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Investigation of Istanbul Kartal Example within the Scope of Urban Transformation

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Abstract - Due to the increasing migration from rural to urban areas in the world from past to present for various reasons, cities need to be renewed and transformed in future times with the irregular construction occurring in the cities. In this direction, States develop and implement urban transformation policies with various methods.

In the study, the logic of urban transformation is discussed with definitions and the progress of urban transformation in history is mentioned with which aims and methods are carried out. In addition, the data obtained in the incident that occurred with the collapse of a building in Kartal district of Istanbul province in 2019 were mentioned and the construction in the area in question was discussed.

Keywords: *Urban Transformation, Risky Area, The Reserve Building Area, Risky Structures*

Introduction

Cities around the world have seen dramatic and important changes since the second half of the 20th century. Urban transformation in Europe has been supported by varying levels of central government since the late 1960s [1].

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With the industrialization since the 1980s, many countries have faced urban regression and collapse problems and have implemented urban regeneration strategies with the mentality of restructuring as a way out of this crisis situation [2].

Turkey's urban renewal policies are currently applied in many cities. However, Istanbul, which has the feature of being the city with the largest population, is of great importance. The city, which is located in the earthquake zone, has survived many earthquakes in centuries and has great risk in terms of recurrence in the coming years. Accordingly, Istanbul, the city with the highest migration from the village to the city, is the capital of the country in the unhealthy and illegal construction. One of the most important examples is the migration of a house in the Kartal district. For many reasons, this unhealthy building has lost a large number of people.

1. CONCEPT OF URBAN TRANSFORMATION

Urban transformation; considering the urban problems and urban needs, it is the creation of a viable road map after examining the spatial, social and economic characteristics of a region. It is defined as the reorganization of plans, ownership and functions for the improvement of urban parts that have worn out, deteriorated, risk of earthquake or have become an economic, social and structural collapse area such as slum areas, illegal construction areas, old industrial sites [3].

Risky area in the Law No. 6306 on the Transformation of Areas Under Disaster Risk published in the Official Gazette dated 31.05.2012 and numbered 28309; It refers to the area determined by the President and at risk of causing loss of life and property due to the ground structure or construction on it. Reserve site; It refers to the areas determined by the Ministry or depending on the demand of TOKI or the Administration or to be used as a new settlement area in the applications to be carried out in accordance with the law numbered 6306. Risky structure; It refers to the structure within or outside the risky area, which has completed its economic life, or has been identified on the basis of scientific and technical data that it is at risk of collapse or severe damage [4].

1.1. History Of Urban Transformation

City-related policies in the 1970s; It focuses on issues such as urban poverty, housing need, increased unemployment and long-term unemployment [5]. The adoption of a private sector-weighted urban transformation model in America by the governments in Europe in the 1980s started a new process [6]. With this process, the way for local governments to start making more partnerships with the private sector has been opened. In the 1990s, local people were integrated with the public-private sector, for the first time, multi-sector and multi-actor partnerships emerged. However, the emergence of this partnership has created

a governance system that few people know at the local level and is becoming more and more complex [7]. In the 2000s, while concepts such as Urban Renaissance and Urban Power Association emerged, sustainability, diversity and local people parameters were effective in urban transformation [8].

A major problem with the proclamation of the Republic of Turkey the city, has been the reconstruction of cities ravaged during the war. This situation was also the main subject of the urban transformation actions of the period [9].

Another legal regulation made within the scope of combating illegal housing zones is the Slum Law No. 775, which came into force in 1966 and aims to transform slum areas into regular residential areas.[10] Within the boundaries of this law, 640 slum prevention areas were determined in 20,000 hectares of land and 30,672 houses were built for low-income families. In addition to this, within the scope of the aid to the self-builder, 40,000 houses were provided. Besides, 808 reclamation areas were defined in 16,000 hectares of land, and infrastructure services were provided for these areas, while 202 purging areas in 1,325 hectares of land were cleared of slums [11].

The latest legal development related to urban transformation is the Law on Transformation of Areas under Disaster Risk numbered 6306, dated 16.05.2012 [9]. The purpose of the law; In areas where there are risky structures other than these areas along with disaster risk areas, procedures for improvement, liquidation and renewal are defined to constitute their safe living environment.

1.2. Aims Of Urban Transformation

Urban transformation, by its field of activity and nature, can affect the structure of the existing city and the physical, social and economic future of the people living there, and consequently to all the traditions of the city [12]. Urban transformation should be designed to serve five main purposes.

1. Urban transformation projects should investigate the causes of social disruption and make recommendations to prevent this deterioration.
2. Urban transformation projects should enable the city to be redeveloped according to the new physical, social, economic, environmental and infrastructure needs emerging in the rapidly growing, changing and deteriorating texture of the city.
3. The economic development model should be designed with the feature of enhancing urban welfare and quality of life.
4. Strategies that will bring economic vitality back into urban parts, which in urban areas that have become areas of physical and social collapse, should be developed and thus, it is aimed to increase the urban welfare and quality of life.

5. Strategies should be put forward for the most effective use of urban areas and to avoid unnecessary urban spread.

In Urban Transformation projects, one or more of these goals may come to the fore, depending on the characteristics of the region's problems and potentials [13].

2. ISTANBUL CITY KARTAL DISTRICT URBAN TRANSFORMATION EXAMPLE

The history of Istanbul dates back to 8,500 years ago and has been the capital of three universal empires, such as the Roman, Byzantine and Ottoman Empires. The area of Istanbul, which takes its name from the city and is located on the peninsula between Haliç and Marmara, is 5712 km². According to Turkish Statistical Institute data, the population of Istanbul is 15 million 519 thousand 267 people in 2020.

In Figure 2, the current general structure of Istanbul is shown, yellow areas show urban settlement areas, purple regions show industrial areas and finally, green areas indicate agriculture and green areas. Considering the current structure of Istanbul, the excess of green areas stands out, and the residential areas are predominantly concentrated in the coastal regions of the Bosphorus overlooking the Marmara Sea.



Figure 2. Istanbul's Existing Urban Area

Kartal; it is one of the important districts of Istanbul and approximately 3.12% of the total population of Istanbul live here. Its old name is called "Kartalimen" and its history dates back to the 6th century. The total number of buildings is 54.368 and the number of buildings declared as risky buildings within the scope of

Law No. 6306 is 4.109. The district, which has a surface area of 278 km², consists of 20 neighbourhoods. Orhantepe neighbourhood, one of these neighbourhoods, constitutes 6% of the total population of Kartal district.

When Orhantepe District is analysed in general, it is observed that the building is not high-rise and is on the average of 5-6 floors. It was determined that the buildings were built between 1982-1994. Accordingly, when the floor numbers and construction years of the buildings in the neighbourhood are taken into consideration and the ground coefficients are added to the results obtained from the core samples taken from risky structures, the map in figure 6 appears. Areas with intensive risk generally show structures built before the 2007 earthquake regulation, structures built before 2000, when the ready-mixed concrete was widely used, and structures that did not receive engineering services under the building inspection law numbered 4708, which came into force in 2001. When these results are combined with the population, figure 7 occurs. In this analysis, taking into account the settlement of the population, the condition of the distribution of the density by region is examined. When the two results are combined, on average, the data reveal that the same regions pose a risk. In any disaster, these regions will be heavily affected.

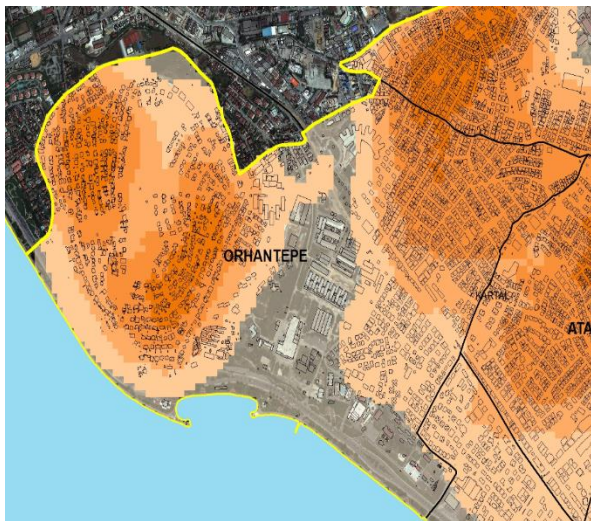


Figure 6. Current Structure Stock Risk Distribution

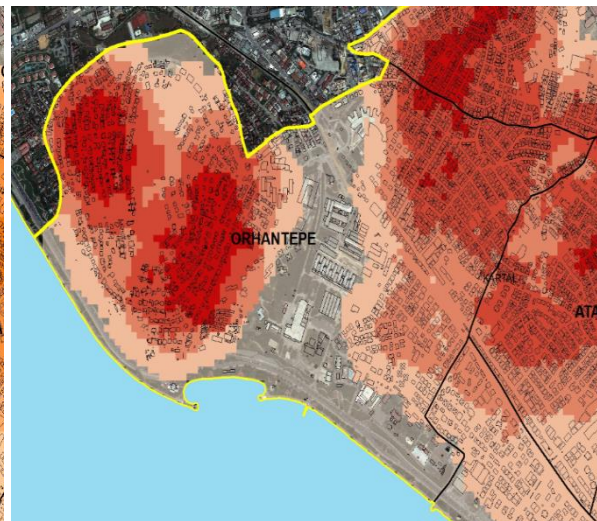


Figure 7. Distribution of Population at Risk

The building on the block number 12580 and 101 parcels located in Orhantepe District collapsed at an unexpected date on 06.02.2019 and 21 people died due to dent and 14 people were taken out from the dent. The mentioned structure was built in 1992 with a total of 9 floors, including basement + ground + 7 normal floors. In the license certificate of the building dated 20.10.1992, there is a 7-storey construction permit,

including 1 basement floor + ground floor + 5 normal floors. The building was built as 2 floors more in violation of the license given by the relevant administration. Basement and ground floors are used for commercial purposes and other normal floors are used for residential purposes. Basement and ground floors are used for commercial purposes and other normal floors are used for residential purposes. The mentioned structure consists of 14 residences and 3 commercial units. The parcel area is 493 m² and the construction area is 1122 m² according to the current zoning plan. However, the current construction area of the building is 2209 m² with illegal floors.



Figure 8. Yeşilyurt Apartments Before Collapse



Figure 9. Yeşilyurt Apartments After Collapse

The building was designed as basement + ground + 5 normal floors in its project in 1992, and the concrete class was designed with B160 and single foundation system according to 1985 TS 500. In the investigations made on the building wreckage, it was observed that unstructured and unwashed sea sand was used in concrete and there was rust in concrete steel.

With the collapse of the mentioned building, firstly observational determinations were made in 10 buildings in 12528 block, 97, 98, 175, 176 parcels, 12580 block 100, 102, 103, 118, 120, 121 parcels in order to be examined within the scope of Law on Transformation of Areas under Disaster Risk by the Ministry of Environment and Urbanization and the implementation regulation.

Table 1. Observational Report of The Reserve Building Area

Apartment Name	Constructional Use	Structural System	Visual Quality	Weak Storey	Heavy Cantilever	Short Column Effect
Ünal	House	Reinforced Concrete Frame	Medium	No	Yes	No
İhya	House	Reinforced Concrete Frame and Concrete Shear Wall	Medium	No	Yes	No
Karalar	Mix	Reinforced Concrete Frame	Medium	No	Yes	No
Potur	House	Reinforced Concrete Frame	Medium	No	Yes	No
Uzunlar	Mix	Reinforced Concrete Frame	Medium	No	Yes	No
Nuri Bey	House	Reinforced Concrete Frame and Concrete Shear Wall	Medium	No	Yes	No
Bahar	Mix	Reinforced Concrete Frame	Medium	No	Yes	No
Anadolu	Mix	Reinforced Concrete Frame	Medium	No	Yes	No
Uğur	House	Reinforced Concrete Frame	Medium	No	Yes	No
Çam	Mix	Reinforced Concrete Frame and Concrete Shear Wall	Medium	No	Yes	No

As a result of observational determinations, it is understood that 5 buildings are residential + commercial and 5 buildings are housing. It is seen that the vast majority of buildings are built as reinforced concrete frames. Although the visual quality of the buildings is medium, the building order is separate. There is heavy cantilever in all buildings. The soft floor and short column effect were not observed.

After observational determinations from the mentioned structures, drilling core samples were taken within the scope of Law No. 6306 and necessary reinforcement stripping was done. As a result of the examination of the data obtained; It has been determined that the buildings are in a position to endanger the safety of life and property, and that there is intense deformation in the buildings, and accordingly, the buildings located in the mentioned parcels except İhya and Çam Apartments have been declared as "Risky Buildings" within the scope of Law No. 6306. The buildings identified as Risky Buildings were immediately evacuated by the authorities to avoid any danger and demolition of the buildings was carried out.



Figure 11. The View After Removal of The Wreckage of Yeşilyurt Apartments

The Reserve Building Area was declared on 11.03.2019 within the scope of Law No. 6306, in order to prepare Yeşilyurt Apartments and the surrounding buildings for earthquake risk, and to provide a liveable area for the protection of life and property security. The 1/1000 scale Implementation Development Plan change and plan disclosure report for the mentioned Reserve Structure Area was approved on 14.03.2019.



Figure 13. The Reserve Building Area

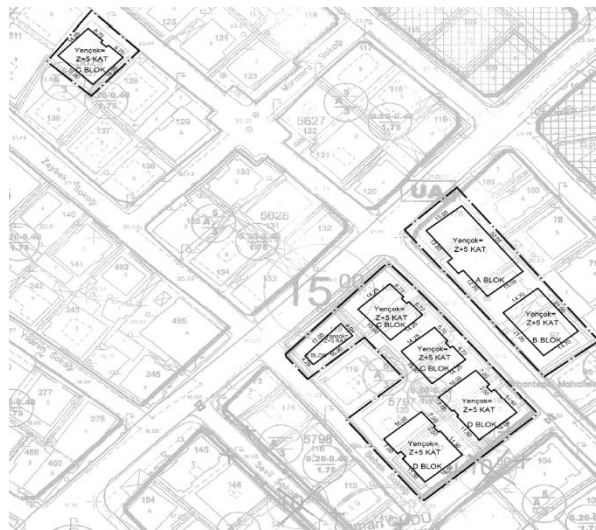


Figure 14. The Reserve Building Area Plan

The buildings within the borders of the Reserve Building Area consist of 129 residences and 29 workplaces. Following the announcement of the Reserve Building Area and the planning processes, the construction process of the construction in the area was started by TOKİ. Along with the mentioned project, 105 houses and 25 workplaces are produced. Approximately 11 months after the date of the incident, 06.02.2019, residences and workplaces were delivered to the beneficiaries on 23.01.2020.

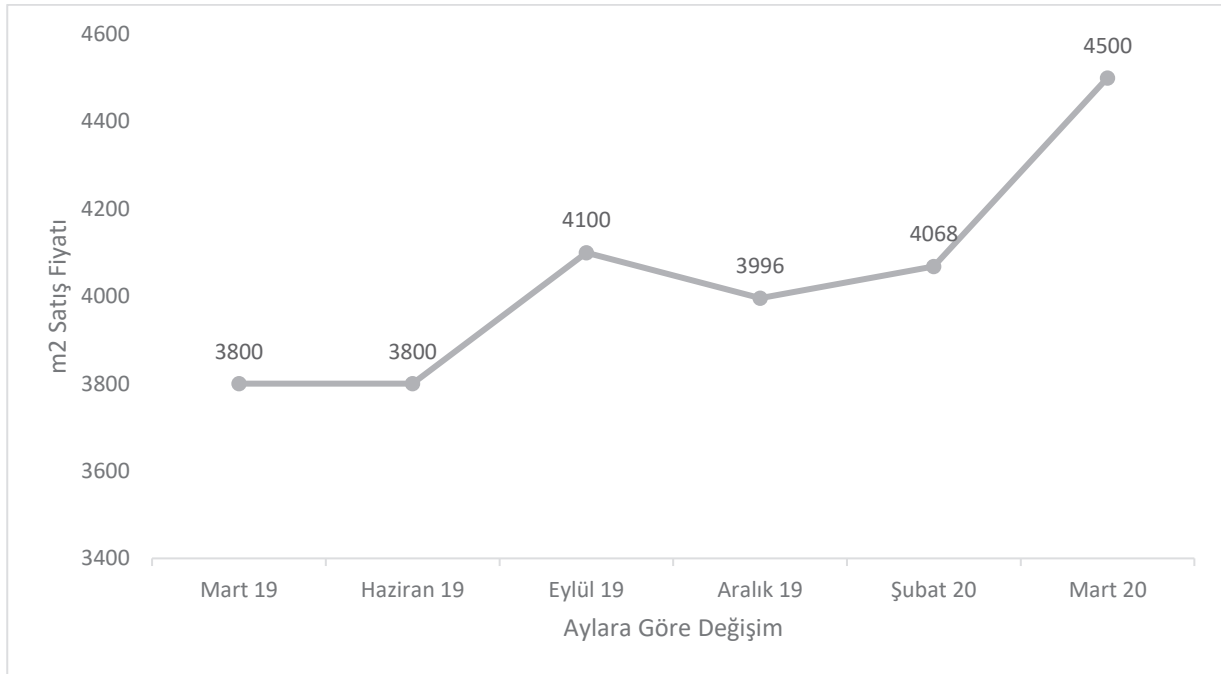


Figure 15. Orhantepe District Real Estate Index

After the delivery of the houses and workplaces, a significant change was observed when the real estate values statement around the area where the crash occurred. After the apartments were handed over to the beneficiaries in February, a significant increase was observed in March.

RESULT

In the 19th century, when the industrial revolution took place in Europe, all policies have changed and especially agricultural policy has entered into a great change and industry has been focused, and as a result, migration from rural to urban areas has increased. With the increase in immigration to the cities, unplanned urbanization started to occur. As a result, an unhealthy city has emerged for people, in this direction, the need for urban transformation in Europe has emerged and urban transformation practices have gained importance.

In our country, the first steps of urban transformation were taken in the 19th century, the last century of the Ottoman State. The first steps were started to be taken in Aksaray in 1854 and it was tried to be extended by various laws with the 1960s. The first legal regulation issued with the expression of Urban Transformation is the Law on Transformation of Areas under Disaster Risk dated 16.05.2012 and numbered 6306. With this law, concepts such as Risk Area, Reserve Structure Area and Risky Structure have directed the transformation.

As a result of the collapse of a building in Kartal district of Istanbul province, 21 people died under the rubble. In this incident, two times more floors have been raised in violation of the license and its annexes given by the relevant administration, and the use of building materials that do not comply with the standards has created an environment for the dentist. Then, with the drilling core samples taken from the surrounding buildings, the buildings were declared as Reserve Building Area and the transformation was started, and new buildings were built within 11 months from the date of demolition and delivered to the beneficiaries. In the studies carried out in the buildings where the collapse occurred and the 10 buildings around it, it was observed that almost all of the structures were used in unstructured and unwashed sea sand. In addition, considering the construction date of the buildings, it was observed that no ready-mixed concrete was used, no engineering services and no S420 ribbed iron was used, and these irons were exposed to great corrosion. It has been observed that similar techniques and materials were used in the buildings since it was built on similar dates in the mentioned settlement unit, and it is obvious that this will bring great destructions during a disaster. Accordingly, this situation has revealed that urban transformation is too important to be ignored.

Conclusion

There are many buildings like this and so on, and urban transformation needs to be accelerated before similar events occur. Otherwise, it is obvious that it will bring unavoidable material and moral results and it is of great importance that states change their main policies within this scope.

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