

# THE EVALUATION OF NEW BUILDINGS BEHIND HISTORIC FAÇADES IN TERMS OF SUSTAINABILITY

Mustafa KORUMAZ, Armagan GULEC KORUMAZ

**Key Words:** Renovation, Reconstruction, Façadism, Sustainable Architecture

## ABSTRACT

New building requirements in Turkey increase urban area density, depending on population growth. This fact causes the formation of change pressure on historical urban fabric that cities have. The formation of these changes is more notable in city centres that completed their developments in historical process. In order to protect historical areas of cities from these pressures in our country, development plans for protection are being prepared and practiced. In Beyoglu district, that has been a significant centre of Istanbul throughout the history in social, economic and cultural terms; the first three-four-storey apartments were built. In the area, that has experienced remarkable changes today, additional floors are allowed for low-rise buildings with reconstruction plans. On condition to protect main façade, floors and depths of buildings can be increased in pursuant of the current development plans. In this area, where significant changes occurred, five specific buildings were aimed to be evaluated according to sustainable development principles. Renovation and reconstruction practices carried out in these old historical buildings have been analysed numerically. Analysis study was conducted according to the two basic criteria: *Resource use* and *aesthetic quality*. When compared with reconstruction practice, renovation approach, which brings new floor addition before available parts of historical buildings are not demolished, has been determined to be both more environmentally-conscious and more appropriate in aesthetic sense. In all of the five buildings, analyses of which have been performed, %52.5 resource-saving could have been gained, had renovation approach been implemented instead of reconstruction. As a result of the research, development plans for protection that determine the practices in historical urban environments were ascertained not to have a contribution to sustainable urban development. Collimating development plans for protection live up to economic expectations mostly. Emergent results emphasized that architectural heritage must be used wisely and that an agreement between individual gains and cultural values has to be reached.

## 1. INTRODUCTION

Sustainability aims to consume resources at the least extent in every field considering that next generations have also claims on the limited natural resources our world possess today. With this awareness, an important part of sustainable urban development is consisted of abstract and concrete cultural values' being transferred to next generations. There will be two significant benefits of that transfer in principal. Primarily, data protection for city and culture, and information flow through generations will be accomplished. Via protection of architectural cultural heritage, transfer of picture and information through generations will have been provided. Secondly, re-use of architectural cultural heritage in appropriate conditions will reduce the consumption of natural resources. The use of space potential that cultural heritage has reduces new building demands and achieves savings in material and energy consumption in general (Edwards, 1999)

Rapid urbanization activities have been seen in big cities of Turkey in parallel with population growths. Especially in the last 50 years, intense migration from village to city took place, rapid construction activity came to fruition in order to purvey necessary places. While 37.6% of population in Turkey lived in cities in 1975, this rate increased to 70.6% in 2000s (DTP, 2011). The cities were negatively affected from this rapid population growth, change pressures throughout the city raised. Historical fabrics of cities were influenced from these pressures directly; real estate prices in city centres increased and historical areas became the target areas of those who want to get speculative rent. These pressures sometimes caused loss of very qualified historical buildings in our cities or provoked interventions with concern for complete economic gains. Some of the practices performed in these areas correspond to the years in which protection delicacy had not been implicitly settled yet owing to being just legal practices and by force of the need of plan. In Istanbul that was affected from these rapid construction activities at the most, allowing high constructions instead of original city fabric in order to meet place needs was seen to be the inevitable resolution. Historical areas were also affected from the increase in density throughout Istanbul; increases in density were made in historical city parts. While building heights were being determined in these density increases; historical fabric heights did not become a decisive element and they were not considered as inputs in planning process. This study involves analyses of innovations implemented to the historical buildings on and around Istiklal Street, Beyoglu district of Istanbul city. This place is one of the most significant areas of Istanbul in social, cultural and economic terms. It is possible to see the Turkey's first examples of three-four-storey buildings in this area. Being a centre of attention, the area is put account for working, accommodation and commercial activities. Density increases, once more in that area, were applied in construction plans, dimensional extensions of many buildings were provided within the limits of construction plan permit. As to the historical buildings, constructions rights gained especially with additional floors were used. The use of construction rights in those buildings were materialized in two ways in the area.

- Practises in which additional floors were built by protecting original inner and outer places of historical building.

- Protecting historical building's façade that is considered worth to conserve with façadism practices and adding a new building with dimensions that construction plans allow for the back.

## 2. METHOD

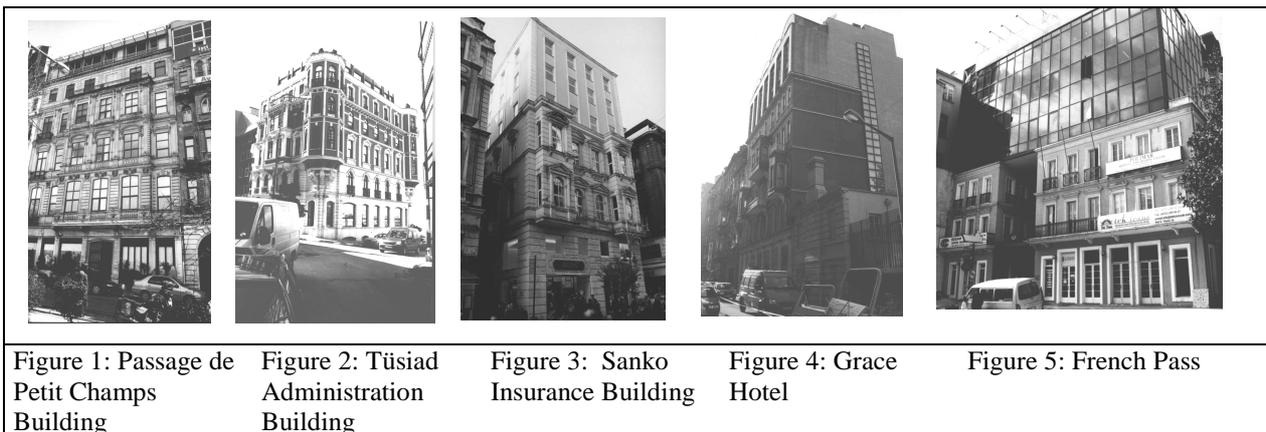
The method accepted within scope of the study is comparative analysis method. The evaluations of the samples in the study were conducted under two headings:

1. In the context of the Use of Natural Resources.
2. In the context of Protection of Cultural and Aesthetic Values.

Construction products used in buildings show varieties. Economic and environmental effects of the materials are quite a number. Still the most used construction products are concrete, brick, glass, steel and wooden materials. For each of these materials, no detailed observations were made but the field in which material use would be obtained were associated. General data were obtained regarding material amount needed by the fields to be acquired before and after the application. Since this measurement involves the rate of new parts' spaces and available places, measurable data could be attained. The concepts of aesthetic quality and cultural identity are such as not to be measured numerically. Even though those are not measurable concepts, measurable results can be acquired from immeasurable values or interpretations via their certain analysis methods. Protection for aesthetic and cultural identity was assessed in terms of spatial originality, mass ratio between historical parts and additional structure, communication of two masses with each other and design approaches used in new parts.

## 3. REASONS FOR THE SELECTIONS OF EXAMPLES ANALYSED

Additional floors built to historical buildings in Istanbul and façadeism practices are frequently come across. Designs of additional structures and façadeism practices with different characteristics can be seen. Additional floors that increase heights of historical structures were assessed within the scope of the study. Of numerous examples, five of were selected and reviewed according to main idea of the study. While selecting the examples, buildings with different characteristics were probed according to height of historical building, height of additional floors, design approaches of the new floors and in terms of whether inner place of the historical building is protected.



## 4. ANALYSIS

### 4.1. The Use of Natural Resource

According to the statistical data obtained in 2001, Turkish Statistical Institute brought out the data for energy consumption in nine industrial production sectors (food, textile, forestry, paper industry, chemistry-oil plastic, industry based on soil and stone, metallurgy, mechanic electronic and other). Sectors and rates regarding direct structure production from those are as below:

1. Iron-Steel Industry (Constructional iron included) is the first with 32%.
2. Industries based on soil and stone (sand, stone, glass, brick, plaster, concrete) is the second with 26%
3. Forestry products (treated wood, furniture) take the ninth place with 0.8% (TİK,2004).

From these rates and placements, according to 2001 statistics, the energy consumed within construction production equals approximately to 58.8% of the amount used in countrywide. For that very reason, environmentally sensitive approaches in construction production and use will directly contribute to reduction of energy consumption. To ensure that, simple precautions to be taken, details of the appropriate structure, structure design with the most suitable dimensions, functional and flexible solutions, compact forms would reduce this consumption. Reduction of energy utilizations in buildings' production and use processes, efforts to obtain the needed energy from renewable energy resources as much as possible are in the very basic fields of architecture. Reduction of gas emissions that make greenhouse effect in structure sector, reducing fossil waste need, environmentally friendly material and detail productions recycle degree of which is high, are also mandatory environmental factors that must be paid attention to. Paying attention to these concepts and evaluations is also inevitable in façadism practices that are construction activities (Korumaz et al., 2009). Since renovation practices are made using little material and energy, they are more sustainable approaches (Canan and Korumaz, 2005). The evaluation of unusable places in buildings and historical environments, re-functioning of available places, re-use of survivor parts of buildings that are in a ruined status provides material and energy savings. Beyond being merely a scientific activity, protection concept is a conscious that is to be spread to all layers of societies together with the values they have. With its ecologic values, natural resources of our world will be consumed less, ecosystem will not deteriorate in the future and natural resources will be able to be still afforded (Pereira, 2005).

There exist differences between renovation and façadism practices in terms of material need. According to the housing estate data, building renovations is 15% cheaper than new structuring (BİB, 2005). Within this scope, Highfield (2003) suggested that façadism has certain problems in theory and practice, compared to renovation practices. Regarding the façadism, the author mentions as the strictest and the hardest type of building rehabilitation practices. The author additionally emphasizes that façadism practices require ineradicable manufactures because of their contents and that advantages of renovation practices that require less manufacture (low-key) are not available in façadism. The author, herein, defines based on the experience that simple renovations that require less manufacture are a lot cheaper than demolishing and re-construction of a historical building and

on the other hand, façadism practices are more expensive due to structural entanglements and custom manufacturing.

Examples	Section	Original Spaces	Additional Spaces	Renovation	Façadism	Percentages
Passage de Petit Champs Building		5a	a	$(5a \times 0.15) + a = 1.75a$ (Current Application)	6a	%70
Tüsiad administration building		5a	a	$(5a \times 0.15) + a = 1.75a$	6a (Current Application)	%70
Sanko Insurance Building		3.5a	3a	$(3.5a \times 0.15) + a = 3.525a$	6.5a (Current Application)	%46
Grace Hotel		5a	3a	$(5a \times 0.15) + 3a = 3.75a$	8a (Current Application)	%53
French Pass		3a	3.2a	$(3a \times 0.15) + 3.2a = 3.65a$	6.2a (Current Application)	%41

Figure 6. Examples' material usage.

Having said that, it was also stated in contrast the fact that façadism practices generally take long time; dominant renovation practices that require less manufacture take less time than demolishing and re-construction owing to having economic advantages.

Materials that buildings have for each floor are given as (a) in the selected examples, then manufactures in the whole building are proportioned hereunder. Material amounts used in renovation and façadism practices can be calculated as below:

Façadism: (coefficient) x (material amount-a-) + (the number of additional floors) x (material amount-a-)

Renovation: (coefficient) x (material amount-0.15a-) + (the number of additional floors) x (material amount-a-)

In Figure 6, generally material usage has been calculated. Dark-coloured parts in buildings' schematic sections imply additional floors. Material differences of the practices during renovation and façadism practices were being performed are observed in the table. Passage de Petit Champ building is the only renovation practice in the table, and had its reconstruction practice been carried out, 70% more material would have been used. Tüsiad administration building is a façadism practice, inner place of which were completely renewed and in this example, 70% more material was used according to renovation practice. More material was also used in Sanko Insurance Building for 46%, Grace Hotel for 53% and French Pass for 41%.

## 4.2. Aesthetic and Cultural Identity

Many topic titles can be evaluated within the scope of the title aesthetic and cultural identity. The titles considered as the most important of these were handled as originality, mass ratio between historical parts and additional structure, adaptation searches between old and new parts, design approaches of new parts. The fact that the most important of these criteria is the originality was obtained as a result of researches and these criteria were determined to be effective much as 40% in the evaluation. As to other criteria was adapted to be effective as 20% to the results. Positive features in the subheadings of these criteria was indicated “1” or “2” and the negatives as “0” and calculations were made (Korumaz, 2003).

Criteria for originality are considered in 5 contexts in a conference held in Norway in 1994; form, material, tradition, function and soul. It is aimed to protect the originalities of these all 5 contexts after any kind of intervention to the historic building. Protection of building form, its original material, construction techniques, function in the building and soul of the building will be important elements in protection of building's originality. Originality may also be considered in the aspects of cultural identity, historical connections, economic necessities and social values (Aroz, 2008). The notion of originality in classical protection approach is about providing physical completeness of historical building and its environment during the application (Shu-yi, 2010). A complete protection of inner and outer space originalities was paid attention. The rates between old and new parts were compared. Size, aesthetic and suitability status of old and new parts were probed in the test. At the very least, whether one of the architectural design techniques had been used or not was looked over.

Differences in mass relation between new additional storeys and historical parts have been found in the examples of application. Dimensions of additional parts are quite bigger than dimensions of historical parts in many applications. This case brings up the issue that which building is additional structure. In this sort of applications mass dimensions of additional parts should be preferred as smaller than the historical structure. Moreover, architectural composition differences between historical parts and additional storeys cause inconsistency visually.

Critiques are mostly intensified by the critics on the differences regarding architectural design approaches between the form, material, colour, fabric, siding structure and arrangement of siding elements of the additional structure and historic parts. (Doğrusöz, 1994). Since repeating the copy of historic structure in historical parts will cause a historical mistake it is found as the most negative design approach. In order not to cause a visual mistake it is preferred for historical parts and new additions to be periodically perceivable. For this reason, neutral glass surfaces, use of simplified structure details of historic structure on the new stories, architectural designs based on comments and even the deconstructive additions whose examples are present in many countries are the well accepted approaches. In addition to these, harmony chases which style the environment and the fabric together with all design inputs by considering the historic building as design data are accepted as a design approach.

Examples	P=0.40				P=0.20			P=0.20		P=0.20		Results	
	Space Authenticity				Mass Relation			Old-New Relation		New Building Design Approach		Culcation	Results
	Indoor Authenticity		Outdoor Authenticity		Addition is toller than historic part.	Equal	Addition somaller than historic part	Positive	Negative	Neutral, Contrast , HArmonic	Inharmonious, Replica		
Authentic	Façadism	Authentic	Altered/ Rekonstuction										
Point	1	0	1	0	0	1	2	1	0	1	0		
Passage de Petit Champs Building	1		1				2	1		1		(0.4x2)+(0.2x2)+ (0.2x1) +(0.2x1)	<b>1,6</b>
Tüsiad administration building		0	1				2	1		1		(0.4x1) +(0.2x2) + (0.2x1) +(0.2x1)	<b>1,2</b>
Sanko Insurance Building		0	“				2		0		0	(0.4x1) +(0.2x2) + (0.2x0) +(0.2x0)	<b>0,8</b>
Grace Hotel		0	1			1	2		0		0	(0.4x1) +(0.2x2) + (0.2x0) +(0.2x0)	<b>0,8</b>
- French Pass		0	1		0				0	1		(0.4x1) +(0.2x0) + (0.2x0) +(0.2x1)	<b>0,6</b>

Figure 7: Examination of examples in context of cultural and aesthetic aspect.

In the evaluation performed, Passage Petits Champs building was approached as the most positive example. The most qualified examples of additional floor applications to historical structures are the least damaging practices for historical buildings. They are the practices that do not give damage to inner and outer space originality of historical structures. Those are also seen as the practices that do not deteriorate environmental perception of historical buildings. They are the practices in which sizes of additional floors are smaller than historical buildings and that were designed as not to be able to be perceived from the street. By the fact that new floor is made with demountable materials, the practice reaches the feature to recant before damaging historical buildings. Those practices are being performed without functional changes and without altering the social structure of city.

Tüsiad administration building takes the second place as qualified example. In spite of positive qualifications of the building in general, the situation that inner space was completely modified caused to be the second in the placement. Sanko Insurance Building and Grace Hotel building took place near the middle since original character of the historical buildings had been altered often. The last place goes to French Pass. Inner space alteration, visual incompatibility of the additional floor, mass-non-integrated approach of the historical building made this structure the most negative example.

## 5. CONCLUSIONS

The research was conducted within the scope of renovation of historical buildings in sustainability sense, including them to current life in Istanbul example. Including a historical building into current life by performing its rehabilitations in appropriate conditions was found positive in two ways in the study. The first is less material and energy usage while the second is about the protection of aesthetic and cultural values. It was concluded that rehabilitation practices are generally the ones that require less energy and material, compared to façadism practices in terms of material usage. Rehabilitation practices were evaluated as an economic solution. Protection of aesthetic and cultural values were considered to be non-qualified examples regarding the fact that the practice demolish inner space and make radical changes in both inner and outer place. The fact that additional part must be smaller than historical structure in terms of mass relation between the historical structure, adoption of opposite interpretation, imitation as one of the design approaches in new parts were ascertained.

When the examples are studied, it is seen that this kind of structuring is not sustainable due to the fact that historic buildings cannot carry the cultural values they owe to the next generations healthfully. Losing the footprints of the city, radical changes in original urban spaces by increasing the density in the cities will cause disconnection between generations. In order for the buildings to be appropriate with the sustainable criteria it is preferred to have additional buildings which are appropriate with the general ecological design criteria, contributing to the positive changes, not increasing the city density and respectful to cultural values.

Of 5 examples researched, it emerged that the 4 examples, façadism practices of which were made, lost their originalities and consumed more resource and energy for 52% according to a suitable renovation practice. Floor additions perceived intensely from outer façade create aesthetic quality problem altering original character of historical building. Passage Petits Champ building restored with renovation method was selected as the most positive example with its resource use aspect. The results support the idea that renovation practices are the closest and the most appropriate renovation methods for sustainable urban development concept. Regarding this result, a review for related assize and plans that lead change and transformation of historical city centres is required. The fact that a balance between individual economic gains and public benefit must be established in these decisions should not be overlooked.

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## CONTACTS

Dr. Mustafa Korumaz  
Selcuk University Department of Architecture  
42003 Kampus-Konya-TURKEY  
Tel: +90 532 440 1939  
Fax: +90 332 241 0635  
Email: [mkorumaz@gmail.com](mailto:mkorumaz@gmail.com)  
Website: <http://mimarlik.mmf.selcuk.edu.tr/>

Res.Assist. Armagan Gulec Korumaz  
Selcuk University Department of Architecture  
42003 Kampus-Konya-TURKEY  
Tel: +90 530 402 4141  
Fax: +90 332 241 0635  
Email: [gulec.armagan@gmail.com](mailto:gulec.armagan@gmail.com)  
Website: <http://mimarlik.mmf.selcuk.edu.tr/>