was thought for low income housing. It allows users or future users to improve their dwellings in time according to their budget, so that they can choose their primal needs and take action. The crucial part of the design is the rooftop.

It has designed as two stores, but the staircase and flat roof gives opportunity to have the third floor.

Similarly Brillembourg carried the same idea to the south hemisphere of the world. The observations tell that in African cities squatter housing is not as developed as the northern hemisphere cities. The material that has used for the squatter houses are usually aluminium panels. Brillembourg's prototype house for those areas was actually similar to the surroundings with the material and low cost (Figure 5.4). In fact the prototype is a product for future families. The rooftop again allows to build a third floor in future when the family extends.

Figure 5.4: Brillembourg's prototype house



Source: Dezeen Magazine, Urban-Think Tank Develops Housing Prototype for South African Slums, 2014 http://static.dezeen.com/uploads/2014/03/Empower-Shack-by-Urban-Think-Tank_dezeen_9.jpg [accessed: 2.12.2014]

This is a kind of rooftop utilization that should not go unheeded. In this example the roof unfolds with its all definitions of unfold. The rooftop is ready for the future improvements, it is useable now, and adaptable to the future needs. It is unfolded in terms of its form as well.

Brillembourg's and Le Corbusier's rooftop designs or intentions are also good examples to loose spaces. The design gives possibilities, the users give flexible functions, and adapt them according to their needs. This kind of utilizations are most needed ones in dense, and growing parts of the world.

The prototype house for South African slums could be one of the best examples to the unfold rooftops. Without technical installations and construction a rooftop could only be utilized and unfold in that way. This rooftop does not only touch to the current dwellers' lives, but also touches to the future dweller's lives.

6. IMPORTANT POINTS AND LINKS BETWEEN THE FINDINGS AND THE EVIDENCES

This chapter is going to summarize and link the philosophical descriptions and tangible examples that are previously mentioned.

- Deleuze's *unfold*, seems to be a philosophical manifestation of architecture, but in this thesis it is only a better way of describing the roofs or entities in their best possible utilized way to satisfy users' needs.
- Utilization is an entity that derives from *unfold*, and *utilize* is an important part of *unfold*.
- People tend to perceive cities in their eye levels, and other levels are being forgotten. This is one of the strongest problems for this thesis.
- As Gifford says, overhead plane gives feeling that a space is enclosed more than the other elements (vertical plans and base plan). But in practice overhead plane is the least utilized part of the enclosed spaces.
- The visibility is one of the most important concerns when regulating the new constructions, or others. However most of the entities of today's cities has the potential to be visible.
- In accordance with Bachelard's saying, "childhood is human water", it is crucial to give a special attention to children. Eagle Street Rooftop Farm, unfolds as a classroom for children with several age groups, with the educational programs they run.
- As it is seen in children's house drawings, the roofs are paid more attention than the other parts of the building. In Corbett's illustrations it is also seen that the same attention was given to all parts of the buildings and townscape. When it is necessary the rooftop becomes a ground for children to play, or a landing strip for aircrafts, helicopters, zeppelins, etc. therefore in Corbett's intentions for future

cities it is possible to say that, he could be able to meet primitive needs of human being if his illustrations had been constructed.

- As Pallasmaa describes ascending and descending stairs, he also mentions where the stairs lead individual to. Therefore the upper levels of a building have a potential to be an escape for the same person from the crowded townscape. In Eagle Street Rooftop Farm, this could be possibly accomplished by setting an environment which is a contrast of the city.
- The features that are wanted for a contemporary construction is to meet more than one needs. However the needs might not be all tangible at once. They could be basic or complex needs just as in Maslow's pyramid. An unfold rooftop could be able to serve as a green area and a place for dwellers to feel more self-esteemed or self-actualized.
- Le Corbusier's Maison Domino was an interesting example to a design for low-income groups. The interesting part is that the design was not limited by only using affordable material or techniques. It is a good way for the dwellers to shape the building according to their needs. The roof of the design is also a different approach for an unfold roof. It is applicable and affordable, as a consequence Brillembourg was inspired by the same approach and applied it on a prototype house in South Africa.

7. FINDINGS OF THE RESEARCH

It is seen that a characteristics of a city lies beneath the roofscape of a city. Therefore unfolding rooftops is a critical task. Rooftop utilization is a topic to handle with care. While constructing a new building or renovating in a historical context, more sensitive approaches are necessary, to be able to preserve the characteristic of the city. In other words preserving the urban structure is important to many cities in terms of preserving the cultural heritage and characteristics of the city.

In general link between city and rooftop may not seem to be strong. However one of the findings of this research attempts to claim the opposite of this statement. As it is mentioned, culture and the character of the urban are extended to the rooftops of the buildings which create the city. There are many small proofs that support this finding, and make it stronger. For instance there are many observation decks on high rise buildings and landmarks, which are desired to be visited by inhabitants and tourists at the same time. People are attracted by higher levels of the buildings, which are the rooftops most of the time, because of being able to see the panorama of a city, where the traces of culture is visible with a wider angle.

The guidelines which are set by the government have a very important role, when unfolding roofs in real life. Unfolding rooftops is only possible according to the legal regulations. In addition the legal regulations vary between cities in the world as it has to be, because of the variations of the characteristics of the cities. The guidelines serve a very vital role, especially in historical cities. For example, if an area is protected by UNESCO or a similar foundation, it is nearly impossible to change the roofscape of that area. The sensitivity of the guidelines or regulations show that the link between the characteristic of the city and roofscape is highly strong, indeed.

According to some studies the rooftops and higher altitudes are entities arousing pleasant feelings for people, however in practice those spaces are being forgotten and not used in an effective way. One of the findings of this research shows that there are deep connections between roofs, rooftops, and human being. These connections are studied over the primitive conscious of people. The basic needs and thoughts of people are traced

via young children and historical evidences. The connection is addressed with philosophical, psychological studies by well-known and credible researchers such as Pallasmaa and Bachelard. Their studies show that the roof means more than a shelter to people. Therefore it should be possible to reflect that human being needs access to the rooftop physically as well as psychologically.

Some examples of rooftop utilizations show that different kinds of rooftop utilizations are to meet some advanced needs. Increasing social interactions in daily urban life is crucial for the city dwellers. It is shown by research that social interaction provides positive feelings on human beings. They have a possibility for urbanites to escape from the monotony of urban life. The Eagle Street rooftop farm case is a significant example to demonstrate the needs of urbanites. In this case, the farm is not an objective, but an instrument for people to get socialized and manifest their primitive identities. Therefore the rooftop is unfold into the dwellers' lifestyles to support them psychologically. Unfolding rooftops with a psychological approach is necessary for the urbanites since there is limited space on the ground level.

The demographic studies also led the research to affordable, applicable and less maintenance needed systems. The reason for that is the predicted population of the world is going to be around 9.5 billion in 2050. Therefore there is going to be a huge need for housing. Apparently more than half of this population is likely to live in cities, than in rural areas, mostly because of the employment issues. Cities are not well designed at the moment, however it is designers' and governments' responsibility to provide healthy dwellings to their citizens. Since there is not enough space for more rapid urbanization, future families will possibly have to build squatter houses where ever is possible. As it is seen in the Brillembourg example which is inspired by Le Corbusier's Maison Domino, affordable housing do not have to be high rise mass housing. Creating unhealthy dwellings in order to keep the cost low would harm people in long term. It is possible to keep the cost low and let the dwellers to build their own houses according to their needs, at the same time. Le Corbusier and Brillembourg had similar design proposals about affordable housing.

The most crucial part of the design idea is the use of the rooftops, in both design research. The rooftops were prepared as the possible future floors of the building. This is another way of unfolding the rooftop.

In brief this thesis finds out that there are different kinds of rooftop utilizations for a city. As for today all over the world it is possible to see rooftop used as an observation deck, or a farm to generate energy, etc. Nonetheless they all have to fit to the limitations that are mentioned in building regulations. It is only possible to utilize the rooftops when they meet the regulations. It is open to debate if the regulations are enough for a city or not. One thing for sure is that they have to abide by the rules to ensure the characteristics of a city, which is reflected to the rooftops of a city. Though to preserve cultural values of a city must not mean to keep everything as they are, it is necessary to develop a city for the upcoming population growth with some kind of utilizations. The rooftop utilizations are not always effective and affordable, but the mentioned examples of unfolding rooftops surely present key notes for future cities.

8. CONCLUSION AND DISCUSSIONS

This thesis aims to emphasize the importance of the rooftops in a city and how crucial it is to unfold them for different objectives aforementioned. There are few techniques to utilize the rooftops, those techniques are very well known and applied in some parts of the world. But the technique of unfolding the rooftops is more effective than merely utilizing them.

Unfolding rooftops in dense urban areas, is essential for the urbanites to have a better living, both physically and psychologically. The examples of utilized rooftops show that more needs of that dwellers' were met by the utilized rooftop.

They are usually basic needs such as less energy consumption, or a cosy space to spend time, but the examples of unfold rooftops are superior. The main difference between unfold and utilization of a rooftop is designing according to the *needs* of dwellers, not the *wants*.

The needs are not always known by the individual, this is why the research headed to the primitive identity. The most basic stage of the human life is more needs based, therefore it is easier to reveal the true needs of the urbanites, since they are the focused group of this thesis. At the end of the research it has been understood that the rooftops are very important for the people in different aspects, but they are being forgotten most of the time.

The cities of the world are excessively different from each other, so that the needs of the city dwellers have to be different too. This is the reason that this thesis is not limited with one city, or a case study. Different examples helps to demonstrate not only different needs of people, but also cities. For example dwellings in Africa is not the same with the dwellings in London by their building principles, dweller needs, focus group, etc. Also the climatic effects make a big change on resulting effects. It was highly important to have a research on this issue to be able to discourse unfolding rooftops and the debate needs further research.

One of the main concerns of this research is optimum land use in cities. This is also one of the most debated issues. Cities suffer from growth issues and lack of land. However,

the forgotten entities, rooftops, are not taken into account seriously. There is plenty of land up on the buildings. It is possible to utilize them in many different ways, in order to create more space for the dwellers. Many of the urbanites are considering to move to better regions for a better and bigger house, for particular reasons, such as need for more green spaces or more social facilities. But the rooftops and legal legislations about rooftops are kept the same. Rooftops are important for people to meet their various needs, but they are not as well organized or designed as other parts of a building. This is one of the research hypothesis, because the topic is still not very well understood.

The rooftops in general, as they are used in the west, are not adequate for today's urban areas and the urbanites. Even in the past there have been more complex studies done addressing present times. As early as the 1920's urban designers were forecasting layered cities for crowded and dense urban areas. Today, it is more than essential to unfold the rooftops of the cities for the future, and it is a delayed design decision to make when the demographic studies and land use in cities were taken into account.

Designing according to the increase in population is a social responsibility, it is also a very big market for the investors. But studying only the mega cities and financing them are not adequate for today's circumstances. There are many cities that are likely to be mega cities according to the demographic studies. Therefore it is a must to produce new ideas for mass housing, and consequently rooftop utilizations, and unfold rooftops.

There are three main goals of unfolding rooftops. First, rethinking the welfare of the daily lives of urbanites, and regaining the entities that enhance quality of life. Second, as the future of the planet Earth is not very promising at all, its resources can only keep going for another forty years, as technology informs us. Population increase is a key element that urban planners, architects and other disciplines have to be prepared for. Unfolding rooftops may be a starting point for both of these objectives. Last but not least, it is only possible to trace the literature about rooftops by limited sources from academia and various credible sources. It is the subjects were not studied directly on rooftops. It is also clear from these sources that the subject is not studied directly from the rooftops. This thesis is expected to be a contribution to the study of rooftops, so as to promote the topic and look for possibilities of new connections that the thesis presents.

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