Evolution of High-rise Buildings as Shapers of Urban Space
Izmir as a Case Study

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ABSTRACT

In recent years, the construction of high-rise buildings has increased in Turkey. Unfortunately, they have been often designed without taking social, historical, environmental, symbolic and visual factors into consideration. And they have got important problems in integration with the urban space. Because the building permits are not given based upon research and analysis. Usually, the solution at this point is to decrease the density and height limits. So they have been the most discussed issue because of their impact on the urban environment. For these reasons, this thesis is prepared to be a guide for future research on the problems of high-rise buildings in Turkey.

In this thesis context the aim is; to examine the role of high-rise buildings in the shaping of urban space and their physical, functional and social impacts on urban environment, to determine the advantages and disadvantages of high-rise buildings; and also to improve the urban planning and urban design criteria to solve the problems caused by them. This research, as a case study, attempts to evaluate existing and proposed high-rise buildings within the city context of Izmir according to their location and environmental impacts.

High-rise buildings can bring great potential benefits to mankind. Instead of preventing these buildings, efforts have to be focused on maximizing its benefits. To solve the problems about high-rise buildings, it is important to consider this type of buildings in urban planning and urban design process.

KEY WORDS:

High-rise building, skyscraper, skyline, urban space, urban form, landmark, environmental impact, mixed use, setback, urban image, visual impact, high-rise building regulation, height control.
Son yıllarda, ülkemizde yüksek binaların inşasında önemli oranda artış görülmektedir. Ne yazık ki bu binalar, kente ait sosyal, tarihi, çevresel, görsel faktörler dikkate alınmadan planlanmakta ve tasarlanmakta bu nedenle kentsel mekana entegre olamamakta ve çevrelerini olumsuz yönde etkilemektedirler. Genellikle ülkemizde yüksek binaların yerşimi ve inşasıyla ilgili kararlar araştırma ve analizlere dayanılmadan verilmekte, sonuç sadece yoğunluk ve yükseklik artırma yönünde olmakta, buna yüksek bina olgunsun ülkemizde çok tartışılan bir konu olmasına sebep olmaktadır. Bu nedenlerle, bu tez, Türkiye'de ki yüksek binalarla ilgili yaşanan problemlerin çözümüyle ilgili araştırmalarla ışık tutacağı düşünülmektedir.

Bu tez kapsamında amaçlar kentsel mekan oluşumunda yüksek binaların rolünü, kentsel çevreye olan fiziksel, fonksiyonel ve sosyal etkilerini incelemek, yüksek binaların avantaj ve dezavantajlarını belirlemek ve şehir planlama ve şehirsel tasarım kriterleri geliştirmektir. Ayrıca tez kapsamında İzmir'de ki yüksek binalar yerşimleri ve çevresel etkileri açısından analiz edilmiş, önerilerde bulunulmuştur.

Yüksek binalar, yaşamanın yerine faydalarını arttırcı kriterler geliştirilmeli; sebep oldukları kentsel problemlerin çözümü için şehir planlama ve şehirsel tasarım süreci içinde ele alınmalıdır.
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CHAPTER I

INTRODUCTION

In the development of cities, high-rise buildings have important role with their economical, functional and symbolic values. But whether in our country or in other developed or developing countries, the crucial problem concerning high-rise buildings is their relationship with urban environment.

High-rise buildings could be elements in creating the image of cities. They define skyline and street vistas; they are also instruments for shaping the urban space. As high-rise buildings have progressed from single entities to large complexes, the urban space, which is created by them, has become an important part of the design problem.

The roots of high-rise buildings go back to the prehistorically periods. They have been built in almost all cultures. Throughout the history power, position, wealth, defense, spiritual feelings have caused to build them. The tower of Babel, obelisks, the pyramids of Egypt, Southeast Asia and the Aztecs' ancient lighthouses and medieval castle towers can be shown as the examples of early high structures. These were generally protective or symbolic in the nature and were frequently used.

The modern high-rise buildings were completely a new invention in the middle of the 19th century. Emergence of these in this century depends on many factors. The most important factors are the;

- Development of technology
- The use of the iron
- Then the steel frame systems.

Also innovations in fire protection system, invention of elevator and pressured water pumps, development of ventilation system, development of design methods, development of seismic design, rising in the quality of concrete caused the development of this type of buildings. Other important factors are economic development and prestige competition.

High-rise buildings are firstly seen in USA. After 1960's they started to be seen in Europe and 30-50 story buildings were constructed. Unlike USA in Europe, there was not high-rise building competition. Far Eastern countries also take place the countries
where high-rise buildings grow really quickly. With the developing technology high-rise buildings started to be built all over the world.

When we take an analytical look at the history of high-rise buildings in Turkey, it is evident that they are very young compared to their western counterparts. High-rise buildings first started to appear in the city skyline after 1950's, and showed a trend of slow increase until 1970's. Till mid 1970's buildings constructed were under 25 storeys. Then the demand rose considerably and especially between 1980 and 1985 many new projects had been announced, but only a small number of them entered to the phase of realisation. After 1985 a big increase in projects and applications of high-rise buildings is observed and projects have been developed with 30 to 50 floors.

So far, in Turkey high-rise buildings have been often designed without taking social, historical, environmental, symbolic and visual factors into consideration. Because the building permits are not given by based upon research and analysis. Usually, the solution at this point is to decrease the density and height limits. So high-rise buildings have been the most discussed issues because of their impact on urban environment. For these reasons, this thesis is prepared to be a guide for future research in Turkey.

The high-rise building subject has a large area as architecture, urbanization, engineering, and, this caused the limitation of this study.

The role of the high-rise buildings in shaping urban space, the effects to the urban environment, and improving the criteria of urban planning and urban designing have been the subject of this thesis.

The cause of keeping the subject and content of this study is that these kind of buildings have got important problems in integrating with the urban space, and, this come in front of the problems with high-rise buildings in our country.

**The aims of this thesis are:**

- to examine the role of high-rise buildings in shaping of urban space,
- to examine their physical, functional and social impacts high-rise buildings on urban environment
- to determine the urban planning and urban design criteria for solving negative impacts of high-rise buildings
- to evaluate high-rise buildings development according to planning, function and environmental relation in Istanbul and Izmir
CHAPTER 2

EVOLUTION OF HIGH-RISE BUILDINGS

This chapter examines the definition of high-rise buildings, their historical evolution, factors causing the high-rise buildings development and the American approach, the European approach and the approach of the developing countries to the high-rise buildings.

2.1. Definition of High-rise Buildings

What is a high-rise building? Every society concerning with high-rise buildings defines it differently. Because highness is a relative matter. A measurable exact definition of the high-rise building cannot be universally applied.

On one side one study may define a five story building as high-rise building, on the other side another study may define high-rise above the tenth stories. On the other hand it can be said that in a typically single story area, a three story building will appear high.

In Europe, buildings of more than 12 stories are generally considered tall. In downtown Chicago or New York, a structure must be over 70 to 100 stories to be defined as high-rise building. According to German standards buildings above 22 m. are defined high-rise.

In Turkey, according to Metropolitan Municipality of Izmir “High-rise building regulation”, high-rise buildings are defined like: "High-rise building is a building type which generally effects its near and distant environment physically and also in term of urban layout and every kind of urban infrastructure. If the last story's ceiling floor is above 30.80 m. or if with the basement story the total number of stories are more than 13 stories, the building is accepted as a high-rise building" (Metropolitan Municipality of Izmir high-rise Regulation, 1996, p. 3)

The old president of UNESCO's high-rise Buildings Council Social Effects Commission, Altan Öke, classified the buildings according to height:

First category: Buildings with 8-12 stories.
Third category: Buildings with 25-50 stories. Special precautions are taken.
Fourth category: Buildings with 55-75 stories.
Fifth category: Buildings above 75 stories. These buildings are called super skyscrapers.

Altan Öke used the term of skyscraper for more than 25 stories buildings. In general terms skyscraper term is used for very high buildings. (Öke, 1991, p:138)

The high-rise building cannot be defined in specific terms related to height or number of floors. The Council on “High-rise buildings and Urban Habitat” has agreed that the proper definition lies not in these factors, but in whether or not the design, operation, or urban impact are influenced by the quality of tallness and require special measures in planning, design, and construction when compared with buildings representative of ordinary construction. (Council on High-rise buildings and Urban Habitat, 1981, p.7)

Because of number of factors, high-rise buildings are identified in different terms. In conclusion it can be said that measurable definition of the high-rise buildings cannot be universally applied.

2.2. Evolution of High-rise Buildings in the Past

Evolution of high-rise buildings is examined in two main title as pre-industrial period and post-industrial period. In the title pre-industrial period, high-rise buildings up to 1880 are examined. Development of high-rise buildings after the post-industrial are examined in six period.

Pre-Industrial Period

High structures have been built in almost all cultures. It is possible to come across these structures which are differentiated by their heights from the other buildings around and which have function in every period and in every settlement. (Eyüce, A., 1995, p:50) Throughout the history power, position, wealth, defense, spiritual feelings
have caused to built them. They are variously described as expressing power, cultural or economic dominance, the aspirations of man to reach up to God. And they have played an important role in urban planning as dominant elements.

Historically, the dominant building form of each culture has represented the dominant or dominating force within that culture. This can be seen in the pyramids of Egypt's pharaohs firstly. They may be considered to be first high structures.

In the Sumerian kingdom, step-shaped pyramids were mountain dwellings. These ziggurats could a ladder between heaven and earth. The great ziggurat at Babylon in Iran is a huge masonry over 90m high (600 BC) (figure 1). This "hill of heaven" is an early example of a religious structure. It is as a symbol of human presumption. (Heinle, E.-Leonhardt, F., 1989 p:10)

Ancient source makes it clear that multistoried dwellings were considered a peculiar mark of the city of Rome. In the fifth century BC when the republic barely started, two story buildings were built in Rome. Augustos established the imperial form of government, central control was possible. He established a city fire and police bridge and to begin to legislate buildings codes for high-rise construction. However, these buildings were almost 10 floors in Roman cities. (Council on High-rise buildings and UrbanHabitat, 1981, p:88)

The grandest masonry structure of the ancient world was the lighthouse at Pharos near Alexandria, in Egypt (280 BC). It was the tallest masonry structures for many centuries (figure 2). If it is correct it was 150m. high. The Pharos of Alexandria was a hallow structure with a square base, then a cylinder, than an octagon, with a primitive elevator running up the middle.
There were two dominant reasons for the high masonry structure of ancient and medieval times: religion and defense. (Heinle, E.- Leonhardt,F.,1989 p:32-35)

The temples around which centered the life of Greece, the structures and monuments of Imperial Rome, the castles of feudal Europe, the cathedral of a Gothic Europe dominated by the Church, and the guild houses and palaces of the Renaissance with its merchant patrons are the high-rise structures up to 18th century. (Council on High-rise buildings and Urban Habitat, 1981, p:3)

The invention of cast iron system through the end of 18th century and a perfect production of steel with the Industrial Revolution made it available to use iron first and then steel, in 1850s; for frame systems. These systems were later, used for wider and higher openings. Heavy, piled walls were replaced by steel frames and glass surfaces. George W. Snow used the first steel frame, which was very light and plated with wood, in 1833, in Chicago. In 1880, an architect from Minneapolis, Leroy S. Buffington had prepared the plans for 16 story steel framed building. (Aytis, S., 1989, p:16)

Post-Industrial Period

1. The Period Between 1880-1900 - The Functional Period

This period is regarded as the first one, in the development of high-rise buildings. It is for the reason that elevator was invented within this era. This important step in vertical movement has brought a real solution to the problem of multi-step stairs occurred as a result of high-rise buildings. Using steel, as structure material, invention of hydrophore and innovation of precautions against fire, were all initiated at that period. (Aytis, S., 1989, p:17)

After the Great Fire, a number of factors came together for the development of high-rise buildings. The use of the steel skeleton frame, its separation from the facade, and the use of elevators were all necessary before buildings of more than about five stories become viable. Four persons dominated the period:

1. William Le Baron Jenney (Home Insurance Building)
2. Daniel Burnham (the Reliance Building)
3. Jonh Wellborn Root (Monadnock Building)
4. Louis Henry Sullivan (Auditorium Building - Carson Pirie Scott Building)
"These four men, along with the leading firm of Holabird and Roche, were instrumental in establishing the influential architectural movement known as the Chicago School." (Bennett, D., 1995, p.41)

"During the functional period- the first high-rise building era- there was a revolution in high-rise building technology: instead of heavy masonry edifices, there emerge those with a light, steel skeleton and a facade of stone or terracotta. With this lighter structure, larger areas of glass became possible, and the buildings of the period were cost-effective and well-engineered, with little decoration. By the end of the period, decoration and glass bay windows characterized high-rise buildings." (Bennett, D., 1995, p.41)

In 1885, architect William Le Baron Jenny built Home Insurance in Chicago and used steel frame system in high-rise buildings for the first time. This building, which started a new era in architecture was rewarded the first skyscraper in the world by Council on High-rise buildings and Urban Habitat. (Aytis, S., 1989, p.17)

(figure 3) ".... this building was the first to have a lightweight curtain-wall facade entirely supported by an internal frame made of fireproof iron and steel. Completed in 1885, this 10-story structure set the style for the Chicago School of architecture...It was demolished in 1931." (Bennett, D., 1995, p.40)

The person who has help to improve the architectural terminology in this period was Lois Sullivan. He was in favor of describing the height of a building by means of vertical elements. He put his thoughts into practice first in Wainwright building in St. Louis between 1890-91 (figure 4).
"Although this building in St. Louis was not tall—it was only 10 stories—Sullivan's design gave it a remarkable sense of height. He emphasized the vertical lines, the piers, by recessing the horizontal element, the windows. This also helped overcome the squareness of the shape by lifting the eye over the perfectly proportioned brick and terracotta facade. The ornate cornice and the decorative panels under the windows balance with the smooth verticals and help to complete this study in total design."

(Bennett, D., 1995, p:46)

Another dimension he added into making of high-rise buildings was to consider the building in three major sections, a concept, which based on human body analogy. According to this concept, every high-rise building is composed of a base, which forms the entrance, a body which identifies the vertical movement and a roof design (figure 5). The Sullivan's base, body and prominent roof concept was the norm in all high-rise buildings until the end of the 2nd World War. Sullivan once quoted after the Guaranty Building "It moves on its feeds, it's alive and it breathes." (figure 6) (Özer, F., 1989, p:8)

Figure 4 Wainwright Building
Source: Bennett, D., 1995, p:46

Figure 5 Sullivan's High-rise formula: base, body, roof Source: Tönük, S., 1989, p:42
In 1890, a new era was opened with the 24 m. Tall Pulitzer building. In addition to the rises in the height of the buildings, the difference between the base size and the height also increased. In Chicago, "The Reliance Building, designed by Burnham and Company, was the first to have a frame made entirely of steel, which meant that the exterior could be sheathed in lightweight, non-load-bearing materials such as glass." in 1895. (Bennett, D., 1995, p:41) In this building, very thin columns and wide glass facade were used. The external walls don't play role in support. Technically, it is well developed and has an original decoration.
2. The Period Between 1900-1920 - The Eclectic Period

"After the works of mass base as much as buildings site base area, regular prismatic masses and shaping the surfaces of these masses which are followed in the early examples of tall buildings in the early 1900s, it is come across some examples of interesting building in terms of the mass shaping features. High-rise buildings had looked for shaping features peculiar to themselves, but each proposal couldn’t be archetypes that carry seminal features.". (Eyüce, A., 1995, p:51)

The original decoration concept, which become popular in early high-rise buildings with the influence of architects from Chicago has been abandoned in this period. The building design and decoration became increasingly flamboyant in the first decades of the 20th century. Gothic and Renaissance motifs from Gothic cathedrals, Palladian villas, Greek temples, Renaissance palaces and French chateaux, were used in the designing of high-rise buildings in this period.

"The second decade of the 20th century, the peak of the eclectic age, produced some of the most memorable and remarkable skyscrapers...... Building owners and their architects began to explore new architectural styles which combine height and decoration in a way that would reflect the owner’s corporate status or aspirations." (Bennett, D., 1995, p:50)

The eclectic high-rise buildings were expressing the power of wealth and position. In the first quarter of the 20th century, there has been loyalty to Sullivan’s High-rise buildings formula. Amongst some examples to these buildings:

- Woolworth Building-New York. The greatest high-rise building of the eclectic period before the 1st World War was Woolworth Building, completed in 1913, and totally 240m high. Its formal approach is reminiscent of Gothic. The building, designed by Cass Gilbert, has a solid 29-story U-shaped base, with the arms of the U facing away from the street front. (Bennett,D. 1995 p:53)

Figure 8 The Woolwort Building
• Equitable Building - New York. Ernest Graham designed this 39-story high-rise building. It was by far the largest building in the World. It casts a shadow that was more than four blocks long. After construction that building, New York high-rise buildings were limited to a total floor area not more than 12 times the size of the plot. This building was almost three times that size. (Bennett, D., 1995, p:51) (figure 9).

3. The Period Between 1920-1940 - The Art-Deco Period

There have been some changes in the high-rise buildings both in style and shape within the second quarter of the 20th century. Eclectic approach has been replaced by Art-Deco. In addition to this, buildings began to transform into thin and tall tower-like shapes as a result of competition between the high-rise building constructors. The Sullivan’s base, body and roof formula has turned into antique column symbolism (Özer, F. 1989, p:8). The Modern Architectural Concept utilized in high-rise buildings in the USA before 2nd World War has not been effective in this period.

"An extension of the eclectic style, Art-Deco involved greater imagery, flamboyance and color. It originated in Europe in the 1920s and developed into a major style by the 1930s. The name was derived from the Exposition Internationale des Arts Décoratifs et Industriels Moderns held in Paris in 1925. Art-Deco was a wonderful mixture of diverse styles, including past European fashion; Mayan, Aztec and Chinese architecture; and the modern influences of Cubism, Futurism and Expressionism. In architecture, these influence were all brought together to heighten the sensual expression of the high-rise buildings. “ (Bennett, D., 1995, p:54 )

In this period, high-rise building technology developed, 100-story high-rise buildings became possible. Shear-core, shear-truss and frame-tube structures were developed. And higher-grade steel, thicker-plate girders, better-riveted connections, and
machine-excavated pile and caisson foundations all allowed greater forces to be carried. Other improvements such as force ventilation, fluorescent lighting and pressured hot-water system all raised level of comfort in high-rise building. In these years, one of the good examples was The Chicago Tribune Building which was constructed in 1925. Hood and Howell’s Gothic design for the Tribune Tower beat more than 250 other entries from around the world to win the competition. The 34-storey high-rise building required complex engineering, including caisson foundations and girder frame structure (figure 10) (Bennett, D., 1995, p:54).

![Figure 10 The Chicago Tribune Building](source: Jencks, C., 1980, p:20)

Constructing high buildings in Chicago at this period, became even more common in Manhattan Peninsula in New York. The buildings constructed before 1930 were mostly trade centers. As structural elements wood, iron, steel were used respectively.

One of the important buildings of this period was the Chrysler Building (figure 11). William Van Allen’s romantic and fantastic design is based on the automobile motif of the client. It was constructed in 1930, inspired by the English Parliament, due to the owner’s wish. It is a 77-story building which has the title of the tallest building of the World for a short time. The tower of white glazed brick, with

![Figure 11 Chrysler Building](source: Bennett, D., 1995, p:56)
gray trim and gargoyles posted on the corners, fused perfectly with the well proportioned base. (Özer, F., 1989, p: 9)

The Empire State Building (1931) had the World’s tallest building title until 1973 with its 102 floors. Sherve, Comp and Herman planned it with base, body and roof concept. Many of its floors remained vacant for a long time after the completion of the building. Following the Empire State, the builders have preferred a newer approach, which gave trade and landscape architecture an emphasis rather than the high-rise buildings. (figure 12) A bomber which lost its way due to the foggy weather, crashed into the Empire State at 450 km/hour. The aircraft fell into pieces and the mild damage of the buildings was restored afterwards. (Aytis, S., 1989, p:18)

The Rockefeller Center, built between 1931-47 was composed of 15 structures in New York. This complex, including tower blocks, plazas, theaters and stores was built on a land of 48500m². The tallest building of the complex is the 70-storey RCA Building. Despite its size, it is not an isolated building like so many of high-rise buildings in USA. This complex is regarded as the first detailed study, in terms of urbanization (figure 13).
Louis Sullivan’s formula has been completely abandoned following the 2nd World War. Prism-like high-rise buildings in the shape of geometrical forms the button to the top has been started to be constructed. Mies van Der Rohe has played an important role in the acceptance of prism-like constructions. This architect defended his rigid rationalist attitude in all high-rise buildings without any concessions. It is very difficult to distinguish the differences between Mies’s buildings. (Özer, F., 1989, p:9)

After the war years, the 1950s has been the scene of important changes and developed in terms of shaping features of high-rise buildings. With the migration of Mies to USA, the designs purified from all the unnecessary details in the pursuit of less are more found the opportunity to fulfill. (Eyüce, A. 1995, p: 55)

In this period, the high-rise buildings mostly built in the form of mass housing and trade centers were usually seen in Chicago and New York. After the “free office” concept appeared, it was necessary to have wide and columnless spaces. Meanwhile, the structure elements also improve. Highly durable steel prestressed concrete was used for carrier systems. Front structures were finished with lighter elements.

In this period, a big economic crisis also appeared and the 2nd World War added to that crisis. As a result, more economical construction techniques were suggested and it was decided that higher buildings would cost less to build. Lands, whose prices increased rapidly and the rapid urbanization influenced one another; and high-rise buildings which made it possible to construct big buildings on small lands, became popular. Due to the needs for air conditioning and illumination systems, various techniques developed for them. (Aytis, S., 1989, p:19)

The General Secretariat Building of United Nations in 1950, and the apartment buildings with 26 stories which were constructed in 1952 in Chicago by Mies Van der Rohe, are among the specific buildings of that period. Another major examples of this period are The Lomonosow university in Moscow and The Price Tower in Oklahoma, which were built in 1955 (figure 14,15). Frank Lloyd Wrigth planned The Price Tower.
Between the years 1950 and 1970, the prism concept of Mies was dominant at all height buildings. As a result of this all of the cities in the world started to look like each other. Architectural critics call this process Manhattanization.

In this period the main interest is not ideal prisms or pure forms, but giving response to pragmatic needs, and balancing the internal with the external, and the architects freed of dogmas to let emerge new ideas.

The years following 1960 were economically more confortable and function has gained importance. Not only function but aesthetic features were also considered and a certain approach started to become popular. Together with this approach, the technology also developed and the improvement in the quality of concrete, operation of pumps which pump concrete to spans both horizontally and vertically; improvement of light concrete; improvement of concrete operation with various additives; using self-rising structures, and development of prefabrication carried the high construction technology up to our date after using reflective windows at the frontage and aluminum frontage became popular, the number of the filled parts at the front rised. (Aytis, S., 1989, p:19)

By the early 1960s’, an important development in structural design was introduced. It was the tubular system developed by Fazlur Khan. This system makes possible the increase in height over 100 floors without any interior columns between the central core and the outer wall.

In this period, changes in planning were done. The carrier system, construction and calculation techniques of high-rise buildings developed rapidly and planning with computers became inevitable. Mostly banks, finance center, business centers and
hotels were built and steel, concrete and light concrete were used as structure material. The improvement in the quality of concrete and development in technology, started an era of development for concrete high-rise buildings. (Aytis, S., 1989, p: 19)

The international style created mediocrity in architecture and monotony of style. The concept of box skyscraper has not changed at once after 1960. Even today there are high-rise buildings being built with this concept. Some examples of this period are:

- **Lever House 1952, by Gordon Bunshaft of Skidmore, Owings, Merrill:** Lever House was the first in a line of innovative glass towers that changed the face of high-rise building architecture for decades to come. The building consists of two glass and steel blocks. The one is, lying horizontally on columns to make an open plaza; the other one is placed vertically on top of it. (Bennett, D., 1995, p:60). (figure 16)

- **Seagram Building 1958, by Mies van der Rohe:** It is the first major high-rise building of Mies. The tower of bronzed glass is 38 story. This building is seen as the fulfillment of Mies's philosophy. The structural system of the steel frame is boldly expressed behind the glass facade. (Bennett, D., 1995, p:60) (figure 17)
• *The Lake Point Tower, 1968 by Schipporeit and Heinrich in Chicago:* The 70 story glass and rounded shape building designs by Mies van der Rohe. With a height of 196 m, this building, one of the tallest in the world for residential purposes occupies a privileged site in Chicago. From three sides it serves as an orientation point within the city, contributing more to the successful city skyline than is the case with many skyscrapers in other large cities. (Hienle, E and Leonhardt, F, 1989, p:302) (figure 18)

• *The John Hancock Building in Chicago was built in 1969 by SOM (Skidmore-Owings-Merrill).* It has 100 stories and reaches a height of 343m. Stores, warehouses, restaurants, technological headquarters, parking facilities, office spaces are housed in this building. The slanting of the exterior walls and external diagonal bars for the absorption of wind forces, based on the concept of the engineer Fazlur Khan, achieved significant economies in steel in comparison to an interior rigification.
The enormous X-shaped brace that is displayed is unmistakable, and is called by technologically naive critics a boastful expression of admittedly powerful force, but is a manifestation of much pride or arrogance. The braces are, however, a source of wind noise (Hienle, E and Leonhardt, F. 1989, p:304). (figure 19)

5. The Period Between 1970-1980

After 1970’s Mies’ rigid geometrical approach has softened. Efforts to remove the monotonous aspect of prism concept without leaving away geometry, have appeared. So the buildings gained a distinctive feature. The surroundings in which the buildings were placed were not monotonous any more (Özer, F., 1989, p:11).

In the beginning of the 1970s, some architects searched for the imagery, style and social character of high-rise buildings. Because until that time, most of high-rise buildings were isolated from surroundings. In that time first true social high-rise buildings were the Citicorp Center and Pennzoil Place (figure 22).

In that period searches for a new style of high-rise buildings followed the rejection of the glass-box high-rise buildings. The high-rise buildings in that period were the forerunners of the post-modernism and romantic modernism. Height was not a problem and very high structures were built. Because, “The development of high-grade steel, fusion-welded sections and new types of connections offered enormous potential for saving weight and with it construction time and money, especially when combined with some of the new designs for megastructures.” (Bennett, D., 1995, p:62)

The searches for high-rise buildings in that period are:
- making them part of the community
- linking them to the urban landscape
- making them more appealing

Architects tacked these in a number of ways:
- Some remodeled the glass facades, creating slender towers that reflected their surrounding.
- Some looked to novelty and dramatic effects
- Others designed mixed-use buildings, which combine offices and apartments with a plaza, atrium or shopping or cultural center.
Some examples in that period are:

- The World Trade Center in Manhattan was completed in 1972 in Manhattan. It has 100 stories and reaches a height of 419m. Minoru Yamasaki designed this building. The simplicity of the form, the dual effect, the clarity of construction, and, of course, the height, make the skyscrapers the focus of much advertising. One technological innovation is the use of external wall disks as a closed vertical pipe. Narrowly placed supports and thick, tall exterior wall supports and thick, tall exterior wall supports between small windows constitute the armature of the tubular system. (Hienle, E and Leonhardt, F, 1989, p:305) (figure 20)

Figure 20 World Trade Center
• William Pereira built the Transamerica Building in San Francisco in 1976. The 61 story, 257m. high skyscraper was conceived about 1970 in various alternatives. It is considered the best example for an image-building skyscraper and it became a symbol and an image-building skyscraper and it became a symbol and an internationally known landmark. (Henley, E and Leonhardt, F., 1989 p:302) (figure 21)

• The Sears Tower in Chicago is a 110 story, 443m. high skyscraper, by Bruce Graham and Fazlur Khan of Skidmore, Owings and Merrill (SOM) was built in 1974 (figure 22). For the structural system of the Sears Tower, Fazlur Khan developed the bundle tubes - modular tubes -. The building is divided into nine squares structural tubes set a different heights, which gives it a distinctive appearance. (Henley, E and Leonhardt, F., 1989 p:304)
• Citicorp Center 1977, designed by Hugh Stubbins and engineered by Le Messurier Consultants: “The direction of high-rise building design in the 1980s was determined by the Citicorp Center, which encapsulates the best ideas behind the social skyscraper.... The complex is devoted to public use at street level and includes restaurants and department stores around an atrium. Outside, around the giant columns that support the tower, is a plaza which includes a sunken terrace garden and St. Peter's Lutheran Church.” (figure 23) (Benneth, D., 1995, p:72)

6. The Period After 1980 -Post-modern Period

In this period, transformation in Rationalism caused another result. Prism skyscraper approach of Mies Van Der Rohe was given up, base, body and roof formula was accepted again. The most dramatically transformation on high-rise buildings has been through Post-modern trend. Post-modernism can be described as decorative, symbolic, humorous and surprising trend which accepts environment as repetition of it and conveys forms partially from history and commercial advertisements.(Özer, F., 1989, p:11). Only, post-modernism have affected high-rise buildings after 1980s widespread. In the development of post-modernism trend, three architects were very effective: Charles Jencks, Robert Venturi ,Philip Johnson.
The main concerns in design of high-rise buildings in this period are that: architects try to make it appropriate to the site and to design tower floors in a way so as to maintain and strengthen the street form. At the same time, they want to bring variety to urban life by designing lower floors with multiple uses. So, while the lower floors are let to public use, the upper floors are designed to house more private functions. To design floor plans efficiently and economically and to shape them according to artistic purposes without disturbing their efficiency and economy are more important. They should be designed not only concerning their immediate surroundings but also by responding to the city it belongs to, because it is a main element in the making and shaping of cities.

“Post modernism, a reaction to the Modern Movement, or international style, incorporated color, sculptured form and decoration. But the choice of exact style was wide open, and a type of modern eclectic approach emerged” (Bennett, D., 1995, p:74)

A number of styles, all loosely termed postmodern or Romantic Modern, have been incorporated into plans for buildings include post-modern classical, Polychromatic futuristic, Engineered High-tech, Modern Expressionism, and modern Minimalism.....(Bennett, D., 1995, p:74) The styles of architecture for high-rise buildings have been adapted too different cultures and climates.

Some examples after 1980:
• Wacker Drive, Chicago, 1983: The firm of Kohn, Pederson, fox presented one of the more unusual ways of bringing historical details executed in traditional materials and combining them in an untraditional way with the most modern materials, technologies and forms. This building is the office tower at 333 Wacker Drive-Chicago. A sheer glass tower springs from a classically detailed masonry base(figure24)
• Republic Bank Center 1984:
The 56 story building is the epitome of post-modern with its spires and cascading granite and glass panels and its sleek lines and crisp detailing. (figure 25) (Bennett, D., 1995, p:77)

• PPG Place 1984, London:
"Inspired by the Victoria Tower of the Houses of Parliament in London, Philip Johnson designed a Gothic glass tower for the Pittsburgh Plate Glass Company. Although at just 635 feet (194m) it is not very tall, its outrageous design and novelty value make it a landmark on the Pittsburgh waterfront and something of a tourist attraction." (Bennett, D., 1995, p:76) (figure 26)
• National Commerce Bank 1984 by SOM: The windows and curved facade of the building at Jeddah in Saudi Arabia, are screened from direct sunlight in a dramatic fashion. A vast central atrium shades and filters the light inward, preventing it from falling directly on the windows. While the outside temperature can vary between-10°C and 60°C or more, this design helps to minimize the heat gain by day and loss by night. And it keeps the inside at an even 20°C. (Bennett D., 1995, p:65) (figure 27)

• AT&T Building 1985, by Philip Johnson: “The top of the 37-story pinkish-granite building resembles a break-arch pediment of the type found on Chippendale furniture. Yet despite this strange top, the AT&T building did not look of place. Indeed, the pediment is only really visible from the tops of nearby buildings, certainly not from the street below. Furthermore, the building's Renaissance-inspired base, with its huge arched entrance, and its into the skyscraper.” (Bennett D., 1995, p:77) (figure 28)
• The Bank of China in Hong Kong was completed in 1988. It reaches a height of 314m. As with the Hancock Center, the diagonal rigidification is the decisive feature of the form. The architect of this building is Leoh Ming Pei. (Hienle, E and Leonhardt, F., 1989, p:307) (figure 29)

• Headquarters of the Hong Kong Shanghai Banking Corporation, Hong Kong, by Foster Associates, Ove Arup and Partners in 1986: The new design abandons the classic model of a central core and surrounding façade skin. Eight masts support the building, each of four tubes. Reinforcing struts at levels 11,20,28,35 and 45 divide the building. The floors are hung from these. 139 modules for toilets and technical installations as well as stairs and elevators are located at the sides of the building (figure 30)
The Puerto de Europe complex of offices and flats is 113m high in Madrid (1996). The fact that the two towers are inclined at an angle of 14.3 and their position at the northern edge of the capital of Spain explains why they have been christened the gateway to Europe. A team of designers notably including Philip Johnson designed it. Height of 113 meters. Concrete and steel were used for building the towers. (L’arca, 1996,p:32-41) (figure 31)

The Petronas Towers in Kuala Lumpur is 451.9m high. It is the tallest building in the world (1999). This project which consist of two high-rise buildings, involves huge shopping center, concert-conference halls, a mosque and public park. The towers are organized in horizontal ribbons of glass and stainless steel panels. To increase the building’s cultural and regional identity further, the composition of the plan is designed using traditional Islamic geometric principles. Two tower will provide a new global symbol for
Kuala Lumpur and Malaysia. (L’arca; p.24-31, 1996) (figure 32-33)

![Figure 33 Sketch of the project area in downtown Kuala Lumpur](image1)

Source: L’arca, 1996 p:24

- **Millennium Tower, by Norman Foster:** "A vertical city in which 50000 people can live, work and relax, this conical tower is an idea for the 21st century.... The building incorporates a helical steel construction, woven like a basket." (Bennett, D., 1995, p.83). The 840m high building has high-speed elevators at every 30th floor, with meeting points, gardens, stores and food halls. (figure 34)

![Figure 34 Millennium Tower](image2)

Source: Bennett, D., 1995, p.83

The figure 35 and 36 show the height increasing of high-rise structures from 1880 to 2000.
Figure 36 Historical evolution of high-rise buildings
After 1980's, varieties of styles were observed. The style of skyscrapers built at present are available to observe all trends from the most rigid rationalism to Post-modernism.

2.3. Factors Causing the Need for High-rise Buildings

Increase of Population Density and Demand for Urban Land

A main reason for deciding of high-rise building projects is often urbanization itself. According to many who have decision making power, high-rise buildings will provide more habitable space on less total land and overcome the threat of urban sprawl.

Both in advanced or in developing countries, high-rise living has been made necessary by the increasing population pressure, steady reduction of dwelling space and the intensification of building used due to the rising cost of construction.

If urbanization is considered inevitable, it is not necessarily inevitable that it must be accomplished with high-rise buildings. High-rise buildings have a role to play in limiting the spread of urban areas. But the consensus should be that: High-rise buildings should not be arbitrarily selected where they are not needed and where they are not applicable to the social, environmental and economic conditions.

It is clear that urban sprawl consumes valuable agricultural land and also requires a large and inefficient network of urban services. Because of them high-rise buildings are seen as the most available alternative to urban sprawl.

Social and Cultural Factors

As industrialized society becomes more strongly based on the nuclear family, the individual appears to be adapting to vertical compartmentalized living. Generally in advanced countries affluent, mobile, single young people choose to live in high-rise apartments to easy access to the city, nearby entertainment and social contacts the feeling that they were marginal. Also elderly and young singles may find themselves comfortable in high-rise apartments. It may be concluded that satisfaction of high-rise buildings is closely related to income level both for individual and society as a whole.
**Symbolism and Prestige**

Height symbolized power and prestige traditionally. Construction the biggest, the most visible and in other words, the tallest structure in the settlement became the indication of social status and a way to express power. Elevation equaled to power and status for almost every society (Mayor, M., p:31, 1990).

In some countries high-rise buildings are regarded as a symbol of growth and modernity. Many of the high-rise commercial buildings in these countries have been encouraged by government as a further symbol of development. Also religious symbolism play an important role today.

It is clear that, high-rise buildings provide the images of progress, affluence and modernization today. This is the case in the minds of urban elite, the politicians and businessmen.

**Development of Economics**

In making decision about a building project whether high-rise or low-rise, the economic factors are given great weight. These economic factors are:

1. The economics of land
2. The economics of the building form
3. The economics of municipal services
4. The economics of the local materials and labor markets

High land value causes more intensive land use with high-rise buildings. The technological level of design, the material of construction and the equipment for mechanical and other systems are costly than low-rises. Firms, which expect the largest benefits from the location, are willing to pay the highest price and thus locate in the CBD. For high-rise buildings multi-criteria approach are needed based on a reasonable method of economic comparison.
Development of Technology

The two most important technological advantages for high-rise buildings were the elevator and steel skeleton. Structural environmental and supporting systems of today’s high-rise buildings are formed and equipped with products of high technology.

Although elevators provided efficient transportation building heights did not immediately increase. This delay in high-rise construction despite an efficient transportation system was the result of other problems in building technology. Until the late 1800s, masonry type construction, which required that the weight of the structure be supported by the walls, was the common form. They were not well suited for high-rise buildings. The introduction of the steel skeleton in construction in the late 1800s was the most important in building technology. The steel skeleton supports the weight of the structure, so the walls do not become thicker as height is increased.

2.4. High-rise Building Policies in the World

The American Experience

American cities were the first to experiment with methods of high-rise controls. Because of high land values, real-estate firms insisted that zoning allow generous corridors or islands of blocks where skyscraper could be built, and towers sprang up in clusters all over America. The height of the towers created a special microclimate of high winds in winter and sizzling streets and oven-hot masonry wall in summer.

High-rise buildings constructed without having any public limitation at the end of the 19th century, have come to a position of insulting the public rights. The Equitable Building, which is 40 stories and lying over the whole plot, has been the subject of the complaint due to the fact of air and light obstruction. This occasion had caused the preparation of first zoning regulation in New York. According to that regulation, prepared in 1916, the initial item provides a definite proportion between the width of the road and the building height. The second proposed item includes the fact that the building to be shaped with respect to the sun, daylight and air conditions. Those proposals for practice had caused the setback of buildings at various levels and therefore, the formation of ziggurats of New York. (Figure 37, 38, 39)
Figure 37 Impact of regulation on building shaping in USA
Source: Eren, Ç.D., 1996, p:77

Figure 38 High-rise buildings before 1916
Source: Eren, Ç.D., 1996, p:16
In 1961, the revised zoning regulation had brought the promoting zoning system in. In that system, with the rate of 20% an increase in the number of story was permitted under the condition of arranging a square with defined guideline rules. The investors were interested in that system of having additional building height right by arranging a square. Bringing the condition of the open public spaces within planning cause the increasing of the KAKS to from 15 from 17. However, the arrangement of the squares had weakened the relations of the building with into surrounding and had damaged the unity of the urban centers (figure 40, 41, 42).
In some respect the regulation in 1981 was a conversion to the zoning regulation of 1916. It can be noticed that the changes in the regulation were parallel to the development in architecture world. That new regulation has become the expression of the understanding of postmodernism. As in 1916, the decision of providing daylight and air for neighbor buildings and streets were again put into agenda with the 1981 regulation. However, it has been tried to provide a different mass control by changing the height of high-rise buildings and the setback conditions. Instead of the angle of seeing the building from the street, the sky, which is not obstructed by a building, is taken into consideration. In accordance with the daylight evaluation scheme, high-rises building providing an adequate daylight is permitted through the traditional setback
ordinance are not met. Such an evaluation of regarding daylight scheme provides new dimensions for building designs. As it is seen, the condition of the physical environment affects the determination high-rise building height (figure 43, 44).

Figure 43 New day-light curb (KAKS:15)
Source: Erell, Ç.D., 1996, p:19

Figure 44 New day-light curb (KAKS:18)
Source: Eren, Ç.D., 1996, p:19

The European Experience

European experience with high-rise buildings differs from the American experience to the extent that the public sector has played a greater role through planning. European cities differ among themselves in this, depending on the prevailing political ideology. Cities in socialist societies have engaged in more extensive forms of government planning of physical development than cities in non-socialist societies.

Future construction of high-rise buildings in Moscow will take into consideration the existing profile of the city as well as complexes of historical
importance. No high-rise buildings are planned, for example, within the boundaries of
the historic center in the immediate proximity of the Kremlin. The tallest concentrated
on the major squares on the outer side of the sadovoye Kil’tso (Garden Ring) and the
peripheral locations of seven planning zones. These centers will include administrative
and office buildings, scientific buildings, commercial and cultural buildings, hotel etc.

Other European capitals like Amsterdam, Brussels, Prague and Rome have never
permitted any new high-rise building within their historic cores. And while Copenhagen
and Vienna have allowed isolated high-rise buildings in or near the centers, they are
unlikely to do so in the future.

Greater London City Council (LCC) has proposed that land be classed in three
categories for location of high-rise buildings:

"1-Areas in which high-buildings are inappropriate-within or with a visual
relationship to famous areas of special character; within or with a visual relationship to
other areas of high environmental quality or unified design; situation in which high
buildings would spoil traditional or famous views; major high points and ridges.

2-Areas which are particularly sensitive to the impact of high buildings-areas of
visual significance such as other high points; areas of rural character; certain Thames-
side areas; areas of architectural or historic interest; other areas of metropolitan
importance.

3-Areas in which a more flexible or positive approach is possible-this pertains to
areas not covered by the other categories." (Council on High-rise buildings and Urban
Habitat, 1981, p. 269)

In comparing the European high-rise building experience with the American
experience, we should note that European cities have shown in the past greater restraint
and have been disposed toward exercising greater public control. The reason for this are
many. Of some importance is the fact that European cultures have fewer inhibitions
over questions of broad-scale planning. France, Britain, the USSR and Poland, for
example, have shown a greater willingness to experiment with strategies of urban
growth as an aspect of national policy. Population pressure, moreover, in many
European nations have not been as great; and some countries, like England, have
recently moved into a zero-growth stage of development.

Depending on the prevailing political ideology, the public sector exercises a
more pervasive form of planning control over high-rise buildings development than
what can be found in American cities.

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Values of historic preservation have significantly limited high-rise building development in the central core of major European cities. Both the public and private sectors have shown a greater sensitivity to issues of high-rise buildings externalities, particularly on questions of topographical, aesthetic and skyline effects.

**The Developing Nations**

Although it is a relatively new phenomenon among the developing countries of the world, high-rise development is proceeding at an increasing rate in major cities. This can be attributed to the spectacular pace of urbanization that is taking place in Africa and Asia.

The phenomenal growth of the urban population is explained in part by demographic factors such as changes in the birth rate and rural to urban migration in developing nations. A prominent feature of the urbanization process in these nations is the uneven distribution of the urban population among different regions, and particularly among cities of different population sizes.

An important consequence of the urban growth patterns in developing nations is that it requires an enormous expansion of physical space. Extensions of boundaries have taken place in all principal cities. Where there is no formal extension of the city limits, which is usually the case, expansion of urban physical space has nevertheless been taking place.

Urban land-use planning in all these countries is poor organization and administration. Municipalities do not have extraterritorial powers to curb haphazard development outside the city limits. Municipal governments in these countries are usually extremely weak institutions.

Another related organizational problem is the lack of coordination between economic and physical planning. A recent survey shows that land-use planning is being carried out in virtual isolation from national economic development planning. The consequences of this sectoral approach are as follows:

1-The locational and spatial dimension of the economic plans or programs are not being taken into consideration

2-National plans do not, generally speaking, provide any guidance on urbanization and urban development policies.
3-Little or no provision is made for urban development programs.

"Key aspects of high-rise building development in the developing nations are:
- High-rise development has not kept pace with the needs of housing and commerce generated by rapid urbanization and rising land values.
- The disordered nature of urban planning and generally inadequate supporting services are significant constraints on high-rise construction.
- The private sector generally lacks both the resources and the necessary incentives to play a role in high-rise development comparable to American and European cities." (Council on High-rise buildings and Urban Habitat, 1981, p. 272)
CHAPTER 3

URBAN SPACE SHAPING AND HIGH-RISE BUILDINGS

Efforts are seen in the West for the integration of high-rise buildings into the urban space, which may create problems in the continuation and wholeness of the urban life. In addition to the precautions about the functions such as mixed usage, it became inevitable to take other precautions about the space formations.

The most important factor in the formation of the space is the form and composition of the mass blocks. Within this context, first the main sections of high-rise buildings are examined. Secondly, high-rise buildings’ alternative typologies from simple to complex forms, thirdly their importance in the formation of the urban space are studied. Finally, the factors, which influence the formation of the urban space, are determined.

3.1. The Main Sections of High-rise Buildings

In the following, the three main sections -base, body, roof- of the high-rise buildings are discussed vertically:

Base

The building’s base is the part, which is seen from street level. Depending on the depth of open space in front of the building, the base usually rises to a height of five to eight stories. Interfacing with the urban setting, base is a crucial determinant of the high-rise building’s quality. Base defines the street wall and urban texture, and generally contains the building’s public-oriented uses. Base has significant impact on the scale and definition of the street.
Body

This section extends from the building’s base upward. It is the prominent form signifier of a high-rise building. Body, is potentially detrimental for the reason that it covers a major portion of the sky dome, and it alters the patterns of air movements. The negative consequence of air patterns must be considered in the designing. This section of the building is formed through a careful analysis of the site, the context and the environmental conditions of the building site.

Top

Top, generally has a reduced footprint compared to its mid-section. It rarely affects the environmental conditions. Its architectural significance lies in the formal transformation from the mid-section and its delineated silhouette upon the sky. Top accentuates the building’s own identity. It is ideally formed by formal influences of both the lower section, the mid-section and skyline.

The key for generating architectural coherence from these three sections lies in the morphological transformations from one to another. The geometric cues must be drawn from what already exist, the context, and the urban environmental condition.

3.2. Typologies of High-rise Buildings

It’s well know that the functions of the buildings, buildings materials and technologies, architectural styles of the period, the wishes of the clients, effect the shape and dimension of the buildings, which are the artificial components of the surroundings created by human beings. The buildings can add different meanings to themselves and the site they are built in and reflect the different powers in the public and the public life to the space. The temples and towers which symbolizes the power of Gods, the monuments and memorial buildings which symbolizes the power of the administration, the castles symbolizing the power of defense, high-rise buildings proving the power of economical development and technological development can be evaluated in this point of view.
Parallel to the variety of the shapes of the high-rise buildings, the conceptions used also have different varieties. Some examples related to these concepts can be ordered as below:

- **Skyprickers**: skypagoda, skypin, skycolumn, skytower
- **Skyscraper**: skynife, skywedge, skymirror, skycutter, skycratcher, skyberg
- **Skycities**: Skytemples, skysquatters, skycrowns, skytubes, skyblobs (Jencks, C., 1980, p:14)

A basic typology must be appropriated to add a meaning and logic to the heterotology of high-rise buildings. This kind of classification is made related to the evolutonal procedure is below:

1- **The pre-skyscraper phase (1849-70)**: When the essential elements are present but not assembled into one building.

2- **The early phase (1868-70)**: When the basic four elements are present (elevator, structure, sufficient height, and business function) but older compositional features are used.

3- **The flat-roofed phase (1878-1920)**: With free and composed groupings of stories

4- **The tripartite phase of the column building (1980-present)**

5- **The tower phase (1888-95)** made up of isolated (1888) and mounted (1911, but actually before) and setback (from the zoning codes of 1916 to the present)

6- **The setback phase dictated by zoning codes (1916 to the present)**

7- **The multiblock phase dating from the Rockefeller Center (1930-present)** (Jencks, C., 1980, p: 11-12)

But this typological classification may not be sufficient because of the unsimple, complex forms of the high-rise buildings.

Apart from this, there are three fundamental plan types:

1- **Centralized form**: The circulation core is at the center. The obelisk central typed, is developed from tower and pyramid and started to be used as defense tower. The skypins, skypapodas are the samples of this group.

2- **Longitudinal form**: The circulation core is outside the center and sometimes near to the edge. The longitudinal building are shaped horizontally. These have been plans with I, L, T, U, E and L shapes. The problem with these shapes is that they cut down exterior views and light.
3-Compound form: The compound forms have several circulation points located variably. Compound high buildings or the skycities are the third main group and still keeps its popularity since the Rockefeller Center of the nineteen thirties. The San Gimiguamo with its 72 towers, in 14th century, might be accepted as a sample earlier historical example to the multiple block solutions (Zeren, N. - Özoys, A., - Esin, N., 1989, p: 63-65).

Buildings as much as their functions can give various meanings to themselves and to their environment in which they were located by their shapes and dimensions. When we consider the alternatives of mass shaping of high-rise buildings from simple to complex forms, typologies of them may be classified as follows:

**The Single Building**

![Diagram of The Single Building]

**The Twin Towers**

![Diagram of The Twin Towers]

**The Multiblock**

![Diagram of The Multiblock]
The Separated Mass Composition

The Slablike Mass

The Gate Mass

The Atrium
3.3. Analysis of High-Rise Buildings in Shaping Urban Space

**Urban Space Concept**

Space as being a territory, which borders and defines the lives of people, is in direct relation with the concept of form. As a result it is an absolute necessity to bring distinctness to the concepts of space and urban space and also necessary to determine the basic starting points of shaping the pattern of the urban spaces in this way.

Space and its characteristics were usually the main issues in the arguments done in philosophy, science and various other disciplines. Space, at urban level, was studied deeply by many different analytical methods. However, it was not possible to form a frame, which covers logical space wholly determined.

One of these analyses and also the most important one are Norber - Schulz's analysis. According to this study, space is not a simple geometric concept but is closely related with human beings, environment and their interrelations. This analysis involves below listed space types:

- Geography or country level
- Landscape
- Urban
- Street level
- House level

This structure indicates to a scale change from macro to micro scale and that space gets closer to human scale, gradually.

Urban space, in its real meaning, is defined by buildings but do not include the buildings. Ashihara classifies these binds of spaces as exterior spaces and calls them as an unroofed architecture. In planing discipline the term exterior space is also used to define the urban outer - space. Definition mode by Francis, on the other hand, defines open - spaces as the spaces that were designed and formed for various activities and facilities and which give service to public.

The characteristics of successful urban spaces can be grouped in three groups:

1. Three - dimensional frame: enclosure, determined by border elements, size, ratio, transparency, openings, and surface decoration.
2. Two-dimensional frame: formation of ground level and mullet-piece design

3. Location of the subjects within the space: trees, sculptors, water elements, street furniture, etc.

Urban spaces can be examined in two groups about the concept of enclosure: positive spaces (space) and negative spaces (anti-space). Negative space is the volume, which is left over from the construction of the buildings, and without any definite shape (figure 45). Positive space is the space that has definite and proper form (figure 46).

![Figure 45 Negative space (anti-space)](source: Çakmaklı, D.,1995, P:12)  
![Figure 46 Positive space (space)](source: Çakmaklı, D.,1995, p:12)

The main difference between these two spaces is their functions. In this manner, people use positive spaces and they feel comfortable within these kinds of spaces. Negative spaces, on the other hand, are the ones, where people feel uncomfortable and they do not use these spaces.

In the formation of the urban space patterns, three-dimensional frame constitutes the most important group. In this context urban spaces should involve two main identities:

1. The space should give the sense of enclosure

2. Dimensions of the urban space should be in harmony with the activities and facilities, which would take place.

**Analysis of High-Rise Buildings in Shaping Urban Space**

As high-rise buildings have progressed from single entities to large complexes, the space around and between them has become an intrinsic part of the design problem. Where zoning restricts high-rise buildings to a percentages of the site, as in New York City, the resulting plaza and its relation to the surrounding buildings and the street
becomes important not only to the building, but the city as a whole. In the recent past, several buildings, called complexes, separated by paved plazas, open and closed walkways and malls, attempt to enclose exterior space within the development complex. (Council on Tall Buildings and Urban Habitat, 1981, p: 387)

Recently, we have been seen lots of high-rise buildings, which are unsuccessful examples of disintegration in urban space. Its negative effect on high-rise buildings is the low percentages of capacity of floors or offices. Construction common public spaces, which form a bridge between urban space and function spaces of high-rise buildings, are really necessary and useful to fulfill individuals’ psychological needs.

There should be a hierarchical transformation from the high-rise building spaces in micro scale to urban scale. From the point view of human-environment relationship, it is positive that these transformations are formed in a hierarchical and consecutive way rather than sudden changes. The existence of secondary spaces that have smaller scale compared to urban spaces is also good in terms of human-human relationships. Surely, providing social activities to this kind of spaces are necessary in order to make them survive.

When we examine high-rise buildings from the point view of forming urban space, four classifications can be done. These are:

1. The high rise buildings that cannot create public space either inside or outside the building

   The point blocks have negative influences on the formation of the urban spaces. While these buildings function and use the urban spaces they not have contribution to the urban spaces. These are single blocks that have high KAKS and TAKS ratio. Generally, examples of them may be seen in open market and marine cities of Far East. They are the blocks that are constructed at the edge of land borders because of high rate rent. Single towers and other constructions built up on platform are also included in this group. These kinds of buildings don’t include a front public space and are surrounded by uncontrolled and disintegrated spaces with high-rise buildings most of the time. This group mostly is of point block which cannot form any special installation and which is constructed in a single city block (figure 47). (Şener Ş, Kahvecioğlu H, 1991)
• The high-rise buildings forming an outer public space with the shaping of the high building in three dimensions and in cross section (figure 49).

![Figure 49](source: Şener, Ş.-Kahvecioğlu, H., 1990, p: 215)

• The high-rise building contributing to forming public spaces with its lower foot parts and the high building parts (figure 50).

![Figure 50](source: Şener, Ş.-Kahvecioğlu, H., 1990, p: 216)

3. The high-rise buildings forming the public transition spaces inside

• Atrium solutions and forming interior spaces
• Forming public usage areas both on floors and between floors
• Forming atrium and between floors public usage areas together (figure 51)

![Figure 51](image)


4. Solutions that seek both outer and inner public spaces formation (figure 52)

![Figure 52](image)


When high-rise buildings which are classified in terms of mass compositions are considered at length according to their formation of public space alternatives; the followings can be found:

It is observed that there is a direct relationship between the public space and mass pieces when public space is formed.

Separation the plan into pieces is not enough when a richness and alternative is to be created in public spaces forming high-rise buildings, also three dimensional movements and mass compositions of high-rise buildings are important.

The decisions about the construction of the high-rise buildings, brings great responsibilities to its designers; due to the relationship of the building with the city and
how it effects the city life. When examined according to the relations with surrounding, with the direction from the one building to building groups, it is observed that the design solutions should involve the common used open, semi-open and closed spaces.

3.4. Factors Affecting the Shaping of Urban Space

The formation conditions of urban spaces, which are created by high-rise buildings, are affected by below factors:

1. Location

   Character of the city

   History, architecture and urbanization create identity of a city. In cities having historical and aesthetic identity when taking planning decisions, historical formation, natural sources, silhouette must be considered in the light of visual perception principles.

   Existing buildings, their location, ecological balances, historical features and morphologies of the cities affect the location of the high-rise buildings. Harmony between high-rise buildings and the identity of the city can be possible only in the light of characters of the city.

   High-rise buildings must not be planned and designed without any consideration of existing city as if they are to be construction on an empty land. In order to prevent such a thing in the areas where the architectural characteristics gain importance of high-rise buildings.

   The high-rise buildings, which are insensitively located, may create visual pollution in the urban environment. However, this aspect can be turn to a good advantages if location and designing of high-rise buildings are made in such a way to enhance or improve the city’s climate.

   Skyline

   In the cities which have typical historical characteristics and which have special cultural identities, the new constructions should be formed in harmony with these characteristics. Skyline is the outline of buildings or other objects seen against the sky.
It occurs as a result of history, architecture, culture and urbanism. It provides information about city and guides individuals.

High-rise buildings appear as the main element, which shape the city skyline. They may enhance the skyline positively and negatively. In order to prevent negatives, the data should be used appropriately.

Skyline do not just happen. They are the result of real forces at work in communities. Skyline are not inanimate lumps on the landscape, but the products, symptoms and symbols of past and present values and decision making. The future of skylines is not set or predetermined. It is always in someone’s hands. Urban designers, planners, architects, municipal officials, have the power to shape the urban skyline.

**Transportation**

High-rise buildings make possible a concentration of urban services and transportation with significant reductions in expended cost and energy. In central business districts, high-rise buildings may require development of a sophisticated urban transportation network, which can be beneficial for the entire urban areas.

Solution for transportation, which is the important factor for a high-rise building to survive under healthy conditions, must be found during the first investigations. Collective studies should be made regarding the extra loads the high-rise building will bring to the existing transportation system and its solutions. The design of the high-rise buildings must be done in relation with the urban fabric network. Transportation systems have to be solved before site selection.

As general principle, the high-rise buildings in the city must increasingly be part of a complex three-dimensional matrix of services, transportation, and amenities. To solve transportation problems high-rise buildings, they may require multi-layered transportation solution. In this respect, there are two techniques: the use of air rights and underground development.

**Building regulations (Lot Coverage Ratio - Floor Area Ratio)**

The purpose of building regulations is to determine the use, location, and intensity of development within the city. The legal justification of the application of the building regulation comes from the need to protect the public safety, health and welfare and in more resent years, the public interest.
Building regulations control of land use, percentage of site coverage, height, floor area ration, public or private spaces between buildings and other devices.

Knapp (1972) divided building regulation into two basic categories:

- Building regulations, concerned with the internal characteristics of structural integrity, mechanical system design, construction material and safety.
- Building regulations, concerned with the external characteristics of land use, site coverage, setbacks, height, bulk, parking and loading, signing.

Gero and Brown (1971) cite six categories for regulations, which control the form of the high-rise buildings:

- Provision for public amenity – public arcades or open spaces-
- Protection of service systems – ratio of population on a site to transport, power, waste disposal-
- Protection of esthetics – to control form and appearance of a building-
- Protection of public health – regulating daylight, sunlight and ventilation-
- Protection of public safety
- Protection of economic investment

Floor area ratios in combination with sky-exposure planes for commercial areas and open space ratios are being introduced in an attempt to achieve better planning of the high-rise buildings.

2. Users

Who needs high-rise buildings and for what uses? Syrovy who makes researches about high-rise buildings, attempts a general answer (1973): “In spite of expressive symbolic meaning of high-rise buildings their principal importance lies in the economic and civic fields. In the world of modern industrial society they represent an indispensable means of concentration of useful area for various purposes connected with the stay and activity of many people—that is their real mission...”

Growth in population and economic resource along with limited building sites and infrastructures in centralized business district have given rise to the construction of high-rise buildings in major urban centers. Clients and their representatives are desirous of solutions to their building problems that will permit them to function well in an atmosphere that enhances their working and living environment. In response to the client’s needs, the designer seeks solutions that are aesthetically pleasing and...
functionally accommodating, and which result in spaces and plans are flexible, uncluttered, and efficient.

**Single-use**

Long before the Industrial Revolution, living quarters and working or trading spaces were combined in single buildings. However, beginning in the late 19th century, new land use patterns emerged where places of employment and dwelling become separate and distinct, thereby giving rise to single-use developments in building design. Residential functions were excluded from the concentration of commercial and office functions. Although being located near the high-density core, they were not physically joined to it. This resulted in a unique building type for a specific use.

**Mixed-use**

To keep abreast with the demands of contemporary urban life created by the concentration of many functions in city cores, new ideas and solutions are being developed to provide a high quality of life commensurate with the high-density character resulting from this concentration.

As far as the central core is concerned, and specifically with regard to the high-rise building, there are a series of bright spots on the horizon, like the trend to create a much richer mix of different uses in single high-rise buildings or complexes of high-rise buildings in order to provide a more sophisticated matrix for circulation and services at the same time that they preserve and enhance certain elements of the cityscape.

The multiuse high-rise building with many amenities is now appearing on the urban scene. In such cases, commercial, office, hotel, residential, recreational and sometimes parking are included in one building, each function having its own entry and circulation. Multiuse projects have advantage of working and living within a pleasant, active and secure environment. They have thus become attractive to developers from marketing and economic points of view.
Points in favor of high-rise buildings as a form with regard to the esthetics of urban planning and architecture, as listed by Zalcik (1973) include:

- Composition of masses
- A means of breaking through the level monotony of cities
- Emphasis on certain parts of cities through effects on the skyline
- The creation points in the city
- The creation of open and semi-enclosed spaces

The high-rise building form to stop or punctuate a vista, given a meaningful location, has its own planning problems. High-rise buildings’ towerlike penetration of the public domain, vigorous proportion, solid geometry, skyline, edge and end qualities, make it a space articulator. The inevitable equi-exposure of all faces, while adding to its public visual burden, weakens opportunities for sensitive response to, and creative exploitation of, orientation (sun, wind ....), view and incident.

The size of high-rise buildings in relation to the surrounding built environment is such that their design must be a harmonious relationship of form, color and space. The perception of high-rise buildings against the sky will be easier when its light intensity is very different from that of the sky. When sky and tower have the same light intensity, it will be colors that will make distinctions between the object possible.

In design, form and profile, proportion and scale, color and texture must also be considered in terms of visual perception of high-rise buildings. If proper care is not taken, high-rise buildings can ruin an otherwise pleasing skyline or create visual barriers for urban resident looking outward from the city; they can irreparably alter the character of an historic building or area; they can overpower an otherwise delicately proportioned natural environment.
CHAPTER 4

THE ROLE OF HIGH-RISE BUILDINGS IN URBAN SPACE AND THEIR IMPACTS

High-rise buildings and their location in city have been largely unplanned. Because their placement, site planning and design have not been part of large scale planning, they have on some occasions created more problems than they have solved. It is necessary to assess the advantages and disadvantages of high-rise buildings and to define ways of improving their future characteristics. This chapter considers some of the important issues in this regard, specifically the role of high-rise buildings as shapers of urban space, their functional role, urban image thereby created and their impacts.

4.1. Functional Roles

High-rise buildings have also had an important role in meeting specific urban needs. Their functions can be summarized below:

1. Commercial

The first high-rise buildings were office buildings. First commercial high-rise buildings were built in USA, outside the USA; they have been developed in Canada, before other countries. Japan, too builds many high-rise buildings for commercial purposes. As corporations are most often their clients, it would been seen that high-rise buildings are an expression of Japan’s rapid industrialization.

Today almost all of the world’s highest buildings have been designed for commercial use. There is a surprising similarity in the form of commercial high-rise buildings in the world. The point block form has dominated commercial buildings, whereas the slab type is more common for residential buildings. Generally commercial high-rise buildings are built to be offices. They facilitate communication and agglomeration in the business world. Other commercial high-rise buildings include stores, banks and public utilities.
2. Residential

It is the second major function of high-rise buildings. It is often difficult to determine how much urban residential building is actually high-rise. Even the statistical data, which often confuse high-density with high-rise living, can be misleading.

Where, population growth must take place in limited geographic and political boundaries, such as in Singapore and Hong Kong, it becomes official governmental policy to built high-rise residential buildings. But, studies indicate there may be low-rise alternative in these cases as well.

In USA and Western Europe, the high-rise life style has less appeal. Nevertheless, some households types prefer urban high-rise living (couples without children or with grown up children and single adults). In urban areas, economics play an important role for high-rise residential building development. Because in urban areas land is costly and all people cannot afford it. And high-rise apartments may provide the only economic solution.

"Their impact on urban form is much more varied than that of the office buildings, and usually there is a profound difference in impact on the city depending upon whether it is luxury or low-income living." (Council on Tall Buildings and Urban Habitat, 1981, p. 548).

High-rise dwellings can be categorized into three groups:

1. People who truly prefer the urban high-rise life style (generally people without children).
2. People who might prefer a low-rise or single family urban dwelling but cannot afford them.
3. People who have accepted urban high-rise living because there is no alternative in their region.

Also accommodation, hotels, dormitories and hostels are special category of the residential function.

In conclusion, "The residential high-rise building offers acceptable and suitable accommodation for a certain part of the population, such as single people, couples and the smaller families. For the housing of larger families, it should only be used in exceptional circumstances: in selected sites, in central areas, if there is no other way to achieve considerable improvements in present housing conditions, and then only if" (Aregger, H., Glaus, O., 1967, p. 36).
3. Institutional

"Institutional buildings are a common part of the urban landscape, including schools, hospitals, religious edifices, museums, library, laboratory. In some instances these functions exist alone as isolated high structures." (Council on Tall Buildings and Urban Habitat, 1981, p. 549). Also they can be part of multiuse facilities.

4. Industrial

The use of high-rise buildings as warehouses, manufacturing facilities and material processing centers is rather limited. North American telephone centers the multistory factories of Hong Kong (20 or more stories) and the multistory storage buildings in Europe are some of the examples for industrial high-rise buildings.

5. Mixed Use

After decades of zoning laws, which separated the functions of living and working in the urban environment, multiple use provides spaces for residential, hotel, retail, offices or other combinations all under one roof creating total urban communities.

"The Marina Towers in Chicago was among the first to make the break through the zoning ordinance high-rise buildings in the United States" (Council on Tall Buildings and Urban Habitat, 1981, p. 10). This complex includes restaurants, shops, parking, offices and apartments.

An alternative approaches to multiple use that; the function and use are mixed not in the same building, but in the same city block. High-rise buildings and apartment buildings are neighbors on the same street. This causes variety for street life. Multiple use in high-rise buildings is not limited in USA. A single building with shops at ground level and offices or apartments above is common in many places.

One reason of this type of buildings is that different market (residential, hotel, retail, etc.) provide security against one of the markets becoming weak. Multiple use high-rise buildings are more easily rented than single use. Also multiple use provides security and variety in urban centers. One other reason of multiple use is that they provide energy conservation in heating, cooling, lighting and operation of building, and require the least amount of private and public transportation.
4.2. Skyline and Urban Form

"In the last hundred years the skyline of major cities of the industrial countries has dramatically changed, creating a new vertical scale. High-rise buildings play a strong role in these cities, in terms of both facilitating human activity and meeting challenging social and economic needs." (Council on Tall Buildings and Urban Habitat, 1981, p. 543).

The identity of the city is defined its natural characteristic, its sense of history, its architecture and landscape architecture. And skyline is one of the main components, which defines the city identity. Skyline can be defined like that it is the outline of buildings or other objects seen against the sky. The skyline occurs as a result of architecture, history and culture of urbanism. Its monumental buildings, its architecture and its own natural form characterize the skyline. Skyline provides various kinds of information. It helps individuals and guides them. By looking at a skyline we can learn which forces dominate life and what is valued in the city, who is powerful, which factors have great impact on the life. Some of city skyline can be seen in figure 53.

Figure 53 Schematic diagram of skyline (comparison is made of cities with same population; height and width are shown with relative scale - 1971)
“While the image of a city as seen silhouetted against the sky can symbolise the collective; and it may be indicative of social processes and values; the skyline also has down-to-earth utilitarian values as well. It provides various kinds of information, and in particular it provides information that aids in orientation. Skyline help individuals know where they are and how to get where they want to go. These is the landmark meaning of a skyline, when it offers conspicuous object that mark and identify localities within a city. The landmarking aspect of skylines is evident in four contexts: in relation to one’s approach to a city, in relation to one’s orientation within a city, and in relation to one’s mental images of a city.” (Attoe, W. 1981, p:43)

Attoe argues that skylines have become the chief symbol of an urban collective ... civic emblem. People view the skyline as a symbol of their city. Their region and sometimes their way of life. As Attoe points out, in some cities a single feature dominates the skyline and encapsulates the image of the city as a whole.

Coming to the role of the high-rise buildings in the city skyline, high-rise buildings appear as the main urban element that shape the city skyline. They may be the most important elements to develop dynamic city skyline. They are the image elements and their use in a sense of melodic sequence in a city skyline makes the urban context remarkable and noticeable.

High-rise buildings may positively or negatively enhance the cityscape and skyline. In the last hundred years the skyline of major cities has changed dramatically. Originally the identifiable high points of cities were religious and defense structures. These were not responses to population or land cost increases, but reflected religious aspirations or military strategy. Today spiritual and religious structures are no longer the focal point in cities. High-rise structures which are shaped by industrial and economic priorities are today’ focal points. Each city can arrive at such conclusion only after careful and detailed studies of its topography and important features. The analytical studies of the existing urban form are needed, also to lead to desirable future shape of city.

4.3. Urban Image

High-rise buildings represent many things to many people. They can stand for the architect who designed them, the developer who builds them, the corporation who
finances them, the district or neighborhood in which they are located and in some cases the city or the nation as a whole. At the national level, the tallest, newest buildings symbolize economic status, technological progress, modernity and growth. At the individual level, for those who own, live in or work in high-rise buildings, these edifices symbolize private wealth, social status and business prestige. (Ellis, W., 1989)

The urban spaces, organized human behavior, prepared an atmosphere for intellectual activities, and formed a base for symbolic expressions in communication, also create a visual quality. Identity, sense and structural system play an important role in the analysis and creation of an environmental image of these kinds of urban spaces. (Aydmli, S., 1992, p: 157).

Lynch’s easily perceived and remembered urban image, involving five important facts - roads, borders, landmarks, nodes, regions- can help the environment to be recognized as a whole. For example, Transamerica Building in the city of San Francisco perceived as a landmark with its original form and with its location, within the image of historical environment (see chapter 2, figure 21).

Moreover, the city centers, which are alive at certain hours of the day and at certain days of the week and that empty suddenly and change identities, gain new images by the construction of new high-rise buildings.

The proper urbanism of the cities Istanbul, Venice, Rome, Sienna, San Francisco, Paris in the past helped these cities to gain original identity. The images of these cities are the combination of an original tradition, reality, legend and memory. For this reason, the environmental image constituted by the symbolic buildings should not be ruined.

In some circumstances high-rise buildings can cause disruption of the image of the cities. For example, Montparnasse building at the center of Paris, IIT Buildings that changed the skyline of Brussel, Towers of Hilton at Israel, damaged the image of the cities both by their wrong location and by their shape and size. In some circumstances high-rise buildings may reduce the existing symbolic values of the cities. It is also a fault to use the high-rise buildings, which create an image as an advertisement bulletin board. Identities of these buildings should gain importance by their messages and by their visual and symbolic contributions to the urban environment (Aydmli, S., 1992, p: 158).
4.4. Impacts on Urban Environment

High-rise buildings impact the environment around them. Some of the impacts of this type of building on the urban environment are positive, while some are negative. When we say positive and negative in connection with high-rise buildings, we should not mean the structure or the architecture alone. Also we must regard their relation with city. In other words the planning of high-rise buildings must include not only structure and architecture but also include the urban aesthetics, transportation, social psychological factors, people's interest, and basic urban services. The failures among high-rise buildings are usually attributed to poor design or planning, or both of them. And failures are not considered a direct result of tallness itself. Analysis shows that high-rise buildings in fact may have positive characteristics.

Impacts on Land Values

The question of land values presents the same dilemma as the classic, *Which came first, the chicken or the egg?* Where some may argue that the accumulation of large population in small areas leads to skyrocketing land values and to the economic necessity of high-rise buildings, others can argue that a major antisocial contribution of high-rise buildings is to the spiraling up of land prices. Both viewpoints are based on the same circular phenomenon: high land value cause more intensive land use with continually higher buildings, which in turn bring land values to a still higher value, and so on. The opposite interpretations of this phenomenon begin at different points on the same circle. “Which came first, the high land value or the high-rise buildings?” become unanswerable.

In any event, high-rise buildings and high land costs do coexist, and tend to occur wherever population pressure creates a demand for space. In spite of fears on the part of many that high-rise development will adversely affect the land value of surrounding property, studies show that the price spiral always tends upward so long as comparably dense development is possible.
Impacts on Density

In certain circumstances high-rise buildings may be the only solution to urban growth. Where geographic and political boundaries absolutely limit the possibilities for horizontal growth, high-rise buildings are most often found to be the only feasible solution.

Where horizontal expansion is possible but not desirable because of precious surrounding agricultural land, or because urban sprawl itself is not desirable, higher densities may be achieved with higher buildings.

Higher construction is not necessarily equivalent to higher densities. In achieving economic population densities and preserving open land, it appears that medium-height development in the range of six to 14 stories will result in the optimum use of land, materials, and energy.

So long as uniform standards for light, open space, and other amenities are maintained, large-scale developments of very high-rise buildings do little to provide still higher urban densities. Studies in San Francisco, for example, showed that increasing high-rise development within the existing city could adversely affect plaza use and livability.

Often high-rise buildings have been justified on the precept of increasing densities, although high-rise buildings and high density, contrary to common belief, are not synonymous.

Visual and Symbolic Impacts

The public is extremely sensitive to the visual environment, according to its symbolic and aesthetic quality. Each high-rise building can be shown to disrupt the identity of their setting. And they can be seen as foreign imports, plastic, computerized, artificial, massive, in human, super urbanized. And the people behind them can be seen outsiders. The visual and symbolic impact of high-rise buildings on urban environment is negative and positive. They would remove city's architectural character and would bring new understanding on city skyline with their shape.
“High-rise buildings are among the most visible in the urban landscape, their symbolic value can be extremely powerful. While individual sentiments enter into the design of any structure, at the scale of the high-rise building, these sentiments are often magnified. Similarly, public reaction to high rises often falls clearly on either end of an emotional spectrum; people either love them or they hate them. Any analysis of high-rise buildings must take this symbolic quality into account.” (Council on Tall Buildings and Urban Habitat, 1995, p: 287).

The visual and symbolic impacts of high-rise buildings are explained in terms of factors that cause illusions according to concept of scale; shape-form qualities that have different effectiveness; and positive and negative outcomes effective in creating an environmental image:

1. The scale concept and visual illusion in high-rise buildings

“How can scale be judged? It has both objective and subjective components. From a design point of view, buildings may be out of scale because they are too tall, dwarfing pre-existing buildings into insignificance. Or they may be out of scale because they are too bulky for the block allotment in relation to other buildings.” (Conway, D., 1977, p: 87).

The sizes, which are mostly referred to in scale concept, are human scale. “Human scale implies a relation between the building and human figures. It also implies a relation with how much information the mind can process.” (Conway, D., 1977, p: 87). If a building is higher than others are or so big as to corrupt the characteristics of structural outlook of that area, it is described as out of scale. Perception of high-rise buildings with out of scale, the tendency to ignore human scale and his/her relation with natural and artificial environment effect urban life in a negative way.

The details those high-rise buildings have the material used and geometrical reflection cause the perception of out of scale buildings in acceptable scales. Above all, the concept of scale has an important role on various perceptions of visual reflections and continuity of a building with environmental values. It is possible to provide the perception of high-rise buildings in acceptable scales by creating various scales with divisions strengthening the horizontal and vertical impact or by geometrical reflections (figure54).
Scale, according to a subjective approach is the measure as realized by human. What human feels while walking past, working in or passing by buildings is important. So, high-rise buildings have been evaluated in terms of relative height, relative length and bulk impact, sense of rhythm and repetition, and also size of details:

Relative height

Hans Blumenfeld (1953) refers in one of his researches that, "maximum angle at which an object can be perceived clearly and easily is about 27 degrees, corresponding to a ratio of ½ between the size of the object and its distance from the beholder. By this criterion buildings over about three stories are out of scale on most urban streets. Above this height, street inhabitants must crane their necks." (Conway, D., 1977,p: 81-92) (figure 55).

In order to perceive higher buildings than that; human needs to raise his/her head. If this output is considered to be the criteria of control mechanism to determine the building height, it makes a base for the principle of backdrawness in accordance with height in urbanization. In some cases however, such an opposition for landmark concept could be considered positively.
Relative length and bulk impact

Large and horizontally long buildings show incongruity with small-scaled buildings without vertical section. Today, buildings are constructed according to scales, which are different from environmental criterion to make symbolic value or for prestige. However, it becomes meaningful and is considered aesthetic only if it gives a message or has continuity with the ratio of elements around. (Conway, D., 1977, p: 81-92)

Sense of rhythm and repetition

In high-rise buildings, there are a lot of similar and repetitive components like windows. These components aren’t perceived singularly. They are perceived as a texture. Mostly, human scale is lost on these kinds of buildings, which are perceived to be a huge thing. The sense of rhythm and repetition usually discontinues the monotonous view of high-rise buildings and create different scales and reduce the entire buildings into acceptable scale. (Conway, D., 1977 p: 81-92).

Size of details

In high-rise buildings, especially on groundfloors, seeing a detail which people can perceive in close distance and put relation with the building cause to perceive the buildings in human scale. In high-rise buildings, windows, irregular forms and other details may be smaller according to the building mass. It’s possible to increase perceptive impact of details by conscious composition or grouping (Conway, D., 1977, p: 81-92).

2. Shape impact of high-rise buildings

In architecture, the line -shape- that distinguished interior and exterior sites is of vital importance in terms of urban life. This borderline not only determines the characteristic of building but also effects the environmental image. That’s why the mixed heterogeneous outlook of modern cities requires new aesthetics rules.

There are many studies on visual aspect. As a result of these studies shape described as a meaningful wholeness having dynamic connections among causes tension relaxation of mankind. Visual balance, scale, contrast, geometrical features, line
effects, wholeness, continuity and proportion are known as emotional qualities causing tension and relaxation.

As we observe the variety of expressions on high-rise buildings in recent years, figural richness has increasingly been creating positive visual and symbolic impact in terms of scale and image (figure 56).

![Figure 56. The variety of expressions of high-rise buildings](image)

Source: Aydmhl, S., 1992, p: 156

When it is searched why same buildings have more affective and perpetual features, it is concluded that, when form features are easily perceivable and when the characteristic of a building and expresses importance, these qualities increases the visual impact of that building. Buildings having these characteristic features can be distinguished from other buildings easily and be perceived as a form. Ashihara (1983) studying perceptual affect of urban site explained the characteristic requirement of a single building by the concept of positive and negative site. According to this view, intensive existence of high-rise buildings and their shadows falling on others in Manhattan causes the lack of base to increase the shape affect of these buildings. But, it is possible to perceive the shape impact of some high-rise buildings like The Chrysler Building or The Empire State Building that raise by original contour line and integrate with sky (Conway, D., 1977 p: 81-92) (see chapter 2, figure 11, 12).

3. High-rise buildings creating visual image

High-rise buildings in a row should not make a boundary, which create monotonous skyline in the city. It creates negative conditions on the environment. If the high-rise buildings are used in different heights, they will create hierarchy in the skyline.
and it will not cause negative condition. The most suitable location for high-rise buildings is on monotonous flat areas in term of natural condition. Because the high-rise buildings of same height creates monotonous skyline in flat areas. Various height buildings should be preferred. (Figure 57, 58, 59)

Figure 57 Buildings of same height create monotonous skyline.

Figure 58 Monotonous flat areas and monotonous silhouettes are the suitable places for high-rise buildings.

Figure 59 it had to be avoided to create boundaries with the composition of high-rise buildings.

High-rise buildings should show true topography. In diagram A, the area is hilly, low buildings are located on hill crests and high-rise buildings on slopes. This produces a uniform skyline, which obscure true topography. In diagram B, placing high-rise buildings in valleys reduce the visual impact of hills. In diagram C, preferred approach
is seen. High-rise buildings assure views for more people. In diagram D, bulky buildings are placed on hilltops, the hills reduced to being just podiums for structures, and no longer seen like hills (figure 60) (Attoe, W. 1981)

Figure 60 Hill and bowl principle Source: Attoe, W. 1981, p: 11

High-rise buildings in a row, on the hill should not be preferred, since they destroy the visual and esthetical values of the site. In stead; on the hill, a silhouette formed by low rise building located as to create terraces might be preferred (Figure 61, 62)

Figure 61 on hilly areas; high-rise buildings out of the elevation of the hill.
In addition, high-rise buildings may reduce uniqueness of the city. Generally high-rise buildings from city to city are getting increasingly similar to each other. They are part of the trend towards homogenization of a world culture. Each additional high-rise building may tarnish the characteristic image of the city, making it less San Francisco and more like other cities. This is, of course, happening to London, Paris, Mexico, and Turkey ... just as with building prominence, measures of city uniqueness and building conformity can be developed.

High-rise building will have an impact on the cityscape and, consequently, care must be taken with its location and design. If proper care is not taken, high-rise buildings can create visual barriers or can ruin pleasing skyline. They can alter the character of an historic city or devalue neighboring historic buildings or area. And they can overpower natural environment.

**Impact on Urban Fabric**

"*Tall buildings developments can also have an impact on the existing city's urban fabric, its environmental ecology and the historical heritage of buildings and spaces. Developments should ensure that they will not jeopardize local environmental quality, existing patterns of street life and subcultures, the existing townscape and the landscape*..."* (Council on Tall Building and Urban Habitat, 1995, p: 147).
An important aspect of modern urban planning and architecture is that the areas between buildings are mostly shaped without planning. As it can be clearly observed in Modernism, sensual and functional aspects of the urban spaces are ignored and reduced to futile areas after location the buildings. Especially, high-rise buildings built by advanced techniques cause physical and functional problems of fabrics of major cities of the US and cities of developing countries including Turkey. In this part, high-rise buildings are studied in terms of impact on the quality of the urban space.

Today we face the matter of creating unifying and collecting urban spaces. What designers do to plan the city is to improve places slightly, which aren't available for public use. Buildings are considered to be objects in distance and it is neglected that they are a part of larger streets, squares and other outside areas. The urban space isn't considered as an exterior bulk, which has size and shape aspects and is connected to exterior spaces. That's why the formless anti-space and lost-space concepts occur.

Lost spaces are areas, which don't have any positive affect to its surrounding, and users and where people don't appreciate finding themselves in. They don't have certain borders and aren't defined clearly.

As high-rise buildings mostly appear in the urban spaces, the most important problem is the existence of disorganized areas between buildings. It's an undeniable fact that modernism provides a new dimension for the development of cities. On the other hand, the traditional concept of street and the integration of these spaces with daily life have disappeared. Especially as we can observe in blocks outside cities; surrounding high-rise buildings by green areas also hasn't worked. They haven't been clearly identified, positive areas. (Figure 63)

Figure 63. Vastra Frolunda, Sweden (1975)
An example 20th European development, traditional qualities of urban space have been lost. Source: Trancik, R., 1986 p: 1
The mass organization of high-rise buildings affects the quality of urban spaces too. According to the architectural tendency of recent years, high-rise buildings are designed in common types, ranking from top to ground. So there is no object slow down the vertical sight of a person on pavement height. This avoids the perception of a street space in human scale (figure 64).

Construction of front facade in a single form causes functional problems too. This type of front facade may mean that, similar activities are held in that building. So, no public facility may be run on the groundfloor. Whereas the physical and functional qualities of groundfloors are the most important impacts on quality of the urban spaces.

An another problem occurring recent year is privatization of social life in the urban spaces. Especially such as shopping centers designed in terms of big scaled and high-rise buildings, commercial arcades dividing city blocks, plazas and huge squares of hotels. These kinds of regulations may represent interesting perspectives for businessman. But they attract the density of users indoors and effect the life in the urban spaces in a negative way.

In urban spaces, the only way to protect the wholeness of street that is occupied by high-rise buildings is to build certain transition between high and low building elements. What is important is the need for two types of building in one plan; in street level, the low part, which is in relation with public, and the higher parts of city sites for private needs at the backstage.
It's possible to find out the relation between these plans and step-shaped high-rise buildings suggested by Louis Sullivan in 1891 (figure 65). Similarly, many high-rise buildings in Manhattan, New York have been step-shaped to maximize sunshine and sight angle. However, in changing architectural tendencies of our age, designers have difficulty in applying those sorts of shapes or they don’t accept.

Hancock Tower in Boston, however it looks from a distance, out of its interaction with other objects in Copley Square where it is based on, it seems to disappear on the ground by its vertical and narrow shape. So, the entrance and platform on the ground seem to be an unfunctional space (figure 66-67).

In opposition to this, Cambridge, Peabody Terrace housing site in Massachusetts reflects a certain variety in distance and represents an effective regulation on the ground level. Bodies with different heights approach big scales to human scales imaginarily and provides a street-square cover by their position in design. There has been great effort to define these streets and squares by these buildings (figure 68).
Figure 68. Peabody Terrace, Harvard University, Cambridge, Massachusetts, 1964.
The complex is also effective at ground level. Transitional levels accommodate the vertical
towers to human scale and create a network of streets and squares.
Source: Trancik, R., 1986 p:42

Impacts on Infrastructure

1. Transportation

It is necessary to control high-rise buildings in these aspects. However high-rise
buildings can be better solution of transportation problems? They can make possible a
concentration of urban services and transportation. And they can reduce cost and energy
expenditures. In developing central business districts, high-rise buildings may require
the development of urban transportation network, which can be beneficial to the entire
urban area. If high-rise buildings, indeed, generate more efficient public transportation,
they could be planned to alleviate the urban automobile traffic problems.

If careful provision is not made in urban master plan or if existing transportation
network does not allow for adequate expansion, transportation problem are generated by
high-rise buildings. We can separate the traffic problems of the high-rise buildings in 3
section:
1. Impact on the private car traffic
2. Impact on the public transportation.
3. Impact on the pedestrian traffic.
Especially at the peak hours of the day the excessive traffic may have lots of negative physical and psychological effects on citizens. In addition to the demands on construction of transportation structure may create high municipal costs.

Where a building is designed to accommodate many people careful planning of transportation pattern is required. The design of the high-rise buildings must be done in relation with the urban traffic network. Otherwise there will be congestion and blockage of corridors, streets and transportation facilities. In the planning of high-rise building the following factors should be considered:

1. External street and sidewalk effects.
2. Parking and truck dock effects.
3. Mass transit access and crowding effects.
4. Pedestrian and vehicular crosswalk effects.
5. Pedestrian and car traffic circulation effects.

To solve current transportation problems and to improve transportation services of high-rise buildings, designers have made many of new systems by using technology. The following show some systems to solve traffic problems of high-rise buildings:

"1. Metro rapid transit versus supplement to freeways
2. Increased construction of malls, plazas, transitways, and other Automobile free areas to eliminate pedestrian auto conflicts.
3. Development of grade-separated pedestrian precincts above and below street level.
4. Development of superblocks which accompany pedestrian malls.
5. Increased of peripheral parking and shuttles on a planned basis."

(Council on Tall Buildings and Urban Habitat, 1981, p. 620)

2. Sewerage and Drinking Water System

Construction of high-rise buildings would extend the sewerage and drinking water system problems. Capacity of these facilities can be inadequate for proposed high-rise buildings and this situation can cause management problems. New facilities must be done instead of existing facilities which's economic life has not finished yet. The removal cost of infrastructure system of developed regions may be high than the cost of establishing new settlements.
While examining the need for sewerage and drinking water systems, high-rise buildings are located in lower altitudes of cities. Because high-rise buildings which are built in high areas, will increase the cost of drinking water and sewerage system (Figure 69-70). Also the construction of high-rise buildings must be dealt with in a long-term master plan. The position of infrastructure plants must be considered and frequent changes of plans must be prevented.

![High-rise building](image1)

High-rise building

80 m.

30 m.

(min pressure)

80 m.

30 m.

drinking water pipe

(1)

Figure 69. Drinking water system.

Source: Samsunlu, A. 1992, p: 118

![High-rise building](image2)

High-rise building

80 m.

30 m.

drinking water pipe

(2)

In respect of pipe cost, second conditions are advantageous.

**Impacts on Climate**

High-rise buildings influence the climate around them. They can stop and change the direction of the wind or can generate uncomfortable winds, they can heat air and obstacle sunlight. "Sunlight and wind are the two of most significant natural values which must be considered. Changes of the effects of these values on high-rise buildings depend on the high-rise building form, size and the density of urban layout it takes place in." (Aregger, 1967, p.75)
An adequate understanding of climatology is essential for the creation of an appropriate urban setting that avoids long-term negative environmental effects. The present day designers of a high-rise building must face a different design problem. The concentration of high-rise buildings has created problems of microclimate. The canyon effect of high-rise buildings on both sides of narrow streets can retard air movement and the diffusion of pollutants; juxtaposition of buildings coupled with prevailing winds and other climatic factors can transform once quiet localities into areas of severe wind turbulence; and the shadows cast by buildings can be detrimental to neighboring buildings and open areas." (Council on High-rise buildings and Urban Habitat, 1981, p. 428)

"When the surface of the terrain is altered, climate will be altered as well. Even an isolated building can perceptibly alter the climate around it (figure 71). The interactions between individual buildings, the site climate, and the urban climate are shown diagrammatically in figure 72." (S., Sham, 1986, p. 67)

Figure 71. Showing how an isolated building can alter the surrounding climate.
Source: Sani, S., 1986, p. 66

Figure 72. Interaction between building site climate and urban climate
Source: Sani, S., 1986, p. 66

- High-rise buildings, which are taller than surrounding buildings importantly, are exposed to high rate load and wind effect is more efficient at pedestrian level.
• High-rise buildings, which have same highness with surrounding building, may be protected from wind effect. More homogen wind is seen at the pedestrian level.

A high-rise building diagram which spread wind effect to base.

• Open gates at the entrance floors of high-rise buildings increase the wind speed but constitute new wind tunnel.

• The second building which is located a high-rise building protect wind load effect from wind effect on the building facade and pedestrian level.
• Multi surfacely building type may provide to decrease of the wind level on the pedestrian level and on the impact of local pressure on the facade.

• While wind effect is reduced on the pedestrian level and carrier system, it spreads the pressure building surface coverlet, at the circle shaped buildings.

• Setback entrance provides less wind effect around the entrance.

• The high-rise buildings, which have entrance at the corner, may increase wind effect.
• At the high-rise buildings which rise on the platform, the wind effect is seen on the platform not the floor.

In conclusion the physical structure of the city must be in harmony with the natural character of it. High-rise buildings should be located to be related with the nature. The sun and wind should be taken into consideration.

**Shading Effects on Adjacent Buildings and Spaces**

High-rise buildings can produce a considerable shadow depending its shape, orientation and location. During the daytime, shadow may cause unhealthy condition for the people. High-rise buildings cut off sunlight and fresh air from the street level and from the lower floor of adjoining buildings. Thus they may damage the normal beneficial effect of these natural condition. The pleasant plazas and green areas around the high-rise buildings are rarely occupied when shaded.

The shadow analysis of high-rise buildings on the immediate vicinity must be made before planning and design. The shadows cast by different building shapes are shown in figure 73, it can be clearly shown that, a high-rise building of tower type will produce the least minimum shadow condition.

![Figure 73. Shadows cast by different building shapes.](source)

Figure 74 shows the importance of knowledge of site topography in predicting shading. If it is necessary to locate the far end of a shadow, the slope of the ground must be known.

High-rise buildings can cut sunlight and fresh air. And they may damage the normal beneficial effect of natural condition. So they cause unhealthy conditions for the people. High-rise buildings grouped together can cut of day light of each other.

High-rise building can produce a considerable shadow, depending upon its shape, orientation and location. At higher latitudes shadow may cover and adjacent site throughout the year. In the canyon type development of CBD permanent shadow exist. These make the streetscape dull, cool and unpleasant. Small parks are often in permanent shadow in the winter months. Either the designers or the local authorities must take the initiative to assure an adequate of sunlight on adjacent buildings and open spaces. But, in some places, which have a hot or dry climate, the contrast case may be meaningful

Shadow pattern should be produced before high-rise building projects. The designers of high-rise buildings or the local authorities must take initiative to assure an adequate amount of sunlight on adjacent buildings and open spaces.

**Acoustic Effect**

If there is a direct path of sound from the source to the receiver and there are buildings on both sides of the street, there will be a reverberant sound field (due to the large number of reflected paths) as well as a direct sound field. The reverberant field
should assure that the sound level at the receiver would be higher than without the buildings presents, except where the street is wide or where there are large open areas between the buildings.

Building are also generators of noise. Air-conditioned buildings require cooling towers, fans, and inlet and outlet grilles, all of which generate noise. These noise source are unlikely to be a problem at street level during the day, but may well be sources of annoyance at night, especially in nearby residential information here other than:

1-Consider the problem of noise from mechanical services affecting nearby Residents.
2-Where possible, locate noise sources where they will not be in a direct line of sight of nearby residents.

Where an accurate assessment of noise levels is required, a model of the building and its surrounding area can be tested provided the characteristics of the major noise source are known.

Generally, it can be concluded that buildings are beneficial in attenuating sound levels in urban areas where sound levels can be conservatively calculated using free propagation analysis in most cases. In high-rise canyons, the noise levels can be reduced by sound absorption, for example by vegetation for high frequencies and glass for low frequencies, and sound scattering, for example by mullions, recessed windows, etc.

Social and Psychological Impacts

High-rise buildings are sometimes accused of being dehumanizing. Because they may create compartmentalized living and working spaces. It is argued that high-rise buildings psychologically and sociologically are not good living environments. High-rise buildings may lead to a feeling of loneliness, isolation and may cause mental illness among users.

Residential high-rise buildings are potential slums when the basic requirements of space, sunshine, light and privacy are neglected. Satisfaction with high-rise buildings for residence is generally related income level, both of the person and society as a whole. According to the researches, high-rise buildings have great negative impact on children. The children who live in high-rise buildings are deprived of contact with nature. Families with may children generally feel that high-rise living present serious
disadvantages. "The consensus of studies is that high-rise living is psychologically most appropriate for single people and childless couples." (Council on High-rise buildings and Urban Habitat, 1981, p.36)

Some works have been made to show relationship between crime rates and building heights. The relationship may be truly related to density. Crime and vandalism are potential dangers particularly in lower income projects and in the nondefensible common spaces of any high-rise buildings. The main target public or communal areas are entrance lobbies, elevators, stairways, landscaped areas, lights and windows. "Actually vandalism and crime are not caused by high-rise buildings but current design appears to facilitate their occurrence." (Council on High-rise buildings and Urban Habitat, 1981, p.49)

For example in Pruitt-Igoe housing project in St. Louis each of 11 story buildings was designed with public galleries. These galleries were intended to provide residents for playing and interaction areas. But residents did not use those areas. They became the targets of vandalism. Because these spaces on fourth, seventh and tenth floors of every building are isolated from dwelling units. Residents perceived these spaces as public areas and they didn't take these spaces under their control and considered them unsafe. Yancey (1972) suggested that architectural design was an important factor in deterioration of the complex and the rise of crime with in. The Pruitt Igoe housing complex was demolished in 1973 after the 16 years of construction.

High-rise buildings may limit the visual perception. In corridor like spaces caused by high-rise buildings the feeling of claustrophobia may emerge. Also high-rise buildings may cause unsocial environment. Because high-rise buildings, which are used only for office, function create high population differences between the worktime hours and out of worktime hours. The mixed uses should be proposed to prevent this problem.

"Newman (1973) has suggested that the incidence of crime and vandalism in high-rise buildings could be reduced by designing semi-private defensible spaces, instead of public spaces which no residents lay territorial claim." (Council on High-rise buildings and Urban Habitat, 1981, p.84)"In planning a high-rise building complex, care must be taken the project does not" "turn its back " on the surrounding area and, in an attempt to create its own environment, become on unfriendly urban neighbour" (Council on High-rise buildings and Urban Habitat, 1981, p.57)

In conclusion, the planning and designing of high-rise buildings should be encouraged social interaction among people. Only with the proper planning, suitable
balance should be provided between the lowrise and high-rise buildings, the green areas and plazas between buildings should be always alive. If these are provided, psychological and sociological pressure of high-rise buildings over the people may be prevented.
CHAPTER 5

PROPOSED URBAN PLANNING AND URBAN DESIGN
CRITERIA FOR HIGH-RISE BUILDINGS

A collective study of various disciplines is required for the formation of high-rise buildings. As a result of these collective studies it is aimed to constitute the plans of high-rise buildings accordingly with some basic principles and the end product should provide maximum benefit for people.

Beyond solving architectural, statical, electrical and mechanical problems, it is essential to take healthy urban decisions in order to reach the goal. These buildings should be considered with its environs as well as only by itself. In this section the main building criteria of high-rise buildings were explained from urban planning to urban design.

5.1. Site Selection (Preliminary Research)

Many factors play an important role in the site selection of high-rise buildings, which could not be built on any ordinary plot. There are some issues which influence the site selection of high-rise buildings such as the characteristics of the settlements, the required activities and facilities of the cities, human resources, energy resources, investments, patterns and silhouettes of the cities and transportation. A very broad research should be made at the site, where a high-rise building was planned to be built. The areas where high-rise buildings are prohibited, where they should be built under certain conditions and where they are encouraged to be built should be determined and their site location criteria should be prepared.

Analyses are required from macro urban plans to micro arrangements of close - environment for site selection decisions of high-rise buildings. In these analyses:

- Floor area ratio
- Total floor area ratio
- Relations between open and close spaces
- Usage density at daytime and nighttime.
- Infrastructure, should be considered
Factors, which influence the site-selection, are:
- Environmental factors
- Economic factors
- Density
- Silhouette-perception
- Infrastructure and transportation

**Environmental Factors**

Situations of adjacent buildings, their location, typical characteristics, ecological balances, patterns of the historical parts, morphologies of the cities, historical values and green areas affect the site-selection of high-rise buildings. It is true that some parts of some cities and whole of other cities may be in conflict with high-rise buildings. The structures of the cities during ages, architectural and historical characteristics form the identity of the cities. Harmony between high-rise buildings and the identity of city can be possible only in the light of historical data, natural data, silhouette data and perception principles. For example, the characteristic pattern of the city of Venice is so, that, a high-rise building of the city center cannot be accepted.

In most of the historical center of the cities, construction high-rise buildings can be only made under certain conditions and are limited. In the whole city of Amsterdam and Helsinki and after 1960s in Bruxel, Copenhagen, Paris, Prague, Rome and Vienna it was prohibited to construct high-rise buildings at the historical city core. In Paris within La Defense zone, which was formed at the outer skirt of the city previously, construction of high-rise buildings was permitted. Here, no limits to the height of the buildings were put, however, the principles of density changed through-time. La Defense zone, where high-rise buildings are in majority, is distant from the historical city core (figure 75-76). In London, a council was formed in order to control the high-rise buildings. This council named as London City Council (LCC); put the principles and regulations for high-rise buildings, which would be constructed in London and also control whether these regulations were put into practice.
In the city of Washington DC, it was forbidden to construct a building higher than the dome of the Capital. This prohibition was put in 1910. In Munich, after 1970, it was not permitted to construct a building higher than the existing height within the area which has diameter of 4 km and which put Frauenkirche Church at the center. And in
Rome it was forbidden to construct high-rise buildings at the historical city core and as a second city center Eur was constructed.

Morphologies of cities are also effective on the site selection of high-rise buildings. It is unavoidable that sloping lands form areas that have various characteristics for high-rise buildings. The lower elevations of the sloping lands are not appropriate for high-rise buildings. The construction of high-rise buildings at lower elevations obstructs the view of the rear buildings. Lowest buildings at the lower parts and higher ones at the higher parts of the area form a very powerful silhouette.

**Economical Factors**

Decrease in the amount of urban land and increases in land prices are two of the most important factors in the emergence of high-rise buildings in urban areas. At the same time, just the opposite of this can be valid, too. A new function, permission of construction, accessibility possibilities, high floor area ratio will cause an increase in land prices. Areas having these kinds of possibilities of course will be the subjects of preference for high-rise construction.

**Density**

When the subject of constructing high-rise buildings become a current issue, to provide people with possibilities in a limited area, the decisions given about cities should not be on the contrary with public benefit.

If high-rise buildings are not constructed for the purpose of increasing the density of the area, it can be concluded that they would be more useful to their environment. However, at some circumstances a specific density is needed at the city center and high-rise buildings can provide this. In this condition, especially demanded at the city center, a special attention should be payed to develop policies and unwanted results should be eliminated.

In order to control the densities in the cities, factors such as:
- the balance between high and low buildings should be planned well
- calculations of sun movements and shades should be done
- traffic flow should be considered controlled, too.
Silhouette - Perception

In the cities which have typical historical characteristics and which have special cultural identities, the new constructions should be formed in harmony with these characteristics.

In order to prevent a monotonous silhouette the data should be evaluated well and the heights should be used appropriately. The changes in the social and economic characteristics of the societies are reflected on the outer appearance of the cities that they live in. The important point is not to lose the existing values when creating new values for the future.

A complicated silhouette researches should be done for high-rise buildings at the cities which have certain urban characteristic richness. If high-rise buildings will be permitted, their appearance at the city center and their effects on the city’s silhouette should be studied beforehand.

Infrastructure and Transportation

The problem of infrastructure and transportation, which should be considered at the stage of site selection, may be an answer to where the high-rise buildings should be located. If high-rise buildings are located at the areas where the solution of these problems are impossible or limited, this fact may have many negative impacts, both on the building itself and on its environs. During site-selection process, the existing transportation network should be studied, too and it should be determined whether the extra traffic and infrastructure load can be reduced.

5.2. Strategic Plans

One mechanism to control high-rise building development, to direct intensification of development, and to encourage the city’s overall urban design policies to be used by some city planners should be a strategic plan. The strategic plans define:

- Planning policies that should govern the exercise of power
- Principles of environmental management
• Emphasizing the relationship between the city’s urban activities and their integration with its support systems.

More important, they specify the practical actions needed to influence events in the city in the direction that city planners and the public want them to go. They fill the gaps that a two-dimensional land-use plan might have left out, by providing a set of ideas, strategies, and objectives for the future of the urban area.

The strategic plan can justify measures that limit the extent of development and ensure that new buildings are broadly compatible with the surrounding land use and circulation system. Common planning tools are control are land use, outline of zoning plans, development controls, percentage of site coverage, height control, floor area ratios, building volume and permissible envelope, required linkages, controls of spaces between buildings, bonuses for particular contributions, and other devices such as the use of transferable floor - space ratios.

These plans may also attempt to regulate the following criteria:
1- Loss of sunlight, light and air by large, closely spaced towers placed right up against sidewalk property lines.
2- Loss of historic buildings and districts with the rapid proliferation of new construction
3- Increased congestion on local streets and increased commuter problems
4- High-rise building massing
5- Strict sun and shadow control, in particular projected shadows over important public or private open space

5.3. Urban Form and Skyline

All new buildings in a city have an impact on the city’s form and its system. However, the high-rise buildings, by its sheer intensity, demand a different set of consideration. Powerful planning tools must be used to shape the height and form of high-rise buildings, which shape the city form and skyline.

The appropriate shape of high-rise buildings as they fit into and, in turn, shape the urban forms is also influenced by topographic conditions. In a city of rolling hills buildings such as a large slab-shaped high-rise structures which generates strong horizontal lines seen as antithetical to the nature cityscape (figure 77).
Hills not only influence the kind of building forms, which are desirable, they have impact on where high-rise buildings should or should not be placed. A large high-rise building built at the base of a hill not only will block views from the hill but also will detract from the hill’s presence and form. The same building placed on top of the hill enhances the hill form and retains existing views. The horizontal forms could be a desirable design objective in a flatland city.

Figure 77 A slab high-rise buildings blocks much more view than a similar sized tower with a square footprint Source: Jaszewski, A - Hedman, R., 1984, p: 108

**Height Control**

Should high-rise building height be regulated? Some observers speculate that the super high buildings would exist more for prestige than for economic reason. Limitations to height seem to be more a factor of building’s services, life safety systems and social acceptance rather than its structure. Proposals for side-mounded helipads, refugezone sky lobbies, spiraling monorail movement systems, exterior wall crawlers and automatic window cleaning are some of the possible devices for the superhigh buildings.

Some economists might contend that the city’s expansion is a sign of a healthy economy and that the expanding city shall likely attract international investments.
Another view is that the city is in constant flux and can never be in a static ideal state; it has to constantly adapt and respond to countless interest groups.

Generally, height limitations to high-rise building development in the city tend to be depending upon its infrastructure systems' thresholds, changing external conditions to the city and its market forces. Height limits can cause problems under some circumstances. When high-rise project after project presses against the height limit the resulting benching can be visually damaging in some settings. When benching is not desired, it can be minimized or eliminated simply and directly by avoiding extended horizontal height districts and creating many small and varied districts.

An approach is treating height district boundaries like counter lines, with height graduates between the elevations represented by the lines (figure 78). Drawing the height contour lines can be difficult in complicated situations and substantially the same effect can be achieved through the selective application of transitional zones to standard height districts, which eliminates many mapping problems. The transitional zones define a tapered height zone eliminating the abrupt step between one district and another except where desired for design reasons (figure 79). Point envelope defines a volume by elevations set at each street intersection. Connecting scaled lines which extend vertically from these points defines the envelope in terms of triangular or rectangular planes inclined at various angles(fig.80). To determine exactly how high a developer could go on a given site would entail a bit of detail work that could be a problem if all potential sites were not calculated in advanced via an axonometric construct.

Figure 78 Building height contours would delineate a potential volume the same way land contours describe a hill. At any point, permitted building height would be proportional to the distance between contour lines.

Source: Jaszewski, A - Hedman, R., 1984, p.115
Figure 79 Transitional height zones work in a similar manner as contours but can be applied selectively to standard height districts.

Figure 80 Point net envelop
Source: Jaszewski, A - Hedman, R., 1984, p:115

Another height control method is the using standard height districts. Figure 81 shows height control districts in San Francisco.
Heights limits are the primary but not the only means for controlling height. Bulk controls and floor area also influence height.

**Bulk Control**

A building, which is many times the width of neighboring buildings, may present difficult design problem. As the height of the wide building increases above that of its neighbors, the nature of the design problem quickly changes. Articulating the facade is no longer enough to ameliorate the clash in scale. Substantial changes in the mass of the building itself are required to reduce the overwhelming bulk and achieve an agreeable contextual.
The elevation at which bulk begins to be an issue is relative to the prevalent height of surrounding development. Above that control point, the perception of bulk depends on the scale of surrounding buildings and, within limits the configuration of the upper part of the high-rise buildings. Bulk controls are a means for keeping the design problems within the range of available design solutions.

High-rise bulky buildings pose serious urban design problems in any cityscape. Bulk control facilitates the improvement of wind conditions at the street level. The setbacks can reduce this effect by diverting wind flow before it reaches the street. (figure 82). Bulk controls in stepped high-rise building forms, decrease wind problem. But themselves cannot rely upon bulk control to solve such problems: wind standards and studies also must be directed toward their solutions. A bulk control is one of the approaches to solve the problems caused by high-rise buildings.

Plan Dimension

Figure 82 Plan Dimensions
The Republic Bank Center - The tiered roof form is repeated three times on the tower and once more on the ancillary base building, providing a unit of measure for comprehending the scale of the building and a basis for the individual on the ground to relate to the whole
The combination of bulk and height controls should be used to direct city form and to contribute to a distinctive style and character. Cities need not passively accept the dictates of a bland homogenized development. Bulk limits should not become rigid form construction. Dimensional restraints can prevent the worst excesses but may also impose an unwanted similarity of form. They should make the skyline more pleasing and memorable as well as provide gaps for light and air. (figure 84). Controls are needed that should lead designers to design buildings with clearly defined bases, midsections, and tops.

Figure 83 Comparison of existing and proposed bulk controls (New York zoning regulations to control bulk)

Source: Jaszewski, A - Hedman, R., 1984, p.132
5.4. Transportation & Infrastructure

The high-rise buildings also have an impact on the capacity of the city’s public utilities and services such as:

- transportation
- telephone lines and exchanges
- water supply and reticulation system
- refuse collection and disposal
- electrical supply and load shedding
- sanitary system and discharge
- postal services
Theoretically there are thresholds for each of these, beyond which these systems will not function effectively unless expanded. Solutions need to be proposed to multidimensional infrastructure problems varying from water and energy consumption caused by high-rise buildings, to waste water and garbage disposal and from excessive loading of the network to extra density in the local traffic, when constructing high-rise buildings.

The impact of the high-rise building on the city and its systems is often transportation congestion. High-rise buildings may increase or create congestion of their surrounding movement systems as well as place additional load on the city's infrastructure and utilities. High-rise building development and the city's transportation requirements are interrelated. One entity cannot be considered apart from the other. The city's land-use plan and its transportation plan must be interlinked. Changes must be properly anticipated and accommodated, or the result will be deterioration of the city's transportation systems and other services.

Serious decisions undertaken during the project stage play an important role in preventing the excessive loading of the surrounding transport network by high-rise buildings. It appears to be crucial that high-rise buildings are situated at locations with easy access to certain centers. It is equally important that improvements with the existing transport system have to be made in order to secure easy and rapid access to transport main arterials, airports, hospital and city centers.

High-rise buildings, functioning as work places, generally have negative impact on the neighborhood particularly on working days both in the mornings and the afternoons. Not only the neighborhood itself, but also people, living in these buildings is also adversely affected. The existing traffic concentrates on certain points at a period described as the peak hour traffic, causing unnecessary congestion. In order to avoid such adversities, when deciding upon the location of high-rise buildings, it is vital that these buildings are positioned in the vicinity of main transport network and that more than just one type of transportation (underground, train, bus, sea, transport etc) is available. In case of inadequate facilities, either every effort has to be made to construct the necessary infra-structure or plans to erect high-rise buildings have to be abandoned altogether.

When examining the New-York World Trade Center, it can be noticed that the surrounding transport network is resolved multidimensionally. In addition to freely flowing wide roads, simultaneously train, underground, bus and marine transport
systems, including helicopter landing facilities, help ease the mounting transport load. High-rise buildings equipped with various transport networks will eliminate congestion at a particular point or points by spreading the potential traffic load around.

The infamous Tour Montparnasse Building in Paris alleviates its transport load in a similar fashion. Parallel to the intensive bad junctions the underground stations where underground lines and fast train stems cross leads to the ground floors of this Building. Despite being in the most central and congested district of Paris, Tour Montparnasse with its helicopter ring has no adverse effect on the city transport at all. The multi-story car park contained within the building also contributes to this effect.

When focusing onto the transport problem at locations of high density construction and considering that high-rise buildings erected alone may create considerable transport load, which may require multi-layered solutions, it is obvious that existing problems will increase by many folds. It is also seen that in such locations, main arterials are formed by transport lines. Infrastructures and transportation systems have to be established planning ahead before forming such locations.

La Defense district in Paris forms a good example for this. When considering the clusters of high quantity, high-rise buildings and the fact that there is no limitation on the height of these buildings, all serving as work places, La Defense may appear to be a yarn of problems. However, the transport difficulty is solved by a very well developed infrastructure system.

The district enjoys a transport network system consisting of quadri-level roads on the vertical axis all crossing or over-passing one another underground. In addition to the underground, fast train, transit fast train and buses, La Defense district is connected to the Paris metropolitan through a wide surface road network. An additional underground road work is rapidly progressing at the present time. La Defense, having numerous transport options to Paris, includes helicopter-landing facilities as well.

When placing high-rise buildings at suitable sites, besides considering close far environment in detail and carrying out landscaping activities accordingly, it is vital that existing transport network has to be reinforced. In particular, solving the problems of infra structure and transportation in the regions of high-density urbanization, becomes the first priority.
5.5. Public Spaces

The shapes of high-rise buildings have an important effect on public spaces. Their forms on the sections and on the third dimension are also effective on the formation of public outer space. When they spread out at the ground floor and rise pointedly at the higher floors public space can constitute at the lower floors. By both spreading out at the lower floors and a with the help of a special design high-rise buildings can form an interior and exterior public spaces.

The high-rise building insertion into the city block must involve place making where the new development can provide a destination of spaces as urban rooms or as occasions for social interaction. By responding to urbanistic values, the planners should give the high-rise building some sense of civic use. Increases in urban population intensities would obviously increase the need for public spaces. This increase might be met by incorporating these spaces as noble civic spaces around or in the building itself both at the ground level and at the upper parts of the building.

Particular attention should be given to the base and lower floors of the high-rise building as these areas serve the street where as its top generally serves the skyline. The tower design must resolve how the high-rise building joins the ground to meet the street and its pedestrian life. In this regard the base must respond primarily to the conflicting demands of is immediate surroundings at the street level and secondarily to the skyline of the city.

Its base and lower floors should include retail spaces and public plazas, not merely as formal devices to set off the form of the high-rise building, but to generate activity and human scale at the street level of the building. These spaces or plazas, if they are included, could be enclosed or they could even be squares or agoras. They may also be located above the street level, although such design devices can diminish the activity on the street, where the urban experience is more appropriately positioned. There can also be some sort of atrium, retail mall, or galleria which itself may be multilevel.

For example, Shanghai Bank in Hong - Kong has a ground floor with an area of 3500m². However, on this floor only, squares and passages for public usage take place (see chapter 2 figure 30). Permission for high-rise buildings was given to the ones that reserve their ground floor for public usage by New York’s zoning regulations in 1962.
La Grande Arch at Paris La Defense almost constitutes an outer space. These solutions, that include the close surrounding areas, form an urban environment directly by themselves (see chapter 5, figure 75-76).

Urban planners and other professionals also approve the social activities that are located at the ground floors of the buildings. So, in most of, the newly constructed high-rise building interior and exterior spaces take place, which attracts people’s attention. For example, Citicorp building in New York is strongly interconnected with the urban dwellers with the help of church and an atrium designed at the entrance of the building (see chapter 2, figure 23).

There would be some that would argue that the indoor atrium is simply an indoor version of the plaza and does not show respect for the traditional urbanism of the city and that the atrium represents an extinction of the street. For instance the atrium might be regarded by some as being anti-urban because it turns the street outside in and converts the streets edge and recesses into an enclosed space. The design challenge for the designer is how to move into an atrium off the street without a total denial of the street itself.

There is another level space between buildings: the space high above ground. The advantage of tight grouping of high-rise buildings can enable to create streets in the sky. The sky lobbies can provide interest, excitement and a useful pattern. Tenants on these floors can include shops as well as offices.

5.6. Preservation Environmental Openness

The degree of the environmental openness (aero-space) deterioration caused by the construction of one or more high-rise buildings in the urban areas one of the design problems. The environmental deterioration can nearly be assessed by the amount of the loss of sky area, which is expressed by the percentage of the solid angle of the visible sky to that of the whole sky. It is called sky amount. The visible sky area means:

- the brightness of that point in the daytime
- the psychological openness
- ventilation, air pollution, the growth of plants and the fall of noise

The quantity of the visible sky area is also expressed by sky factor. It is the ratio of the projection area of visible sky to whole sky. To keep the average environment
above a certain required degree should be the most essential item in building regulation. But that alone may not be sufficient in some cases.

Some sky amount pictures taken in 1965 at several famous places in the world are shown in figure 85 to give the idea of the image of openness.

<table>
<thead>
<tr>
<th>Place</th>
<th>Cross Point</th>
<th>Light Street</th>
<th>Dark Street</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paris: front of the Opera (884)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Paris: Notre-Dame (816)</td>
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<tr>
<td>Paris: Avenue de Champs Élysées (3774)</td>
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<tr>
<td>New York: Rockefeller Center (196)</td>
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<tr>
<td>London: Piccadilly Circus (616)</td>
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<tr>
<td>Paris: Montmartre (568)</td>
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<tr>
<td>London: Oxford Street (506)</td>
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<tr>
<td>London: near St Paul's Station (158)</td>
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<tr>
<td>Florence: from the municipal office (726)</td>
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<tr>
<td>New York: Rockefeller Center (596)</td>
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<tr>
<td>Paris: front of the tour Eiffel (434)</td>
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<tr>
<td>Florence: front of the residential area (113)</td>
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<tr>
<td>New York: front of the U.S. memorial hall (204)</td>
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<tr>
<td>Florence: residential area (143)</td>
<td></td>
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<tr>
<td>New York: apartments area (348)</td>
<td></td>
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</tr>
<tr>
<td>New York: Wall Street (808)</td>
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</tbody>
</table>

Figure 85 Whole sky pictures taken in 1965

5.7. Formulating of Figure-Ground Relationship

"In this approach, the starting point for an understanding of urban form is the analysis of relationship between building mass and open space. Figure-ground relationship analysis are powerful tools for identifying the texture and patterns of the urban fabric as well as problems in its spatial order..." (Trancik, R., 1986, p: 98)

In design the high-rise building, its figure-ground relationship with its context needs to be studied. For this, the building configuration at the street elevation and the
spaces between buildings must be examined. The high-rise building’s base has to deal
directly with the city block’s urban fabric and be proportioned to the city’s horizontal
scale. Its design should pay close attention to the site coverage of the surrounding
structures. If the new high-rise building is set on a plinth, then this can physically
remove it from the street entirely, from the surrounding buildings in the same block and
from the ongoing life of the city around it. In many instances where the building stands
back from all side of its lot, it becomes disconnected from the street line and could
become disjoined from its context.

In terms of figure-ground the ground space between high-rise buildings should
not end up solely as vehicular driveways, which then could become a threat to urban
linkages by resulting in disjointed urban and the creation of island building situations.

5.8. Street life

It is clear that, the relationship between the pedestrian at the street level and the
building is important. The high-rise building should form linkages with the surrounding
buildings to reinforce the city’s urban fabric and enhance street life at its base. If these
are neglected, then high-rise building stands alone, devoid of any connections to, or
acknowledgments of, the city block of which it is a part. It then becomes like an island,
such as one in which the tower is set back from the street by a plaza or park. The
problem with such a site layout is that it rejects rather than reinforces the street life by
having the activity in the tower’s base set back too far from the sidewalk. The
pedestrian is distanced and subsequently discouraged from window shopping, from
gazing at the building’s lobby, or from visiting the small retail shops which could be
located in the tower’s base. Building setbacks from the street can separate the tower
from the sidewalk, eliminating pedestrian plaza life itself, and discouraging
communication and movement into and around the tower, particularly from the street’s
pedestrian traffic and its points into the building.

The isolated building is better geared for the automobile than for the pedestrian.
It is primarily an isolated building on an isolated plot. Many such buildings have
destroyed the existing streetscapes of many American cities by eliminating older
buildings that had once defined a hard edge on the street.
In cases where the streetscape has been irreparably altered, ill-defined or unusable spaces are opened up on the street, resulting in the street losing its intimate scale. The new high-rise buildings also have replaced those existing parts of the city where its public life had traditionally been active. Bonus provisions of many zoning ordinances, which gave additional building density in exchange for street-level plazas or open public spaces, encouraged this situation. “A zoning bonus is the right to build additional space which is given at the discretion of the city as a reward for desired urban design characteristic. For example, a 1980 report from the city of San Francisco suggest that an additional FAR (floor area ratio) of be given for excellence in architectural design and enrichment of the pedestrian environment. It suggest that the same bonus be given as incentive to provide features which prove to be bona-fide public amenities (arcades, pedestrian ways, open spaces...). Zoning bonuses are also sometimes given to buildings that include direct access to subways.” (Ford, L., 1980, p: 58-59) In retrospect it is clear that the effect of such design elements has great potential for damage to the street and the pedestrian zones of the city.

High-rise building designers also need to avoid designing fortress buildings such as those with lavish interiors, which are barricaded behind a screen of security, restricting public interaction. These buildings will only serve to create a defensive and divided city that will eventually embrace only those individuals who can afford the services offered within. On the contrary, buildings must provide the city with commercial and public spaces accessible to people at grade rather than alienating them. The interaction between the people within the base of the building and those on the street must be encouraged.

The common argument of many urban designers and planners is that the high-rise building’s base should hold the street line to avoid the separation of the tower from its urban context, and that any setting back of the building from the street edge is disrespectful to the line of buildings that mark the street and crucial definers of the city’s urban fabric. Such rigid attitudes are too limiting. If the high-rise building’s facade is placed right up to the street line and also incorporates transitional zones in the interior of its lobby, then the base of the high-rise building could relate its interior spaces to the life of the city outside.

In the case of a tower and building group set back from the edge of the street, a large covered lobby might be provided at the street’s edge with a recessed veranda way
to address the street. This can physically unify the buildings and towers rising above the street level and, thus, turn the whole complex into a unit.

High-rise buildings can also have public areas at higher levels in the building, which include green landscaping so that the park is now within the tower. Such devices should not take precedence over the street pedestrian zones. The high-rise building should always be seen in relation to its context, whether it is located as an infill building within the block or as a corner building defining intersecting streets. These issues need to be addressed so as not to diffuse or weaken the streetscape and the city grid its existing street pattern.

5.9. Micro-climatic environment

Other urban design considerations include the impact of the high-rise buildings on the microclimatic environment of the city block and its surroundings, such as the shadows that the high-rise building might cast during the major hours of solar access at the street. These shadows may significantly change the character of the area, affecting the microclimate as well as blocking out vistas. The tower may also create powerful wind downdrafts and uncomfortable eddies at its base, which would be objectionable to pedestrians. Wind tunnel tests performed during the preliminary design stages could contribute to incorporating design changes aimed at averting these effects.

Sun angles should be calculated according with the building height so that the shady area could be known beforehand. In the calculations of light, air and sun there are factors that play important roles other than building, height. They are, the distance of the building from the road, front elevation line, and back elevation line, depth and the dimensions of planning area. As a result in the form of the building some changes should be made for a positive solution.

Controls directed toward ensuring sunlight access to streets and open space are a form of height control, which can significantly affect urban form. Each method for protecting sunlight access to streets makes a unique imprint on the form and character of the street and cityscape. Examples of the basic tools for controlling sunlight access follow:
**Height Limits**

The standard building height limit is the most basic mechanism for assuring sunny streets. Either the height can be derived from the sun angle desired or the sun angle can be the by-product of a desired street wall height. This method is not well suited for differentiating between north-south and east-west streets.

**Setbacks**

Requiring a setback of a certain number of feet at a specified height, when coupled with a height limit establishes a sun angle the same as a height limit alone. This arrangement differs in two ways: the development potential can be increased while keeping the same street wall height and setback introduces a layered effect that can strengthen and inject added formality into the streetscape. The tiering of series setbacks, each progressively deeper could be used to create a special streetscape.

**Conditional Height**

Above a base by right height, obtaining additional building height is made conditional on meeting specified criteria for achieving a wide variety of objectives in addition to sunlight control. Additional height also could be tied to parking requirements, building material, color, achievement of a particular image, or design review.

**Sun Angels**

Sun angles are designed to assure sunlight to sidewalk areas or other public areas between selected hours. The angle usually starts at the opposite curb line and defines the street wall height and setbacks up to the maximum height. The angles vary with the street orientation and width.

The need for and the restrictiveness of sunlight controls for reflect local climatic conditions, the size of the city, the uses along the street and the disposition of public open spaces. A city which endures extended hot weather might actively seek cool, well shaded streets in contrast to the protectionist aims of a city with cool, windy summers.
5.10. Recreational and Play Spaces

Outdoor play spaces in high-rise residential complexes often fall victim. The end result, in spite of planned spaces, is that children who live in high-rise residential buildings just do not play outside. Some residential high-rise buildings include large communal play spaces inside. Most sociologists and parents agree that indoor play areas are no replacement for children’s playing outside.

In the research Adams and Conway (1974) have found that at very high-densities, families with children have considered children’s play facilities to be unsatisfactory. Smaller children are hardly leave apartments if not under somebody’s care for the time it takes to get to the playing area will be too long and the distance too great for parents to keep a watchful eye on their children playing.

People prefer open spaces, which they can use to formal landscaping which they can only look at. The outdoor spaces between high-rise buildings are hardly usable unless they have an improved.

5.11. Street Furniture and Landscaping

The urban landscape designs that are constituted by the common spaces created with plants, water, light and plastic elements and common recreation areas, sports activities, form positive effects on the social and cultural relations, between urban people who were in much stress.

Also the furniture makes the spaces between high-rise buildings inhabitable. They are the small-scaled elements: benches and places to sit, light fixtures, signs, drinking fountains, bollards to control traffic, bicycle holders, sculpture, cafes, benches, trees. They set the dominant quality at streets and plazas. Landscaping give people a contact with nature, soften the hard surfaces of urban structures. Trees can also be used around high-rise buildings to partially break the noise coming from adjacent streets.
6. EXAMINATION OF HIGH-RISE BUILDINGS IN TURKEY
IZMIR AS A CASE STUDY

In this chapter the evolutionary improvements and functions of high-rise buildings in Turkey have been examined, and the high-rise buildings have been evaluated from the point of site selection, design approach, relation to the city, affection of near and far environment in Izmir and Istanbul, also the reaction to the high-rise buildings in Turkey has been discussed.


Compared with the other countries, the high-rise buildings have a short history in Turkey. High-rise buildings began to appear in 1950 and until 1970's they showed a slow increase. Until 1970's high-rise buildings were under 25 storey. After 1985 major increase has been seen.

The Bother Apartment Building constructed by Raymond d’ Aronco at Beyoğlu in 1907 can be accepted as first high-rise building according to its surroundings.

A political opposition against inappropriate and extreme high-rise buildings has appeared since the middle of 1980. In this period a considerable number of projects have been halted by municipal authorises in Istanbul. On the other hand some projects were suspended due to economic reasons.

During the Republican high-rise buildings as apartments spread out from İstanbul to Ankara and İzmir. After 1930’s, the apartment buildings of four stories were seen on the Atatürk Boulevard in Ankara. In this period Ceylan Apartment Building of seven stories was constructed by Sedat Hakkı Eldem at Taksim.

According construction regulations in 1948, the maximum building height was 21 metres. In the period from 1950’s to the mid 1970’s the high-rise buildings were under 25 storey.
The followings are some high-rise examples of this period: (1950-1970)

- The Istanbul Hilton Hotel of S.O.M (Skidmore Owings and Merrill) built with new construction techniques and designed according to a new structural system in 1951. (figure 86)

![Figures 86 The Istanbul Hilton Hotel](image)

- The Ankara Ulus Office Building of 13 story by Bozkurt Beker and Bolak in 1954. (figure 87)

![Figure 87 The Ankara Ulus Office Buildings](image)
• The Ankara Hotel in Ankara was built in 1965. (figure 88)

![Figure 88 The Ankara Hotel](image)

• The Ankara Kızılay Office Buildings of 25 storey by Enver Togay in 1967. (figure 89)

![Figure 89 The Kızılay Office Building](image)
• The Ankara Stad Hotel of 20 stories by Doğan Tekeli, Sami Sisa Hepgüler in 1969. (figure 90)

![Figure 90 The Ankara Stad Hotel](image)

• The Istanbul Sheraton Hotel of 21 storey by The Mimarlık Groupe in 1970. (Figure 91)

![Figure 91 The Istanbul Sheraton Hotel](image)
Between 1975 and 1985, the demand to high-rise buildings rose. During this period, building height was increased up to 30 floors due to the technological development. In this period, many new projects had been developed, but only a small number of them were realised. Türkiye İş Bank Building and Hacı Ömer Sabancı Dormitory in Ankara are the major buildings of this period (figure 92). The Turkey İş Bank Tower was built as a prestige building in 1976. The Tower with its facade brings variety to the part of Ankara. With The Türkiye İş Bank, the tower form has become a model in the design of prestige buildings (figure 93).

![Figure 92 The Sabancı Dormitory](image1)

![Figure 93 The Turkey İş Bank Tower.](image2)

After 1985, high-rise building projects with 25 to 50 stories have been developed. They have been designed according to the tubular system. This system has many advantages as being cost-efficient. This construction system provides better results than the conventional methods. In spite of all construction methods of high-rise buildings, there are not the standards for these buildings in Türkiye. In Turkey, the main problem is the selection of proper sites for this type of building to maximise the advantages.
The Ankara Hilton Hotel of 23 story in 1985 and İzmir Hilton Hotel of 34 story in 1989 were in this. Architects design lightweight enclosures by using contemporary materials and production systems to eliminate the loads of the curtain walls, in this period the structural problem of the buildings is solved by the tubular system (figure 94).

Some high-rise buildings after 1975 are:

- The Marmara
  Architect: Fatih Aran, Rüdnettin Güney
  Location: Taksim
  Construction start date: 1967
  Construction completion date: 1975
The Marmara Hotel has 5 floors underground and 23 floors above, a total of 28 floors. Its height is 81 meters. The reason of its height is capacity and the idea that the view could be enjoyed from each room. The five star Marmara Hotel with its 434 beds, consists of a high block which is build on a large horizontal block with a few floors. The car park has a capacity of 200 cars. The top floor’s plant is different from the other floors. It is square. It has its own special look and far from the rationalist monotone looks.

Figure 95 The Marmara Hotel

- Istanbul Orduevi
  Architect: Metin Hepgüler
  Location: Harbiye
  Construction start date: 1968
  Construction completion date: 1983

The Harbiye Orduevi has 25 floors above and 3 floors underground, a total of 28 floors. The height of the building is 90m. After the study we have come to the conclusion that the most important reason of the height of this building is determined in order to exceed the existing Hilton Hotel’s height.
Next to this reason there is the fact that the construction site was not very large and therefore the building had to be high. Also the height of the building is a symbol of the force of the country and the building has taken its place in the city’s silhouette.

It has 15 floors with beds, 4 private apartments on two floors. Next to this special banquet rooms, a restaurant with a capacity for 400 people, shops, conference rooms, a wedding lounge with a capacity for 660 people, an outdoor swimming pool, a 4 floors car park and a helicopter landing runway. The Orduevi is planned according to geometric forms. On the plan the rooms are arranged forward and backward. The vivacity in the plan is to be seen on the sides of the building and has made this building different from others (figure 96).

Figure 96 Istanbul Orduevi

- Yapı Kredi Plaza

Architect: Haluk Tümay, Ayhan Eske
Location: Levent
Construction start date: 1982
Construction completion date: 1989
The Yapı Kredi Plaza consists of three blocks. These blocks are 18 floors (64 meters), 19 floors (71 meters), and 20 floors (70 meters). It has 4 floors underground.

According to the research the reason of the height of this building is that the ground on which it is built is very expensive. On every block there are cafeterias for the employees, library and conference rooms. The blocks are located in such a way so that they don’t stand in each other’s view. The rectangle shaped buildings sides are covered with reflective windows. We can say that the building is planned with a soft rationalism approach. It has been tried to give a recognizable characteristic.

Figure 97 Yapı Kredi Plaza

- The Halk Bank Tower
  Architect: Dogan Tekeli
  Location: Ankara
  Construction start date: 1985
  Construction completion date: 1990

The Halk Bank Tower of 32-story is the newest prestige building of Ankara. The tall building, with its location and gate-like from, is suggested to have its identity, and to assume to have a symbolic role, as being a symbolic entrance of Ankara. (Figure 98).
The Barbaros Tourism and Commerce Center consists of 2 blocks of 24 floors each a block in between of 5 floors. The higher masses function as offices the lower ones as shopping, conference rooms, exhibition rooms etc. The Barbaros Tourism and Commerce Center is planned on an area with very high ground prices. The offices are planned to be square and the shopping areas in a L-shape geometry (figure 99).
The Mersin Metropol

Architect: Cengiz Bektaş

Construction start date: 1986

Construction completion date: 1991

Location: Mersin

Metropol Activity Center was established to be center of international commercial and business activity. The building of 52 story is the highest building of Turkey. This building has a rectangular plan. Construction system of the building is reinforce concrete. The building has a land of 12325m² and the floor area 125520m². It is a mixed used complex for shopping center, office, hotel and cultural establishments. The shopping center of 6 story has a courtyard in its center.

The architect Cengiz Bektaş thinks that the tower will contribute to the new silhouette to Mersin City. He aims to create vertical emphasis between the Touros Mountains and the Mediterranean (figure 100).
The Mövenpick Radisson Hotel has 3 floors underground and 30 floors above, a total of 33 floors. The height of the building is 99 m. It is planned of 33 floors. The height of the building is 99 m.

It is planned to be single building. The value of the area is high and the reason for its height is to establish rooms with a sea view. A capacity of 305 beds, a 5 star hotel, recreation, entertaining shopping functions. A 300 car capacity car park underground. The hotel is planned with a post-modern approach. A characteristic for post-modern planned high-rise buildings, base, body, roof is to be seen on this building (figure 101).
The Ak Center
Architect: Fatih Aran
Location: Etiler-İstanbul
Construction start date: 1988
Construction completion date: 1992

The Ak Center is a horizontal three-floor block with there vertical blocks. The building has a land of 22,000 m² and the floor area is 12,000 m². The higher blocks heights from the entrance level are as follows: the 1st block is 63,71 m (15 floors), the 2nd block 73,82 m (18 floors), the 3rd block 91,65 m (24 floors). The Ak Center is a complex for hotel, office apartment, shopping center and cultural establishments, (mixed use). The hotel building has a triangle shape according to the shape of the building land. The offices are circles shaped. The height of the buildings is arranged so that one will not stand in another's view. On the 4 underground floors, there is a 750 car capacity car park. The horizontal part is the shopping center with atrium. The hotel block is planned according to apart hotel (figure 102).
Sabancı Center consists of 2 towers. One of 34 floors and one of 39 floors with five floors underground. The Akbank Tower of 39 floors is 141 m, the Sabancı Holding Tower of 34 floors is 130 m high. One of the reasons of the height of the building constructed in a very expensive area is its prestige. Next to this, the buildings vertical development took place with the office buildings, which are organized vertically for its safety and easiness. This building, in which the management of Sabancı Holding and Akbank come together, has 5 floors car parking of 440-car capacity, exhibition and conference rooms and a library on the ground floor. Next to the twin towers, a bank branch is planned on the same land.

The plans of each floor of the Sabancı Center are symmetrical. The building has an octagon atrium entrance. On the sides of the building, vertical echelons can be noticed (103).
• International Taksim Tourism and Business Center
Architects: Doruk Damir, Ercüment Gümrük
Construction start date: 1989
Construction still continuing:
Location: Taksim

With 11 floors underground and 28 floors above this 39 floors buildings height is 134 m when measured from the entrance floor. The land on which it is built is 6500 m² and the floor of the building 5500m².

After being announced as the **center of tourism** by the Council of Ministers, the area on which the “Gökkafoes” (“Skycage”) is located, the Ministry of Public Works presented the 1/5000 scale Master Plan and the Ministry of Tourism, the 1/1000 scale Structure Plan. The construction of the “Gökkafoes” had started a big discussion among the people and at last the Istanbul Municipality started a trial at the state council for cancellation and interrupting the execution. The 1/1000 scale Plan is being interrupted and investigated by an expert (On April 1999 this is the latest situation).
The International Taksim Tourism and Business Center (Gökkaifes) consists of hotels and offices. On the ground floor there is a public shopping center and social-cultural establishments.

6 of the 11 underground floors are for business and 5 for technical services, warehouses and a 600 car capacity car park. We can say that the “Gökkaifes” is planned with a post-modern approach. building has the “bare, body, roof” formula (figure 104).

Figure 104 International Taksim Tourism and Business Center

• İş Bank General Management

Architect: Tepe İnşaat & American Turner Steiner Int.
Location: 4th Levent-Maslak - on Büyükdere Street.
Construction start date: 1996
Construction still continuing

Consist of three towers, one 42 floors and two of 32 floors. In to the highest tower the General Management from Ankara will settle in one of the other blocks Şişecam General management and the other one will become a İşbank Branch Office. Like Tat Towers the project is realized by changing the master plan (figure 105).
The Tat Towers
Architect: Ayhan Böke
Location: Şişli
Construction start date:
Construction still continuing

Consisting of two skyscrapers of 32 floors each, the project is planned for a business center. It has 6 underground floors. The height of the towers is 99 m measured from the entrance floor. The high towers are connected with each other by a lower construction in between. Next to one of the towers a shopping center of 3 floors is within the project. The project is realized FAR (Floor area Ratio) = 5.85 by changing the master plan (Figure 106).
In Turkey, only Izmir Metropolitan Municipality has prepared a regulation for high-rise building in 1996. The regulation consists of description of high-rise buildings, detailed principles of architectural and mechanical design of high-rise buildings. But location criteria are not included in this regulation. For suitable places, it is necessary to examine natural, economic, infrastructure, environmental, historical, social factors, which determine location of high-rise buildings.

6.2. Human Responses to High-rise Buildings in Turkey

There are increasing responses to high-rise buildings in Turkey where great demands for these types of buildings started to be seen in the last 30 years. These types of buildings were criticized thoroughly and even tried to be restricted. Even though there are some truths about these critiques, most of them do not only belong to high-rise buildings but also belong to other types, too.
After 1980’s, when high-rise buildings started to be projected, negative reactions were most intense on city of Istanbul. Response groups can be gathered under two large groups, in Turkey:

- Anti-respondents to high-rise building types totally,
- Respondents who think that preparations for this building types are inadequate

To examine the positive and negative responses to high-rise buildings is important in the determination of inadequacies about this type of buildings. Topics that emerged after this study can be listed as:

- **They may cause extreme-densities**
  High-rise buildings cause high densities on the land, on the plot and on the population and this fact is the leading reaction to these types. Increase in density result problems in infrastructure systems and environmental quality diminishes.

- **Wrong site selections**
  Wrong site selections for the construction of high-rise buildings form another reactionary group. Location criteria of high-rise buildings should be decided in relation with factors such as: infrastructure, silhouette and density.

- **Inadequate regulations**
  Even though in other countries there are some critiques about regulations based on the fact that building designs were limited by these regulations, in Turkey and especially in Istanbul, inadequacy of regulations frequently become a current issue. When existing regulations are evaluated in respect with high-buildings, it can be concluded that high-rise buildings were composed of low-rise buildings put one over the other.

- **Unfair profit**
  Perhaps the most accentuated response about high-rise buildings, in Turkey, is obtaining unfair profits by forming new non-existing construction rights in the development plans. Further more, sometimes, the ones who gained these rights, before realizing the project, can transfer projects to others, at high prices. In some of these
procedures, a fact that, there lies an image of bringing in capital from foreign countries but in truth there are some other unknown sources is claimed.

Most of the plots, used for gaining speculative profits, were captured by build-operate-transfer formula and owned by public establishments. Exploitation of land and constructing rights is indeed a very broad subject. All kinds of buildings can be constructed on lands owned by the treasury, foundations, public establishments with supplementary budgets and other public establishments. Most of these lands, in addition, are the ones that are restricted areas for any kind of construction.

- **Destroy of green areas**

Another response is that these buildings do destroy green areas within the city. Some of these, “Gökkaifes”, “Sheraton Hotel”, “Dunya Ticaret Merkezi” in Istanbul are seen as green areas for public usage on the development plans.

- **Destroying the environment**

Responses to the environmental problems caused by high-rise buildings can be studied under two main groups:

**Objective Responses**

- they are the responses that rely on scientific and technical grounds:
- they cause infrastructural and transportation problems
- block the sunlight and view
- change the natural effects of seasons and cause physical discomfort
- may create risks for the surrounding community like fire and earthquake

**Subjective Responses**

- they vary according to people’s ideas and judgments:
- destroy silhouette
- destroy the historical characteristics of cities
- cause psychological constraints on people.

Even though, there are many arguments about the subjective responses that originate from acceptance of people’s ideas and judgments as an absolute truth, it is quite impossible to respond to a comprehensive final conclusion.
In Istanbul, which is one of the leading cities of Turkey both in business and commerce, an increase in their demand for high-rise buildings is seen. One of the reasons for these phenomena is the decrease in the number of construction lots in the city center and parallel with this fact the plot prices reached to maximum points.

City of Istanbul, with its natural and historical beauties, began to be affected by the social and cultural changes that seen in Turkey, after 1950's. Consequently, Istanbul entered a period of becoming a metropolitan center.

After 1960's construction of buildings with more than 20 floors started, in Istanbul. An item about encouraging the construction of high-rise buildings was added to The Building Regulation in 1967. (Yapı Yönetmeliği). In this item it was determined that if less than 25% of the plot is used during construction, the height of the building can be exceeded. With this additional item, through, it was not permitted to build high-rise buildings at every part of Istanbul. The first high-rise buildings started to be constructed at Beyoğlu. Also by parcellation in city centers done by municipalities, very small lots were planned and this caused high-rise buildings to be rentable.

Another reason of this demand is the rapid development in tourism sector and the expansion in business sector, due to the foreign market economies realized after 1980's. As a result of foreign market economies there appeared a need for buildings with modern standards where foreign businessmen or tourists could stay.

Besides the fact that there exist limited number of plots in city centers and because there is an increase in the demand, on March 12, 1982 the government announced that some of the public lands were declared as “Tourism and Commerce Regions”. As a result, new plots were formed on which high-rise buildings would be constructed. High-rise buildings designed on these plots were thought to be part of a modern city image of the future.

In the hotels, which take place at the city centers the rentable bed number is minimum 600 and another point is these hotels exceed the heights of the surrounding buildings in order to have better view of the city. This causes a demand for high-rise buildings.
Some of the high-rise buildings which were constructed on a limited number of plots in the city center, are the results of wanting to collect all the firms and corporations which constitute a holding company under the same roof. Also these firms and corporations especially choose high-rise building types for symbolizing their power.

During the years 1975-1985 there is a small amount of increase in the height of the buildings. However, after 1985, it can be observed that there was a progress both in the numbers and qualities of high-rise buildings as a result of social, cultural and technological aspects. Starting, from 1990's, construction of high-rise buildings in Istanbul, central city of financial, commercial and tourism activities, continued increasingly.

The 1/5000 scale Istanbul Metropolitan Area Plan, which passed the assembly of the Istanbul Municipality on 20 October 1995 and was approved on 15 October 1995, brings the following rule:

Within this plan, the remaining areas after the plan is being executed, with the similar constructions, should not exceed the net area of FAR: 3, this means, that there will not be any similar construction exceeding three times the area, and all new plans and constructions will be executed according to this.

Lately, for this reason, in Istanbul, when a construction of a high-rise building for which a plan was already made starts, we can notice it will not be according the plan but according the above mentioned rule.

The locations of the high-rise buildings in Istanbul

We can see that the first high-rises building in Istanbul are located on the peninsula Beyoğlu near by Galatasaray-Taksim.

The desire of building these high-rise buildings in Istanbul caused intense discussions and lawsuits. People came to the opinion that these kinds of buildings are only causing problems and for sure not needed in Istanbul.

After 1985 in the following areas in Istanbul projects for high-rise buildings have been started; Taksim Gümüşsuyu area, Beşiktas- Levent- Maslak axle, Mecidiyeköy-Zincirlikuyu axle, Zeytinburnu and Ataköy areas. For the Dolapdere-Kasımpaşa area, also suggestion plans for high rise buildings have been prepared.
The Mecidiyeköy-Zeytinburnu axle, the first high-rise buildings which will be located on Büyükdere Street, the project of Şişli Culture and Commerce Center building, a huge commerce center consisting of 5 blocks of 16 floors, one block of 27 floors and one block of 72 floors. This center will have 400,000 m² office space and 200,000 m² shopping space.

The study of Prof. Ergün Gedizoğlu of the civil engineering faculty’s transportation department of the Istanbul Technical University shows that between 25 and 30 thousand people will be employed in this center and a hundred thousand people will visit it. The study also showed that 84 busses and 1750 cars will pass this center each hour and therefore it will be necessary to widen the road with 1,5-2 lane.

This other high-rise buildings on Büyükdere Street are Maya-Akar Business Center, Şişli Municipality Culture and Service building and Şerbetçili Business Center. At the beginning of Barbaros Boulevard, from Beşiktaş to Zincirlikuyu, the 25 floors high Seven Hills Hotel is located. The Barbaros Business Center, next to the Darphane, built for Intes-Kazaci̇lar, who plan to rent and sell, consists of 2 blocks of 25 floors each. The Hotel and Business Center, which is being in Esentepe, will reach 30 floors. The “Z.I.M. Towers 2000” in Zincirlikuyu are under construction. The General management and Service building of PTT in Esentepe of 26 floors are completed and the building has taken its place in the silhouette of Istanbul.

In the area between Zincirlikuyu and the 4th Levent lots of high-rise buildings will be built: in the 1st Levent, the General Management building of Töbank, at the location of Squib Medicine Factory, the General Bank’s Headquarters building. The office of Üstay Group of Companies, which will be, called “Marmara Plaza”, Yapı Kredi Plaza, Şişe Cam and İş Bank’s towers and Sabancı Center and Akbank’s high buildings.

In Maslak, the Akabe Center of Commerce building and Movepick - Rodisson Hotel are located. The location on the nigh buildings on the peninsula of Beyoğlu starting from Mecidiyeköy to Gayrettepe, Esentepe, Zincirlikuyu and Büyükdere Street, including Levent and reaching till Maslak shows that it is becoming a Finance Center.

The İş Banks and Şişe Cam Building are under construction on Levent-Maslak axle. At the opposite of these buildings which has been located on Büyükdere Street where the Fatih Bridge starts, the buildings of Sabancı Center and Akbank Headquarters will stand.
The first high-rise buildings on the seaside road are in Zeytinburnu, the building of The International Center of Commerce (UTTM). In Ataköy, Ataköy Tourism and Commerce Center, Holiday Inn’s building, in Yeşilyurt, Polat Hotel bring a new view in Istanbul’s newly arisen areas.

**Effects of High-rise Buildings in Istanbul**

Around the high-rise buildings, used only for the purpose of offices, there occur population changes during working hours and after working hours. During hours outside the working-hours the surrounding of these buildings become asocial.

Design of the ground floors, either open or enclosed to the surrounding environment, also causes diversified street arrangements. As in Sabancı Center, the buildings that collect all of their own management services under the same roof, the ground floor is generally closed to the surrounding neighborhood. (Sabancı Center, Yapı Kredi Plaza, Plaza Spring Giz, İş Bank....) On the contrary, the buildings constructed for commercial purposes are open to the surrounding neighborhood (Ak Merkez, Barboros Tourism and Commerce Center, TUTIM-gökkafes- ) Besides, these, open spaces of big hotels were enclosed to exterior spaces according to their usage purposes.

Whether the high-rise buildings are open or enclosed to exterior environment is important in the formation of atmosphere for people and environmental relations. Plazas constructed with plastic or water elements inside them may not always be accepted as successful samples. Another effect of high-rise buildings is that they can block air or sun light.

**6.4. Examination of High-rise Buildings in İzmir**

In this section, some samples of high-rise buildings which are realized and which are planned in İzmir are studied: Information about these buildings are gathered from various publications, from the interviews done with the architects or construction firms, and from the Chamber of Architects and Chamber of City Planners. Each building was studied in respect to: site selection, data of master plans, relationship to the city, affection of near and far environment functions.
Case Studies of some High-rise Buildings in İzmir

Ege Palas

Location: Alsancak - İzmir (in CBD)
Architects: Bülent Veryeri, Doğan Tuna, Erçin Kezer, Said Saltağı
Construction start date: 1987
Construction completion date: 1993
Number of floors: 23
Height: h: 61.80m
Functions: hotel-commerce
Parcel area: 1800m²
Parking capacity: 75 cars
Total floor area: 12955m²
Floor area: 1635m²
Total floor area ratio: 7.9
Water consumption (lt./day): 120lt/day
Water disposal system: 100lt/day
Water disposal connection diameter: 30cm

Ege Palas, the second highest building in İzmir, was planned on Cumhuriyet Boulevard of Alsancak.

Construction process of Ege Palas that is located at Alsancak is explained chronologically as below:

- The first permission was given on 13.01.1987 (hmax=9.80m)
- Height of the building was raised to 61.80m by Metropolitan Municipality of İzmir on 21.01.1988 (without taking the opinions of “Preservation Council” and “Municipality Council”)
- Permission of construction of foundation above, was given on 25.01.1990
- While the construction of the building continued, at the 16th floor Konak Municipality sealed the building and the same municipality decreased the height back to 9.80m.
- “Provincial Administration Council”, according to Act No. 1580 and title 73, cancelled the decision of Konak Municipality
• This last decision of "Provincial Administration Council", was canceled by İzmir 3rd Administrative Court and Higher administrative Court, 6th Department approved this decision on 21.9.1994.

• Council of State, 6th Department rejected the request of reform on 24.5.1995

• Plan change about raising the height of the building and construction permission was discussed at 1. and 3rd Management Court and as a result were canceled by Council of State 6th Department on 24.2.1998

• Finally, Konak Municipality raised the height of the building from 9,80m to 61.00m by a change on the development plans (According to the information taken on March 19th, 1999).

Ege Palas Hotel which has 23 stories, were projected in connection with the office block that is 7 stories high. The first two stories of the office block and the connection section between the hotel and office blocks were designed as shopping center. Height of the hotel building is 61.80m.

The hotel block, which has a rectangular form, gets service from Cumhuriyet Boulevard. This block was drawn back from the front elevation of the large block on which it was constructed. Hotel has 112 bedrooms, and has 4 star quality. All kinds of required installation system take place. It has a car parking area with the capacity of 75 cars.

This building takes place in an area where land prices are very high. It was constructed on a limited area with very high density and causes transportation, car parking and infrastructure problems at the surrounding area. At the connection point of the building's waste water system, which occurs problems frequently, and municipality make periodical controls and cleaning. During the design phase no studies were done about the infrastructural facilities that would meet the requirements of the buildings.

Ege Palas, on which many arguments are done, was constructed by, creating privileged development rights and by changing the development plain against the laws.
Figure 107 Ege Palas

Figure 108 Site Plan of Ege Palas
Hilton

Location: Alsancak-Izmir (in CBD)
Architects:
Construction start date: 1985
Construction completion date: 1990
Number of floors: 34
Height: h:122.95m
Functions: hotel-office-entertainment
Parcel area: 3245m2
Parking capacity: 1000 cars
Total floor area: 38955 m2
Floor area: 3245m2
Total floor area ratio: 12
Water consumption (lt./day): 350lt/day
Water disposal system: 250lt/day
Water disposal connection diameter: 30cm
Hilton being the highest building in İzmir takes place on Gaziosmanpaşa Boulevard, at Alsancak.

The lot on which the building was constructed belonged to the Metropolitan Municipality of İzmir. By a central decision, the lot that was planned as Tourism and Commercial Region was sold to the construction firm. The building covers the whole lot and the total floor area ratio is 12 (FAR: 12). Hotel was planned at the city center where land prices are highest. The building forms of horizontal and vertical sections. Horizontal section is 13 story high, and vertical section is 34 stores high.

On the ground floor lobby and reception hall and on the first and second floors meeting rooms are located. In between the 3rd and 12th floors, there is one technical floor, I management floor, I restaurant floor, and 9 office floors. The first two floors of the horizontal section consist of a shopping center, 3rd and 4th floors are fame-city and the last 8 floors are car-parking floors.

Shopping center although is located at the ground floor; mostly serves to people whom stay at the hotel. Because it covers the whole lost, it was not planned together with a public open area. The hotel that was constructed on a limited area has a very high density. In order for this building to be constructed, a change on development plan was realized just like in Ege Palas. Through the parking area is sufficient just for Hilton Hotel it is insufficient for the requirements of the whole area. Especially at the peak hours it creates a large problem at the entrance and exit.
KSK - Plaza and Sports Foundation Project

Architect: Ertem Ertunga
Location: Karşıyaka-Izmir (out of CBD)
Construction start date: -
Construction completion date: -
Number of floors: 33
Height: h: 119.90m
Functions: office-hotel-shopping center-residence-stadium -closed sports hall
Parcel area: 23000m² stadium- 4020m² plaza =27020 m²
Parking capacity: 290 cars
Total floor area: 82212 m²
Floor area: 2500m²
Total floor area ratio: 19 (plaza)
Water consumption (lt./day): -
Water disposal system: -
Water disposal connection diameter: -

The Youth and Sports Ministry possess it and it is hired to K.S.K. Sports Club for 49 years. K.S.K plans to construct a plaza and sports foundation. And will participate 49 percent of the foundation with the public.

The project area is planned as stadium and social foundation. The stadium is between the residence and the nursery-garden belonging to the Forest Region Head Office. It is approximately 23000 meter square. The area planned, as the social foundation is next to the parcels where exists the detached 8 floors, 5 floors, 8 floors and adjacent 5 planning rules. It is totally 4020 meter square.

In the architectural project stadium consists of the basement, grand-floor and the first and second floors. The upper elevation of the closed tribune is +11,60 meter. The elevation of the cave element is about +21,20 meter. Basement grand-floor the first and the second floors are totally 21,685m². The capacity of the stadium is planned as 10000 person. According to the project there is no other sports alternative except the football ground. A parking place with a capacity of 200 auto placed in the basement.
Closed Sports Hall is consisting of basement, ground floor and first floor. It is planned as two different blocks, one of them for swimming pool, and the other for basketball. It is totally 8160m² and placed between the stadium and plaza.

Plaza (Shopping center, hotel, office, residence): At the basement of parking place of 90 auto and on the ground-floor shopping, management and hotel-residence lobbies, on the first and second floor the shopping units, on the third floor conference hall and cinema, on the fourth floor restaurant and kitchen, on the fifth, the technical services, on the sixth and tenth the hotel rooms, on the 11-26, the residence units, 27-28 penthouse, 29-30 health center, 31,32,33 technical floor. The total area is 50750 m². The foundation is totally 82212000m².

Izmir Chamber of Architects made a research about parking requirement of this project. According to the research: For the project as a whole 606 car-parking place and 12120m² parking area is required. At the project offered, totally only 290 car-parking place is planned. The 200 of it belonging to the stadium and the rest to the plaza. And this standard does not even reply to the half of the standard of Izmir Metropolitan Municipality, and there is no other area near to reply the parking place requirement. The region still has the parking problem today.

When the plan is examined, the transportation to the stadium with the capacity of 10,000 person, is supplied from two different roads; one of 6 m. and the other 8-m. and it is obvious that this transportation is insufficient.

The present constructions in Karşıyaka waterside residence are generally at 24.80m height. Two buildings one of them at the corner of Girne Street and the other opposite the marriage house are higher than 24.80m. But both of them should be examined according to the planning decisions.

Shortly, a plaza of 119,90m. will wrong opposite the general silhouette of the city. Besides, the parcel of the plaza is insufficient to reply that height. And it will create new problems of infrastructure. The plaza was planned be without examining the transportation possibilities of the stadium entrance and departures.

With the offered constructions a privileged construction right is trying to be hold and that conflicts with the planning for public benefits rules. And is obviously in contradiction with the laws.

In both Karşıyaka and Izmir, the lack of green-area is one of the greatest problems of the city. The project offered will completely fade away the open-air sea identity of the region and will annihilate the nursery-garden and its surrounding. From
this paint of view, it will cause new problems. The sports description to the offered construction is only a speculation to legalize the project. In the surrounding of the construction mentioned to be built up will be the reason of someone other problems to come up.

The buildings group will be an attraction center, so the regiment of the area will be higher than the standards. The offered plan is not even sufficient to reply the half requirement of the parking place it self.

In this project it is seen that the project is planned firstly and then the construction rules are now being tried the change according to the prepared project. The asked construction densities and decisions are not suitable any planning standard.

Figure 113 Development plan
Figure 114 KSK-Plaza

Figure 115 elevation
Figure 116 Site Plan

Figure 117 section
The Aegean World Trade Center

Architect: Ertem Ertunga

Location: Basmane-Izmir (in CBD)

Construction start date: 1998

Construction completion date: construction still continuing

Number of floors: 38 office
33 hotel

Height: h:153m / h:140m

Functions: office-hotel-shopping center-cultural center

Parcel area: 2 ha (20000m2)

Parking capacity: 2070 cars

Total floor area: 82212 m2

Floor area: 2500m2

Total floor area ratio: 5

Water consumption (lt./day):-

Water disposal system: -

Water disposal connection diameter: -

The Aegean World Trade Center is located in the southwest of Izmir Fair and planned in an approximately 2 ha (20000cm2) area between Basmane Square, Refik Saydam Street, Dr. Behçet Uz Street and 1362 Str. İzmir Metropolitan Municipality is the cure of the land. It is delegated to the Güçbirliği Holding with the method of floor recompense.

The mentioned project area is described as trade function in the 1/5000 scale Master plan. In the 1/1000 scale application structure plan hmax = unlimited, FAR=5 the setback distances from the road are required as 5 meter and there exists the expression “Application will be made according to its special project”

The legal period of the project:

In 1984 for this area a project competition was organized under the name of “Izmir tourism and trade center.” The functions are hotel, congress and trade center and total construction area is 97.006m2. The winner of the competition was the project prepared by architects Zafer Koçak and Kemal Ipek. But the project could not be realized.
1988 with the partnership of Izmir Metropolitan Municipality Asil Nadir, PolyPeck Company and Sheraton Hotel a project was prepared to the French architect Pierre Porrat. Again the same functions were planned. (trade, hotel, congress center) And the total construction area was 110000m2. And then this project was abandoned.

In 1990, the “International Fair Competition” was organized by the Izmir Metropolitan Municipality and this area was included to the competition land. The functions offered were -bourse centers, trade hotel and congress center- and the total construction area were 80000m2. The winner of the competition was the project prepared by Architect Melih Karaaslan and Sükrü Kocagöz. And this was not applied either.

And lately the project of architect Ertem Ertunga.

One of the two highest buildings of the complex is a five-starred hotel with capacity of 240 and is planned as 33 floor high.

The office places are planned without any columns in order to total best benefit of the floor. The office is planned to be 38 floored.

The culture center situated at the south of the complex is separated from the main mass with a passage in the grand-floor.

In the culture center:
1st floor; two cinemas
2nd floor; theater of 500 person capacity
3rd floor; two cinemas
4th floor; conference hall of 750 person capacity

The grand floor and the first floor are planned as the shopping center.

The transportation to the complex is supported with the private cars, bus metro, taxi and pedestrian entrances. The two floors under the ground floor elevation and the fourth floor is planned as parking place of 2070 cars capacity.

The offered construction (as mentioned in the architectural project), aims to create an attraction center and solves the parking place problem with at least 2100 auto capacity. But it is inevitable that the construction and its activities will create a traffic circulation and its surroundings. When the master plan of the region is examined, no difference and addition is deserved in the present traffic practicalities. The roads are the same roads. In this sense, no traffic direction plan exists for the surroundings of the construction. The lack of this plan, will cause traffic jam, like the similar type of centers.
in Istanbul has caused to their surrounding. The main decision should be taken after the traffic plan.

The land mentioned is the biggest empty area in the city and its very valuable. According to the calculations of the project, the net construction area is 101512.14 m², grass area is 209278.63 m². The structure position does only the 104.330-m² net construction area. According to this calculations %100 grass area is used as extra constructions. The density of the land (Emax:5) creates so high dense construction. When the volume $M^3$ is not limited, this project creates big dimensional constructions.

The enterprises of high-rise buildings and the site selection decisions should be carefully evaluated in order not to effect the underground construction and the macro form of cities. Whole the decisions should be taken so carefully both in the whole of the plan and the regional plans. For each region the maximum population, traffic and construction density should be limited in the Development plans.

Whole of this land is 20 866 m² and whole of this area is used as construction area by including the setback distances of the basements. it is opposing the 3194 structure law. At the grand-floor the whole area of the land is pulled inside 5-meters from each side, but on the other hand on the 1,2,3,4 and fifth floors with 1,5 meter wide closed and open balconies the pulling distances is broken. Such a great mass cannot be related with the other constructions around in urban design scale.

Figure 118 Master plan
Figure 119 Development plan

Figure 120 Photograph of the Model
Figure 121 Site plan

Figure 122 Ground floor plan
Figure 123 section

Figure 124 elevation from the Basmane Square
6.5. Evaluation and Recommendations

The skyline of Izmir is taken from the bay, mountains around the city and the man-made environment. Man-made environment is in process of uncontrolled development and rapidly by having no identity and changes the skyline of Izmir. It is important that, there is need the restriction for high-rise buildings in Izmir, which has historical importance.

Unfortunately in our country construction research and analysis do not give permissions. Usually the solution at this point is to decrease the density and height limits. In Izmir the buildings of two story in Alsancak have been eight story and they will be 30-40 story like Hilton and Ege Palas Hotel. These buildings have been located architecturally and historically important districts of Izmir. They effect the environment visually and physically negatively. Their location destroys the silhouette of Izmir. Traffic roads around these buildings are not sufficient. They create extensive automobile traffic at peak times. And those buildings have attractive power on surrounding areas.

In Bostanlı, Atakent mass houses were the first example which were composed of houses having different building heights (2, 4, 17 story buildings). This mass housing
The project was planned the ratio between the recreational area and the population. It has large green and recreational areas.

The other mass housing project near Atakent is Mavi Şehir. In comparison with Atakent for Mavi Şehir we can not say the same criteria. In Mavi Şehir 20 blocks of 18 story have the same project and only their colors are different. In Mavi Şehir sun and wind factor are not be taken into consideration. High-rise buildings, which were grouped together, cut of daylight each other, block each other's views and their shadows are cast on each other. In addition to recreational and parking facilities are not enough.

The need for the restriction of the high-rise buildings is mainly the problem of the historic cities like Izmir. The subject of high-rise buildings must be approached with objective data of science and urban planning. Choosing of high-rise buildings to be image element for Izmir, which has historical importance, is wrong. It is important that, before decision of high-rise environmental impact analysis must be done.

In Izmir there are rich natural elements, the construction of the high-rise buildings, their location and their forms should be in relation with the natural elements of the city.

These studies should be done in three parts.
1. Areas in which high-rise buildings are inappropriate
2. Areas which are particularly sensitive to the impact of high-rise buildings
3. Areas in which high-rise buildings are appropriate

In the definition of those areas, the following subjects should be considered:
1. View points from and to special features
2. Areas having special natural values
3. Historical areas accepted as a conservation area
CHAPTER 7

CONCLUSION

High-rise buildings have been built in almost all cultures. Throughout the history power, position, wealth, defense, spiritual feelings has caused to build them. They are variously described as expressing power, cultural or economic dominance, and the aspirations of man to reach up to God. From the past to present they have played an important role in urban planning as dominant elements.

The modern high-rise buildings emerge in 19th century. Emergence of them in this century depends on many factors. The most important factors are the development of technology, the use of the iron and hen the steel frame systems. The other important factors are economic development and prestige.

High-rise building can be described as a multistory building generally constructed using a structural frame, provided with high-speed elevators, and combining extraordinary height with ordinary room spaces such as could be found in low buildings. In aggregate, it is a physical, economical and technological expression of the city’s power base, representing its private and public investment.

High-rise buildings are mostly constructed for commercial purposes. They are also built for various purposes, too: residential, industrial, public assembly and multiple use.

There is an unending quest for construction taller and taller buildings today. Unfortunately they are often designed in accordance with the political, economic and technological reason, without taking social, urban, symbolic and visual factors into consideration. So they are most discussed issues because of its disruption in the environment.

It is known that high-rise buildings have significant impact on that city which is located. These impacts can be both positive and negative. And proper planning and design can reduce the negative impact. The impact of high-rise buildings can be summarized as below:
• On the city, its systems and skyline
• On the urban fabric
• On the city block
• On the people
• On the natural environment

High-rise buildings both have positive and negative features. These are:

**The negatives**

They cause excess building densities.

Use of the areas, which must be kept clear of buildings.

Create environmental disadvantages

Destruction of green areas

Provide unjustifiable profits.

**The positives**

Less hindrance of view and sunlight.

Better solution of transportation problems.

Provide of green and natural element for city centers.

Less environmental pollution.

High-rise buildings are responses to unique development conditions found in the city. They are a natural response to scarcity of land, concentrated population growth and high costs of land. Too often high-rise buildings have been designed without considering them as part of the larger context of the environment. To understand the complex phenomena of the built environment, organized efforts are needed to bring together and expand upon our current knowledge in the field of urban planning, urban design and architecture.

Efforts are seen in the West for the integration of high-rise buildings into the urban space. As high-rise buildings have progressed from single entities to large complexes, the space between them has become an intrinsic part of the design problem. We have seen lots of high-rise buildings, which are unsuccessful examples of disintegration in urban space. There should be a hierarchical transformation from the high-rise building spaces in micro scale to urban scale.
In Turkey, high-rise buildings began to appear in 1950. Until mid 1970's buildings constructed were less than 25 story. After 1985 major increase has been seen. In Turkey high-rise buildings mostly effected Istanbul, because of its big role as a center of commerce, industry and culture. After Istanbul and Ankara they began to appear in Izmir, Adman, Mersin and other expanding cities in Turkey. Only Izmir Metropolitan Municipality has prepared a regulation for high-rise buildings in Turkey in 1996. The regulation consists of description of high-rise buildings, detailed principles of architectural and mechanical design of high-rise buildings. But location criteria are not included in this regulation. Natural, economical, infrastructural, environmental and historical, social and psychological factors, which would determine the site selection of high-rise buildings in the city, should also take place in the regulation.

Before site selection, high-rise buildings must be examined according to following in urban planning scale:

1. Metropolitan master plan
2. City silhouette studies
3. Geological, infrastructure studies
4. City construction and population densities
5. Architectural and historical features of city
6. Economical factors
7. Environmental factors

After these evaluations;

1. Areas in which high-rise buildings are inappropriate
2. Areas which are particularly sensitive to the impact of high-rise buildings
3. Areas in which high-rise buildings are appropriate,

must be defined, cities natural, cultural, and historical specification must be preserved in such definitions.

High-rise building, by its sheer intensity, demands a different set of consideration and attitudes toward the city. They should be the subjects of an effective urban design plan. At this level high-rise building development can be controlled by planners through master plans that would involve such urban design considerations as:
1. Place making
2. Providing infrastructure systems
3. Formulating figure ground relationship in the new massing within the block, the street, and adjoining buildings...

High-rise buildings must not be considered to be independent from their surroundings. They must be considered in urban planning and design process. Because they can cause adjacent developments and they are attractive power. In research and development of high-rise buildings, formulation of the problems must be based on comprehensive analysis. High-rise buildings must never be used to increase density. They must be alternative. And they are a matter of choice rather than necessity.

High-rise building placement, site planning and design should be part of large scale planning. It is necessary to assess the advantages and disadvantages of high-rise buildings and to define ways of improving their future characteristics. Beyond solving architectural, static, electrical and mechanical problems, it is essential to take healthy urban planning decisions in order to solve problems that caused by high-rise buildings.

These buildings should be designed as to make a positive contribution to public amenities and their projects should be of highest possible standards. And the control of surrounding areas must be provided.

However, construction of high-rise buildings requires multi-sided decision series. They must concern lots of discipline from engineering, architecture to urban planning and urban design.

In conclusion, social and economic needs may increase demand for high-rise buildings. Instead of trying to prevent this type of building, efforts have to be focused on maximizing its benefits. High-rise buildings can bring great potential benefits to mankind, if used with discrimination, intelligence and sensitively, otherwise destroy our cities.
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• Yüksek Binalar II. Ulusal Sempozyumu (1992) İTÜ Mimarlık Fakültesi İstanbul-Kasım
<table>
<thead>
<tr>
<th>NAME OF THE BUILDING</th>
<th>PLACE</th>
<th>NUMBER OF FLOORS &amp; HEIGHT</th>
<th>DESIGNERS</th>
<th>CONSTRUCTION YEAR (Start-Completion)</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>THE ISTANBUL HILTON HOTEL</td>
<td>Taksim/Istanbul</td>
<td>13 floors / h: 40.00m</td>
<td>Skidmore-Owings-Merril and Prof. Sedat Hakki Eldem</td>
<td>1948-1953</td>
<td>hotel</td>
</tr>
<tr>
<td>EFES HOTEL</td>
<td>Alsancak/Izmir</td>
<td>10 floors / h: 35m</td>
<td>Prof. Paul Bonatz, Fatin Uran</td>
<td>1953-1959</td>
<td>hotel</td>
</tr>
<tr>
<td>ULUS BUSINESS CENTER</td>
<td>Ulus / Ankara</td>
<td>13 floors / h: 40.00m</td>
<td>Prof. Orhan Bozkurt, Prof. Gazanfer Beken and Prof. Orhan Bolak</td>
<td>1953-1960</td>
<td>office</td>
</tr>
<tr>
<td>KIZILAY BUSINESS CENTER</td>
<td>Kizilay/Ankara</td>
<td>27 floors / h: 76.00m</td>
<td>Enver Tokay</td>
<td>1958-1965</td>
<td>office+commerce</td>
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<tr>
<td>THE ANKARA HOTEL</td>
<td>Kizilay/Ankara</td>
<td>20 floors / h: 60.00m</td>
<td>Doğan Tekeli, Sami Sisa</td>
<td>1964-1968</td>
<td>hotel</td>
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<tr>
<td>THE ANKARA STAD HOTEL</td>
<td>Ulus/Ankara</td>
<td>23 floors / h: 71.00m</td>
<td></td>
<td></td>
<td>hotel</td>
</tr>
<tr>
<td>THE SHERATON HOTEL</td>
<td>Çankaya/Ankara</td>
<td>28 floors / h: 63.00m</td>
<td>Prof. K. Ahmet Aru, Dr. Tekin Aydın, Prof. Hande Suher, Yalçın Emiroğlu, Altay Erol,</td>
<td>1959-1975</td>
<td>hotel</td>
</tr>
<tr>
<td>ODA KULE</td>
<td>Beyoğlu / İstanbul</td>
<td>23 floors / h: 69.00m</td>
<td>Kaya Tecimen, Ali Kemal Tamer</td>
<td>1968-1975</td>
<td>hotel</td>
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<tr>
<td>THE MARMARA HOTEL</td>
<td>Taksim/Istanbul</td>
<td>28 floors / h: 81m</td>
<td>Fatin Uran, Rüknettin Güney</td>
<td>1967-1975</td>
<td>hotel</td>
</tr>
<tr>
<td>TÜRKİYE İŞ BANK GENERAL ADMINISTRATION BUILDING</td>
<td>Ankara</td>
<td>29 floors / h: 91m</td>
<td>Ayhan Böke, Yılmaz Sargün</td>
<td>1970-1976</td>
<td>office</td>
</tr>
<tr>
<td>Building Name</td>
<td>Location</td>
<td>Floors / Height</td>
<td>Architect(s)</td>
<td>Years</td>
<td>Category</td>
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<td>-------------------------------</td>
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<tr>
<td>VALİKONAĞI BUILDING OF YAPI KREDİ BANK FOUNDATION</td>
<td>Istanbul</td>
<td>23 floors / h:73.20m</td>
<td>Doğan Tekeli, Sami Sisa</td>
<td>1977-1977</td>
<td>office</td>
</tr>
<tr>
<td>HACI ÖMER SABANCI DORMITORY</td>
<td>Ankara</td>
<td>28 floors/h:98m</td>
<td>Tamay Sütmen, Yılmaz Koçak</td>
<td>1980-1984</td>
<td>dormitory</td>
</tr>
<tr>
<td>KARAYOLLARI 17TH REGION ADMINISTRATION BUILDING</td>
<td>Levent/Istanbul</td>
<td>14 floors / h:50.25m</td>
<td>Mehmet Konuralp</td>
<td>1974-1979</td>
<td>official building</td>
</tr>
<tr>
<td>İSTANBUL HARBIYE ORDUEVİ</td>
<td>Harbiye/Istanbul</td>
<td>28 floors / h:90m</td>
<td>Metin Hepgüler</td>
<td>1967-1983</td>
<td>hotel</td>
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<tr>
<td>ANKARA HILTON HOTEL</td>
<td>Ankara</td>
<td>23 floors / h:70.00m</td>
<td></td>
<td>....-1985</td>
<td>hotel</td>
</tr>
<tr>
<td>İzmir Hilton Hotel</td>
<td>İzmir</td>
<td>34 floors / h: 102.00m</td>
<td></td>
<td>....-1989</td>
<td>hotel</td>
</tr>
<tr>
<td>YAPI KREDİ PLAZA</td>
<td>Levent / İstanbul</td>
<td>1. Block 18 floors / h:64.00m, 2. Block 19 floors / h:71.00m, 3. Block 20 floors / h:70.00m</td>
<td>Haluk Tümay, Ayhan Böke</td>
<td>1987-1990</td>
<td>office</td>
</tr>
<tr>
<td>EGE PALAS HOTEL</td>
<td>Alsancak / İzmir</td>
<td>23 floors</td>
<td>Bülent Veryeri, Doğan Tuna, Erçin Kezer, Said Saltagı</td>
<td>1987-1993</td>
<td>hotel-commerce</td>
</tr>
<tr>
<td>THE HALK BANK GENERAL ADMINISTRATION BUILDING</td>
<td>Ankara</td>
<td>28 floors / h:89.00m</td>
<td>Doğan Tekeli, Sami Sisa</td>
<td>1985-1989</td>
<td>office</td>
</tr>
<tr>
<td>NOVA-BARAN PLAZA</td>
<td>Şişli / İstanbul</td>
<td>21 floors / 76m</td>
<td>Utarıtızgı, Ataman Demir</td>
<td>1985-1990</td>
<td>office</td>
</tr>
<tr>
<td>AKABE COMMERCIAL CENTER</td>
<td>Ayazağa / İstanbul</td>
<td>22 floors / 57.20m</td>
<td></td>
<td>1984-1990</td>
<td>office</td>
</tr>
<tr>
<td>NET HOTEL</td>
<td>Talimhane / İstanbul</td>
<td>32 floors / h: 110.00m</td>
<td></td>
<td>1986-1991</td>
<td>office</td>
</tr>
<tr>
<td>THE ANKARA SHERATON HOTEL</td>
<td>Ankara</td>
<td>25 floors / h: 75.00m</td>
<td></td>
<td>....-1991</td>
<td>hotel</td>
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<tr>
<td>THE MERSİN TRADE CENTRE TOWER</td>
<td>Mersin</td>
<td>52 floors / h:162.00m</td>
<td>Cengiz Bektas</td>
<td>....-1991</td>
<td>hotel-office-commerce</td>
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<tr>
<td><strong>TAKSİM INTERNATIONAL TOURISM AND BUSINESS CENTER</strong></td>
<td>Gümüşsuyu/İstanbul</td>
<td>44 floors /h: 129.00m.</td>
<td>under construction</td>
<td>office-commerce</td>
<td></td>
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</table>
| **BÜYÜK SÜRMELEY PARK HOTEL** | Gümüşsuyu/İstanbul | 1.Block 45 floors /h: 119.00m.  
2.Block 33 floors /h: 66.00m. | ....-1991 | hotel |
| **YEDİTEPE HOTEL AND BUSINESS CENTER** | Beşiktaş /İstanbul | 30 floors /75.00m | ....-1991 | hotel-office |
| **ÜÇ-EL BUSINESS CENTER** | Levent /İstanbul | 24 floors /h: 95.00m | ....-1991 | office |
| **SWISSHOTEL** | Maçka /İstanbul | 21 floors /h: 50.40m | UD United Architect Construction and Tourism Partnership. | hotel |
| **CONRAD HOTEL** | Beşiktaş /İstanbul | 18 floors /h: 60.00m | W.B. Tabler | ....-1991 |
| **BARBAROS BUSINESS CENTER** | Balmumcu /İstanbul | 24 floors two tower/h: 95.00m | Hayati Tabanhoğlu | ....-1991 |
| **ZİNCİRLİKUYU BUSINESS CENTER** | Levent /İstanbul | 27 floors | | office-commerce |
| **HOLLIDAY INN HOTEL** | Ataköy /İstanbul | 29 floors /93.00m. | Hayati Tabanhoğlu | ....-1991 |
| **MAYA - AKAR BUSINESS CENTER** | Esentepe /İstanbul | 30 floors /h: 100.30m  
16 floors | İlhan Tayman, Levent Aksüt, Yaşar Marulva | ....-1992 |
| **MOVENPICK RADISSON HOTEL** | Levent /İstanbul | 33 floors /99.00m | Ertem Ertunga | 1988-1992 |
| **SPRINGIZ PLAZA** | Maslak /İstanbul | 22 floors /65.50m. | Can Elgiz | ....-1992 |
| **TURK ŞİŞE CAM BUSINESS CENTER** | Levent /İstanbul | 1.Block 47 floors /h: 160.00m | | office |
| **UTTM (INTERNATIONAL COMMERCIAL AND TOURISM CENTER** | Zeytinburnu/İstanbul | 1.Block 22 floors /h: 95.00m.  
2.Block 24 floors /h: 102.80m.  
3.Block 25 floors /h: 106.40m | | office-commerce |
<table>
<thead>
<tr>
<th>Building Name</th>
<th>Location</th>
<th>Floors/Height</th>
<th>Architect(s)</th>
<th>Completion Year</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ETAP MARMARA</strong></td>
<td>Taksim / Istanbul</td>
<td>20 floors / 81.00m</td>
<td></td>
<td>1992</td>
<td>Hotel</td>
</tr>
<tr>
<td><strong>ŞİŞLİ BUSINESS CENTER</strong></td>
<td>Levent / Istanbul</td>
<td>15 floors</td>
<td></td>
<td>1992</td>
<td>Office</td>
</tr>
<tr>
<td><strong>AK CENTER</strong></td>
<td>Etiler / Istanbul</td>
<td>15 floors / 63.71m</td>
<td>Fatin Uran</td>
<td>1992</td>
<td>Residence - Office - Commerce</td>
</tr>
<tr>
<td><strong>POLAT RENAISSANCE HOTEL</strong></td>
<td>Yeşilyurt / Istanbul</td>
<td>28 floors / 93.00m</td>
<td>Yılmaz Sanlı</td>
<td>1993</td>
<td>Hotel</td>
</tr>
<tr>
<td><strong>SABANCI CENTER</strong></td>
<td>Levent / Istanbul</td>
<td>44 floors / 136.00m</td>
<td>Haluk Tümay, Ayhan Böke</td>
<td>1989-1993</td>
<td>Office</td>
</tr>
<tr>
<td><strong>MECIDİYEKÖY COMMERCIAL CENTER</strong></td>
<td>Levent / Istanbul</td>
<td>39 floors</td>
<td></td>
<td>1993</td>
<td>Office</td>
</tr>
<tr>
<td><strong>HYATT REGENCY HOTEL</strong></td>
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<td>12 floors / 32.50m.</td>
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<td>1993</td>
<td>Hotel</td>
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<tr>
<td><strong>CIHAN BUSINESS CENTER</strong></td>
<td>Balmumcu / Istanbul</td>
<td>30 floors / 86.25m</td>
<td>Dinçer Tunali</td>
<td>1989-1995</td>
<td>Office</td>
</tr>
<tr>
<td><strong>METROCITY MILLENIUM</strong></td>
<td>Levent / Istanbul</td>
<td>42 floors / 118.57m</td>
<td>Doğan Tekeli Sami Sisa</td>
<td>Under Construction</td>
<td>Mixed Used</td>
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<tr>
<td><strong>THE AEGEAN WORLD TRADE CENTER</strong></td>
<td>Basmane / İzmir</td>
<td>33 floors / 140.00m</td>
<td>Ertem Ercüner</td>
<td>1998 - ....</td>
<td>Office - Shopping Center - Cultural Center</td>
</tr>
<tr>
<td><strong>KSK-PLAZA</strong></td>
<td>Karşıyaka / İzmir</td>
<td>33 floors / 119.00m</td>
<td>Ertem Ercüner</td>
<td></td>
<td>Office - Shopping Center - Residence Center - Stadium - Closed Sports Hall</td>
</tr>
<tr>
<td><strong>ÖZDİLEK BUSINESS &amp; SHOPPING CENTER</strong></td>
<td>Balçova / İzmir</td>
<td>26 floors / 100.00m</td>
<td>Proje Architecture Company</td>
<td></td>
<td>Office - Shopping Center</td>
</tr>
</tbody>
</table>

*Note: The table contains information about various buildings, their locations, architectural features, architects, completion years, and uses.*
| İŞBİRLİĞİ HOLDING SHOPPING CENTER | Balçova/İzmir | 22 floors / h: 78.00m. | Engin Gürel | 1998- .... (under construction) | office shopping center |
| AKSOY PLAZA | Alsancak/İzmir | 22 floors / h: 65.00m | Orhan Erdil | 1998- .... (under construction) | office shopping center |
| BİRLİK BUSINESS CENTER | Alsancak/İzmir | 21 floors / h: 63.00m | Engin Gürel | - | office shopping center |
| SILVER TOWER | Alsancak/İzmir | 22 floors / h: 60.00m | | 1998- .... (under construction) | office |
# APPENDIX-B

## HIGH-RISE BUILDINGS IN İZMİR

<table>
<thead>
<tr>
<th>NAME OF THE BUILDING</th>
<th>PLACE</th>
<th>NUMBER OF FLOORS &amp; HEIGHT</th>
<th>DESIGNERS</th>
<th>CONSTRUCTION YEAR (start-completion)</th>
<th>FUNCTION</th>
<th>LOCATION DECISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HILTON</td>
<td>Alsancak/İzmir</td>
<td>34 floors/h:122.95m</td>
<td>-</td>
<td>1985-1990</td>
<td>hotel</td>
<td>Tourism and commercial region</td>
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<tr>
<td>EGE PALAS</td>
<td>Alsancak/İzmir</td>
<td>23 floors/h:61.80m</td>
<td>Bülcen Veryeri, Doğan Tuna, Erçin Kezer, Sait Saltağ</td>
<td>1987-1993</td>
<td>hotel</td>
<td>according to master plan</td>
</tr>
<tr>
<td>THE AEGEAN WORLD TRADE CENTER</td>
<td>Başmane/Izmir</td>
<td>33 floors/h:140.00m 38 floors/h:153.00m</td>
<td>Ertem Erunga</td>
<td>1998- .... (under construction)</td>
<td>office-hotel shopping center cultural center</td>
<td>partial plan changing</td>
</tr>
<tr>
<td>KSK-PLAZA</td>
<td>Karşıyaka/İzmir</td>
<td>33 floors/h:119.00m</td>
<td>Ertem Erunga</td>
<td>-</td>
<td>office-hotel shopping center residence stadium closed sports hall</td>
<td>partial plan changing</td>
</tr>
<tr>
<td>ÖZDILEK BUSINESS &amp; SHOPPING CENTER</td>
<td>Balçova/Izmir</td>
<td>26 floors/h:100.00m</td>
<td>Proje Architecture Company</td>
<td>-</td>
<td>office shopping center</td>
<td>partial plan changing</td>
</tr>
<tr>
<td>İŞBİRLİĞİ HOLDING SHOPPING CENTER</td>
<td>Balçova/Izmir</td>
<td>22 floors/h:78.00m</td>
<td>Engin Gürel</td>
<td>1998- .... (under construction)</td>
<td>office shopping center</td>
<td>according to master plan</td>
</tr>
<tr>
<td>AKSOY PLAZA</td>
<td>Alsancak/İzmir</td>
<td>22 floors/h:65.00m</td>
<td>Orhan Erdil</td>
<td>1998- ..... (under construction)</td>
<td>office shopping center</td>
<td>partial plan changing</td>
</tr>
<tr>
<td>BİRLIK BUSINESS CENTER</td>
<td>Alsancak/İzmir</td>
<td>21 floors/h:63.00m</td>
<td>Engin Gürel</td>
<td>-</td>
<td>office shopping center</td>
<td>partial plan changing</td>
</tr>
<tr>
<td>SILVER TOWER</td>
<td>Alsancak/İzmir</td>
<td>22 floors/h:60.00m</td>
<td>-</td>
<td>1998- .... (under construction)</td>
<td>office</td>
<td>partial plan changing</td>
</tr>
</tbody>
</table>
LOCATION OF HIGH-RISE BUILDINGS IN İZMİR

- HILTON (34 FLOORS)
- EGE PALAS (23 FLOORS)
- THE AEGEAN WORLD TRADE CENTER (33 & 38 FLOORS)
- KSK-PLAZA (33 FLOORS)
APPENDIX D

LOCATION OF HIGH-RISE BUILDINGS IN ISTANBUL

LEGEND

- HIGH-RISE BUILDINGS UPTO 1985
- HIGH-RISE BUILDINGS AFTER 1985
- UNDER 20 FLOOR
- BETWEEN 20-29 FLOOR
- BETWEEN 30-39 FLOOR
- MORE THAN 40 FLOOR
AIM
Highrise buildings should be located in such a way in the city so that they would not make any psychological pressures and negative effects on the silhouette.

DETERMINATION OF THE OBJECTS
1. Zone, that the highrise buildings will take place should be determined. These zones:
   - According to the functions (where the hotel, resident, commerce buildings will be located)
   - According to the areas where building height will be controlled (location in the existing silhouette)
     1. Chosen spatial view points belonging to the city,
     2. Areas with special natural values,
     3. Areas facing open areas,
     4. Historical areas that will be conserved.
2. Creating harmonious spaces for people, without ruining the eco-system balance.

RESTRICTIONS
* Eco-system
  - Nature
    - (Underground and overground values, climate effects)
  - Manmade obstacles
    - Existing urban layout and silhouette
  - Technological possibilities
  - Investment sources

DETERMINATION OF DESIGN CRITERIA
* Design guides
  To produce the outline rules according to the function of the highrise buildings and the environment they take place in.

IMPLEMENTATION

DECISION MAKING AND CONTROL COMMISSION
* Local administration representative
* Urban planner
* Urban designer
* Psychologist
* Sculptor
* Designer
* Geographer
* Economist
* Sociologist

APPENDIX-G

İZMİR METROPOLITAN MUNICIPALITY
HIGH-RISE BUILDINGS REGULATION

İZMİR BÜYÜKŞEHİR BELEDİYESİ
YÜKSEK YAPILAR YÖNETMELİĞİ

İZMİR BÜYÜKŞEHİR BELEDİYESİ
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ÖNSÖZ

YÜKSEK YAPILAR YÖNETMELİĞİ KENTSEL GELİŞME HIZLANDIRACAKTIR.

İzmir'i dünyaya taşiyacak mega projeleri uyguladığımız bir dönemde yeni bir çalışmamızı gerçekleştirdiğimiz için büyük mutluluk duymaktayız. Söz konusu çalışma Türkiye'ye çağdaş kentleşme yolunda hızla mesafe almada önemli katkı sağlayacak bir eserdir.


Yönetmelik uygulama çerçevesinde karşılaşılan problemlerle ilgili düzeltmelere açık olup gerekli görülebileceği her türlü eklemelerde bilahare yapılacaktır ve elbette daha sağlıklı bir yönetimliğin oluşturulmasına çalışılacaktır.

İzmir kentsel problemlerin çözümünde daima öncülük yapma şerefini kazanmıştır. Büyükşehir Belediye Başkanlığı görevimin ilk döneminde de İzmir çevre duyarlılığını Türkiye gündemine girmesinde önemli rol üstlenmiştir. Çevre Yönetmeliğinin hazırlanması ve uygulanması başarısını göstermiştir.

Yüksek Yapılar Yönetmeliğinin de aynı şekilde başarılı bir uygulamayı beraberinde getireceğine iztenlikle inanıyorum.

Yönetmeliğin hazırlanmasında emeği geçen ve kent menfaatleri doğrultusunda sürekli dayanışma içerisinde bulunduğuuz meslek odalarımızın Değerli Başkan ve Üyelerine teşekkür ediyorum.

Mimarlar, inşaat mühendisleri, makina mühendisleri, elektrik mühendisleri ve şehir plançları odalarımız bu yönetimliğin hazırlanmasında Belediyemiz İmar Müdürlüğü ekipleriyle örnek bir çalışma sergilemişlerdir.

Neticede güzel bir eser ortaya çıkarılmıştır. Meyvelerinin bu emeğin karşılığı olmasını diliyorum.

Saygılarıyla

Dr. Burhan ÖZFATURA
İzmir Büyükşehir Belediye Başkanı
İZMİR BÜYÜKŞEHİR BELEDİYESİ
YÜKSEK YAPILAR YÖNETMELİĞİ

1-GÉNEL HÜKÜMLER

1.01- Amaç:
Bu Yönetmelik, Yüksek Yapıların tasarım, yapım ve denetim aşamalarında İzmir Büyükşehir Belediye Başkanlığı'nın kent bütününde eşgüdümülü ve uyumlu uygulamayı sağlamak üzere, ilgili kurum, kuruluş ve kurullar ile bu konudaki görev, yetki ve yöntemleri belirleme amacıyla düzenlenmiştir.

1.02- Kapsam:
Yönetmelik, İzmir Büyükşehir Belediyesi ve mücavir alan sınırları içinde, İmar planlarında uygun görülen yerlerde yapılacak yüksek katlı yapıların tasarım ve projelerinin denetim ve değerlendirilmesinde, gerekli izin ve ruhsatnamelerin verilmesinde, uygulamaların izlenmesinde ve diğer imar yetkilлерinin kullanılmasında gözetilecek idari ve teknik ölçüt, önlem ve yöntemleri kapsamaktadır.

1.03- Hukuksal Dayanak:
Bu Yönetmelik, Büyükşehir Belediye Başkanlığında 3030 sayılı yasanın 6/A-b, 14/n ve buna ilişkin Yönetmeliğin 8/B maddeleri ile verilmiş bulunan imarla ilgili genel gözetim ve eşgüdüm sağlama görev ve yetkisinin, yüksek Yapılar özelinde aynı Yönetmeliğin 10.maddesinin altıncı fıkrası hüküm doğrultusunda idarenin danışma ve denetim birimleri oluşturma ve buna ilişkin düzenleme yapma işlevi uyarınca düzenlenmiştir.
Yürürlük Ve Uygulama:

Bu Yönetmelik Büyükşehir Belediye Meclisinin onayı ve mahalli gazetelerden birinde onayının duyurusundan bir ay sonra yürürlüğe giret. Büyükşehir Belediyesine bağlı tüm belediyelerde uygulanır.

Bu yönetmelikte açıklanmamış hususlarda İzmir Büyükşehir Belediyesi İmar Yönetmeliği hükümleri geçerlidir.

Uygulamada tereddüte düşülmesi halinde uygulanacak çözümün taktirine İnceleme Kurulunun görüşünü alarak İzmir Büyükşehir Belediyesi yetkilidir.

İnceleme Kurulu:

İnceleme Kurulu, yüksek yapıların tasarıımı, yapım ve denetim aşamalarında imar yetkilerini kullanacak olan Belediyelere sürekli teknik danışmanlık hizmeti veren yardımcı birimdir.

Kurul kararları ilgili Belediyeler açısından varlığı zorunlu ve yönlendirici hazırlık işlemi niteliğindedir.


Kurul, incelemlerini sırasında gerekli gördüü konularda ve ilgili oda temsilcisinin olumsuz görüşü bildirdiği hususlarda uzman kişi ve kuruluşlardan görüş alır. Kurulun sekreterya hizmetlerini kurul başkanlığı yürütür ve gerekli harcamalar Büyükşehir Belediyesi bütçesinden karşılanır.
Ön Olur Ve İnceleme:
Uygulama projeleri (kesin projeler) yapılmadan önce; avan mimari proje, statik, mekanik, elektrik v.b. mühendislik kabullerine ait açıklama raporları ve gerekli yerleşim krokileri ile inceleme kurulundan ön olur alınacaktır. Kurul, ön incelemeyi müracatin kurula intikal tarihinden itibaren bir ay içinde görüş raporu ile sonuçlandırır.

İnceleme kurulu tarafından kabul edilmiş bulunan avan mimari proje, mühendislik kabulleri ve İnceleme Kurulu raporuna göre hazırlanacak uygulama projeleri, ilgili Meslek Odalarının mesleki denetiminden geçmişden inşaat ruhsati; yapı bitiminde ise İnceleme Kurulundan uygunluk belgesi alınmadan yapı kullanma izni verilemez. İnceleme Kurulu, uygunluk belgesi için incelemesini başvuru ve parselin arşiv dosyasının kurula intikalinden itibaren onbeş gün içinde sonuçlandırılır.

Kurul tarafından yapılan tüm incelemelerde, süresi içinde olumlu veya olumsuz olarak sonuçlandırılamayan projeler kuruldan onay almış sayılır.

2-TANIMLAR

Yüksek Yapılar: Yüksek yapı, genel olarak yakın ve uzak çevresini, fiziksel çevre, kent dokusu ve her türlü kentsel alt yapı yönünden etkileyen bir yapı (bina) türüdür.

Son kat tavan doşeme kotu 30.80 metreyi ve /veya bodrum kat dahil olmak üzere toplam kat adedi 13'ü aşan (13 kat hariç) yapılar Yüksek Yapı olarak kabul edilir.


Yangın Zonu: Yangın durumunda, ihbar ve söndürme önlemleri aynı bölüm içindeki diğer sistemlerden ayrı olarak devreye giren bölüm parçalarıdır.

Yumuşak Kat: Dolgu duvarlarının üst katlarda olması ve söz konusu
katın büyük bir kısının duvarsal olması nedeniyle diğer katlara göre farklı rijittlikte ve çok narin kolonlardan oluşan katlardır.

**Atalet momentleri merkezi:** Bütün taşıyıcı düşey elemanların ataletlerin ağırlık merkezidir.

**Kitle merkezi:** Her katta mevcut olan tüm düşey yüklerin ağırlık merkezidir.

**Yanmaya dayanıklık sınıfı:** Bir yapı elemanı ve malzemesinin standartına uygun ısıtma ve basınç koşullarında yapılan deney sonucu belirlenen yanmaya dayanıklık süresine bağlı olarak ayrıldığı sınıf Örn.TS.1263’e ve TS. 4065’e göre F 90 sınıfının dayanıklık süresi 90 dakikadır.

### 3- YERLEŞİM DÜZENİNE İLİŞKİN ESASLAR

**3.01**  Mevcut imar plan kararları ile öngörülmüş olan yapı ve nüfus yoğunluğu arttırılamaaz. Mevcut yoğunluk, plan kararları ile yüksek yapısı olarak kullanılabilir.

**3.02**  Avan projenin hazırlananması aşamasında aşağıdaki kriterler dikkate alınır.

- Çevresel etkisi, şehir silüetine etkisinin incelenmesi,
- Jeolojik yapıların incelenmesi,
- Hava trafiğinin incelenmesi,
- Genel ulaşım ve yangın ulaşım planlarının incelenmesi,
- Alt yapı bağlantıları ve kapasitelerinin incelenmesi,
- Güneş açılara ve rüzgara göre çekme mesafelerinin incelenmesi.
Gelişme alanlarında, imar planında aksine bir açıklama getirilmediği hallerde;

01- Binanın 30.80 metre yüksekliğe kadar olan kısmı için imar hattından ve parsel sınırından minimum çekme mesafesi 15 metredir. Binanın 30.80 metreden yüksek olan kısmının ön cephe hattının imar hattına olan uzaklığı, yapının toplam yüksekliğinin yarısından az olamaz.

0.2- Bir parselde birden fazla bina yapılması halinde, binalar arasındaki mesafe, en az binaların yükseklikleri kadar bırakılır. Binalar farklı yüksekliklerde ise yüksek olan binanın yüksekliği minimum mesafe olarak alınır.

03-Yapı adasının konumu, arazi yapısı veya değişik mimari çözümlerin gerektirdiği hallerde, yukarıdaki minimum koşulları sağlamak kaydı ile, binalar arası mesafenin saptanmasında inceleme kurulu yetkilidir.

4-YANGIN ÖNEMLERİ

4.01- Konut dışı yapılarda; Yapı en çok 30 metrede bir yangın duvarları ile bölümlendirilecektir. Bu bölümler arasındaki geçitler yangına dayanıklı kapılarla sağlanacaktır. Her yangın bölümünün, doğrudan bir yangın merdivenini bağlanışı veya açık hava penceresi olacaktır. Her yangın bölümünde, 20 metreden daha uzun koridorlar, 15 metrede bir ateşe dayanıklı duvan geçirmez kalemla zonlara bölünecektir. Ayrıca, yangın derecesi yüksek her bodrum kat, depo, mutfaq, çamaşırhane, garaj gibi hacimler.mustakil-yangın bölümlü olarak oluşturulacaktır. Konut yapılarda, her bağımsız bölüm ayrı bir yangın bölümü olarak
duzenlenecek ve her bağımsız bölümden doğrudan yangın merdivenine ulaşılarak. Tüm yapılar, merdiven ve asansörler müstakil bir yangın bölümünü oluşturacaktır.

4.02- Yüksek yapıların taşıyıcı sisteminin yangın güvenliği, yanmaya dayanıklık sınıfı F 90 olan yapı elemanlarıyla sağlanacaktır. Yüksekliği 60 metreyi aşan binalarda ise dayanıklık sınıfı F 120 olacaktır. Yanmaya dayanıklık sınıfları için bu konudaki TS. 1263 ve TS. 4065 kullanılacaktır.

4.03- Yüksek yapıarda bütün taşıyıcı yapı elemanları, merdivenler, merdiven kovalarının duvarları, doşemeler, kaçış yolları vb. yangına dayanıklık sınıfı en az F 90 olan yangına dayanıklı malzeme ile tasarlanacak ve yapılacaktır. Zemin altındaki duvar ve doşemeler ile yangın dirençli bölüm kapıları için dayanıklık sınıfı F 120 olacaktır. Yeterli direnç sahip olmayan elemanlar uygun kaplamalar ile korunacaktır.

4.04- Dış duvarlarda yangın söndürme ve kurtarma araçlarının erişebileceği yeterli ölçüde açıklıklar bırakılacaktır. Yangın sırayetini önlemek üzere dışa kapı ancak zemin katta (giriş katında) veya en az 60 cm. genişlikteki balkonlarda yapılabilir.

İki pencere arasındaki mesafe en az 1.10 metre olacak ve bu bölüm yangın dayanıklık sınıfı F 90 olan malzeme ile yapılacaktır.

4.05- Yapıda otopark dışında toprağa gömülü birden çok bodrum kat varsa, bu katlar birbirlerinden iç bağlantıları olmaksızın, yangına dayanıklı biçimde ayrırlacaktır. Bodrum katların penceleri farklı ışıklıklara açılacaktır.

4.06- Yapıda, tahliye anında korunmuş alana ulaşılmasını sağlayan kaçış yolları tasarlanacaktır. Kaçış yollarının başka daire veya mekanlar içinden geçerek korunmuş alana ulaşmasına izin verilmez.
Kaçış yollarının genişliği 150 cm. den az olamaz. Kaçış yollarının kon- runmuş mekanlara veya sokağa açılan kapıların genişliği 150 cm. den az olamaz. Çok sayıda kişinin bulunduğu yerlerde, kaçış yolları ve kapıların genişliği kişi başına 1 cm. olarak hesaplanır. Bu kapılar, kaçış yönünde içerden dışarıya kilitsiz olarak açılacak, otomatik olarak kendi kendine kapanacaktır. Bunların yanın dayanıklılık sınıfı en az F 60 olacak, dışa açılan tüm kaçış kapıları "Panik Bar" sistemi ile donatılacaktır.

Binanın ana elektrifikasyonu ile ilgili bölümleri (jeneratör odası, trafo, kontrol merkezi gibi) ve itfaiye asansörlerinin makine dairelerine ait duvar, doşeme ve tavanlar yanın dayanıklılık sınıfı F 120 olan yapı elemanları ile korunacaktır.

Bacalar:


Pencere ler:

Tüm yüksek yapılarda, dıştan temizleme düzenekleri yapıldığı takdir- de çatı parapetleri betonarme olmak zorundadır. Pencere lerin en az 90 cm. parapet kısmı dolu veya yanın dayanıklılık sınıfı F 90 olan malzeme ile yapılacaktır. Her durumda en az 110 cm. yükseklikte yatay güvenlik önlemi alınacaktır.

Yüksek yapılarda, 51 metreden sonraki pencere ler ancak kontrollü ola- rak açılabilir.
4.10- Kapılar:
Ana giriş kapıları rüzgarlıklı ya da döner kapı yapılacak, kapı kanatları dışa açılacak, rüzgarlık iç kapıları çarpankapı vb. olacaktır.

4.11- Bina girişine yakın, binaya ilişkin tüm dökümanların (proje v.b.) ve yangın sistemine ilişkin bilgilerin bulunduğu bir mekan ayrılacaktır. Bu mekan yangına dayanıklık sınıfı F 90 olan malzemeden yapılacak ve binanın idari bölümleri ile irtibatlandırılacaktır. İtfaiye merdivenin çekirdeğinin düzenlenmesi halinde, bu mekan çekirdeğin içinde yer alabilir.

4.12- Yangın Merdivenleri:

0.1- Binada normal merdivenin dışında ve bu merdivenden bağımsız olarak tertiplenmiş en az bir yangın merdiveni olacak ve katlardaki her birimden bu merdivene ulaşılacaktır. Yangın merdivenlerine yapının en uzak noktalarından ulaşım mesafesi 30 metreyi geçemez. Bu merdivenler açılış katına ulaşacak, ayrıca son katta birbirine yangına karşı güvenli olarak bağlanacaktır.

0.2- Yangın merdivenlerinde pozitif basınç yapılmamış ise; merdiven bölümünde açılabilir pencere veya her merdivenin üzerinde devamlı havalandırmayı sağlayacak tepe penceresi bulunacaktır. Ayrıca, duvanın boşalabilmesi için, merdivenlerde uygun aralıklarla delikler bırakılacaktır. Bu merdivenler, her kattan kismen veya tamamen mekanik havalandırma sağlanmış hollerden (kaçış yollarından) geçilmesi zorunludur.

0.3- Yangın merdiveni kargı veya betonarme olarak inşa edilecek ve içinde, duvarında, tavanında ve tabanında hiçbir yanıcı malzeme kullanılamayacak ve yangına dayanıklık sınıfı F 120 olacaktır. Yangın merdiveninin kapıları, duvan sızdırmaz ve yanmaz olarak yapılacak. Yangın merdivenlerinin her iki kenarında yangına dayanıklı malzeme den yapılmış küpeste ve korkuluk bulunacak ve kapılarla eşik yapılmayacaktır.
0.4- Yangın merdivenleri yangına karşı tamamen korunmuş olacak. Yapıda otopark dışında toprağa gömülü birden fazla bodrum kat olması halinde, bu katların her biri için diğerlerinden bağımsız ve ilişiksiz ayrı ayrı yangın merdivenleri düzenlenecektir.

0.5- Yangın merdivenlerinin genişlikleri 135 cm. den az olamaz. Yangın merdivenlerinin korunmuş mekanlara veya sokagı açılan kapıların genişliği 150 cm. den az olamaz. Çok sayıda kişinin bulunduğu yerlerde (tiyatro, sinema vb.) yangın merdiveni genişliği; kaçış yönüne göre inişte kişi başına 1.25 cm., çıkışta 2 cm. alınır. (Örneğin 200 kişinin bulunduğu bir yerde; üst katlardan inen her merdiven kolu 250 cm. den, bodrumdan çıkan her merdiven kolu 400 cm. den az olamaz.)

0.6- Yangın merdivenlerinin elektrik tesisatı ayrı bir hatla kesintisiz güç kaynağına veya otomatik devreye giren jeneratöre bağlı olacaktır.

0.7- 51 metreden daha yüksek ve toplam brüt inşaat alanı 15.000 m² yi aşan konut dışı yapılarda, ayrıca iftaiye merdiveni yapılması zorunludur. Bir noktadan iftaiye merdiveni girişine kadar yürümeye uzaklığı en fazla 60 metre olmalıdır. İftaiye merdiven sahanlığı, min. 6 m² olacak şekilde düzenlenmelidir, dış duvarlarda en az 0.50 m² boşluk olmalıdır. Bu boşluk sahanlık alanının 1/4'ü oranında bırakılmalıdır. Merdiven mahaline binanın dışından doğrudan ulaşılacaktır.

13- Binaların konut dışı kullanılan topluma açık bölümlerinde, yağmurlama (sprinkler) sistemikurulacaktır. Kullanım yer ve amaçına uygun olarak, ıslak borulu veya kuru borulu sistem dizaynı kabul edilebilir. Sprinkler sistemi, yangın algılanması anında, pompayı devreye otomatik olarak sokan ve yangın ihbar santralına uyarı gönderen otomatik vana ile teçhiz edilecektir.

14- Her türlü yüksek yapıda, yangına karşı mücadeledede kullanılmak üzere, yangın dolapları bulunacaktır. Dolaplar, yangın musluğu ve hortum-
laren yerleşirilmesine uygun büyüklükte olacak, üzerinde kolayca görülebilecek "YANGIN" ibaresi bulunacaktır. Yangın hortumlarının katlanarak toplanabildiği yangın dolapları tercih edilecektir.

Yangın dolapları, her katta ve her yangın bölümünde, aralarındaki uzaklık 50 metreden fazla olmayacak şekilde düzenlenecektir. Kapalı kullanım alanı 500 m² den büyük yerleşimlerde, her 500 m² için en az 1 adet yangın dolabı bulunacaktır. Konut yapılarda ise her katta ve aralarındaki uzaklık 50 metreden fazla olmayacak şekilde yangın dolapları düzenlenecektir.

Düşey yangın kolonlarında, en düşük boru çapı 2 1/2", branşman boruları en az 2" olacaktır. Yüksek yapılarda, ayrıca 2 1/2" dan aşağı olmamak üzere hidrolik hesap yapılacaktır. Boru sistemi, 10 bar basınca kadar, 15 bar hidrostatik basınçla, 10 bar'ın üzerinde işletme basıncının 1.5 katına test edilecektir.

Yüksek yapının bina dışında ve ana caddeden ulaşabileceği en uygun yerinde itfaiyenin kendi aracından su bağlantısı yapabileceği kuru boru sistemi yapılacaktır.

Yangın muslukları, dakikada 500lt. debiyan en kritik noktada lansın girişinde, 6 bar basınçla verebilecek 2" büyüklükte olacaktır. Hortumlar, 2" ve 20 metre olacaktır. Yangın muslukları, 2", rakorlar 110 olacaktır.

4.15- Yangına su sağlayan sistemler, su akışı varken en kritik noktada, dakikada 500 lt. debiyan 6 bar basınçla, en az 60 dakika süre ile sağlayabilecek şekilde dizayn edilecektir.

4.16- Konut yapılarda en az 100 m³'lük, konut dışı yapılarda ise en az 150 m³'lük güvenilir su hacmi veya mevcut değilse, 300 metre içinde, aynı nitelikte bir su hacmi bulunmalıdır. Her katta, en az 2 adet olmak üzere, beher 250 m² için sabit kuru boru sistemine bağlı, yangın musluğu bulunacaktır.
ASANSÖRLER

1.01- Binanın tipi ve konfor düzeyine göre tekik kriterler dikkate alınarak trafik hesabi yapılıp, asansör sayısı, kapasite, hız ve kuyu ölçüleri belirlenecektir.

1.02- Asansörlerden en az bir tanesi yük, eşya ve sedye taşıma amaçına uygun olarak yapılacaktır.

1.03- Aynı kuyu içinde üçten fazla asansör pozisyonlandırılmaz. Dört asansör pozisyonlandırıldığı takdirde ikişerli gruplar halinde ayırlarak, araları yangına karşı dayanıklı bir malzeme ile ayıralacaktır.

1.04- Asansörlerde, kabin kapısı olacak ve kabinin havalandırma için akü şarj grubuna bağlı bir havalandırma düzenesi bulunulacaktır.

1.05- Yüksek hızlı asansörlerde (1 m/sn.in üzerinde) tahrik sistemi kademessiz hız kontrol ilkelerine bağlı olarak seçilip tasarlancaktır.

1.06- Asansörlerde kuyu altlarının meskun mahallerin (iskan edilen hacimler) üstüne gelmesi halinde karşı ağırlıklar da mutlaka paraşüt tertibatı yapılacaktır. 1m/sn den yüksek hızda asansörlerde kaymalı fren sistemi kullanılacaktır.

Karşı ağırlık için paraşüt donanımı yapılması halinde, bunun için kuyu ölçü taydilati dikkate alınacaktır.

1.07- Konut dışında halkın toplu bulunduğu (umuma açık) yapılarda trafik hesabi sonucu ortaya çıkan asansörlerden biri bedensel özürülerin kul- lunımına uygun olarak düzenlenecektir. (Bkz.İmar Yönet. M.3.46)
Yangın anında asansörler; yangın ihbarı aldıklarında kapılarını açılana kadar kapalı kalmayacak ve kapıları açık bekleyecek. Ancak, asansörler gerektiğinde yetkililer tarafından kullanılabilir elektriksel sisteme sahip olacaktır.

Asansörler yangın ihbarı aldıklarında kat ve koridor çağrılarını kabul etmeyecektir.

Yangın anında asansör kuyularının yangın etkisi altında kalmaması için kuyu basınçlandırma ünitelerinin kurulması zorunludur. Deprem anında ise; asansörler, ihbarı aldıklarında en yakın katta gidip, kapılarını açıp, hareket etmeyecek şekilde programlanacaktır.

Asansör kat kapılarının yangına dayanıklılık sınıflı F 90 olacaktır.

51 metreden daha yüksek toplam brut inşaat alanı 15.000 m²'yi aşan konut dışı yapılarada, ayrıca itfaiyeden kullanılması için en az bir tane yangın asansörü yapılacak. Bu asansör itfaiye merdiveni çekirdeğinde olabileceği gibi bu merdivenle bağlantılı bir bölümden de yer alabilir.

İtfaiye asansörünün kabin alanı min.1.5 m², taşıma kapasitesi min.630 kg., hızı zemin kattan en üst katta 1 dakikada erişecek hızda olacak ve enerji kesilmesi halinde jeneratöre bağlı olacaktır.

İtfaiye asansörleri her katta hizmet edecek ve normalde de kullanılabilir olacaktır. Bu asansörlerin kapıları, elektrik tesisat ve kabloları 2 saat yangına karşı dayanıklı olacaktır. Asansör boşluğu içindeki tesisat sütun etkilenmeyecektir.

6. STATİK VE BETONARMEYE İLİŞKİN ESASLAR:

Her yüksek yapı için proje onayından önce hesaplara esas olmak üzere, arazide ve araziden alınmış numuneler üzerinde jeolojik ve geoteknik çalışmalar yapılacaktır. Bu çalışma, bu işlerde uzmanlaşmış kişi ve kuruluşlar tarafından yapılacaktır.
6.02- Zemin raporunda binanın yapılacağı araziye ilişkin şu bilgiler bulunacaktır.
- Jeolojik yapı,
- Zemin özellikleri, (yeraltı su seviyesi ve kimyasal yapısı),
- Temel sistemi konusunda öneriler,
- Gerekiyorsa istenen sıkıştırma veya islah yöntem önerileri,
- Temel kazı sırasında alınması gereken önlemler ve iksa yöntemine ilişkin öneriler,
- Temelin çevreye yapılara etkisi.

6.03- Sondaj yerleri ve derinliği arazi konusunda bilgi verecek yeterli sayıda ve derinlikte seçilecektir. İnceleme Kurulu gerekli görülse daha fazla sondaj isteyebilir.


6.05- Yüksek yapılarda BS 20 den daha düşük kalitede beton kullanılmaz. Donatı cinsi olarak, birim uzama değeri % 10'un altında olan BC III kullanılmamalıdır.

6.06- Yüksek yapılarda, tekil temel sistemi uygulanamaz.

6.07- Yüksek yapı temellerinin tasarımında, özellikle yumuşak ve bozuk zeminlerde zemin-yapı etkileşimi hesapta dikkate alınacaktır.

6.08- Kazıklı temel sistemi seçildiğinde, kazıklar arasındaki uzaklık kazık çapının 3 katından daha az olamaz. Kazık başlık kirişlerinin boyutu en az 30x70 cm. olmalıdır.

6.09- Kaya zemine oturan yüksek yapılarda devrilme tahkiki yapılacaktır.
6.10- Temel projelerinde alt yapıya ilişkin imalatların yeri gösterilecek ve özellikle depremde oluşabilecek yer değiştirmelerde veya farklı oturmalarda nasıl önlem alınacağı belirtilir.

6.11- Yüksek yapılarda yapının mimari tasarımında düşey ve yatay simetri ve düzenliğe özen gösterilecektir. Bunun için, hesap yapılan yöndeki düşey taşıyıcıların atalet momentlerinin merkeziyle kitle merkezi arasındaki uzaklık, yapının o yönündeki boyutunun %5'ini geçemez.

Perdelli yapılarda kattaki her iki yönde betonarme perdelerin toplam alanı, kat alanının %2'sinden az olamaz.

6.12- Yüksek yapılarda zemin katta yumuşak kat oluşumuna neden olacak mimari ve statik çözümlere izin vermeyecek önlemler alınmalıdır.

6.13- Yüksek yapılarda, yatay yer değiştirmeler için afet bölgeleriyle ilgili yönetimlikte verilen sınırlara uyulmanın yanısıra, katlar arasındaki nispi elastik deplasmanın kat yüksekliğine bölümü 0.002'den büyük olamaz.

6.14- Yüksek yapılarda kolon alanı \((A_c=Nd/0.6*f_{ck})\)'dan daha küçük seçilemez.

6.15- Yüksek yapılarda asmolenli döşeme kullanılamaz.

6.16- Temel üst kotundan toplam yüksekliği 75 metreyi geçen yapılarda dinamik hesap yapılmalıdır. Ancak dinamik hesabin sonucu bulunan yatay yük, eşdeğer statik yük esasına göre bulunan değerin %70'inden daha az olamaz.

6.17- Temel üst kotundan toplam yüksekliği 75 metreyi geçen yapılarda, sıcaklıkta, sümne ve buzulmeden doğan etkiler de, özellikle kolonların hesabında dikkate alınmalıdır.
6.18- Yüksek yapıların taşıyıcı elemanları Yangın Önlemleri bölümündeki 4.02 ve 4.03 maddelerine uygun olarak tasarlanacaktır.

6.19- Yangın merdivenlerinde, yangına karşı korunmuş mahallerde pas payı 4cm. den az olamaz. Taşıyıcı sistemlerin paspayları için TS. 1263' deki yanmaya dayanıklık sınıflarına uygun olarak TS 4065' deki çizelgelerde verilenden değerler kullanılacaktır.

6.20- Çelik taşıyıcı binalarda, çelik elemanlar, sivama, betonlaurma ve benzeri yöntemlerle yangına karşı korunacaktır.

7. MEKANİK TESİSATA İLİŞKİN ÖNLEMLER:

7.01- Bu yönetmelinin 2.01 maddesinde tanımlanan yüksek yapılarda, bodrum kat dahil olmak üzere, her 30 metre yükseklik için, tesisat katı veya mekanik tesisat proje ve hesaplarına uygun olarak mekanik tesisatının gereksinimini karşılayacak tesisat alanı ayrınlacaktır.

7.02- Yapının temiz su tesisatı, yükseklik zonlarına ayrırlacak ve her zon ayrı hidrofor sistemiyle beslenecektir. Binanın tek hidrofor ile beslenmesi halinde her zon girişine basınç düşürücü vana konulacaktır. Bütün zon hidroforları, tesisat katı veya mahallerinde olabileceği gibi, mekanik tesisat merkezine de konulabilir. Konfor standardı yüksek binalarda gerektiği göreli olduğuinde aynı zon dahilindeki kat girişlerine basınç düşürücü vana konulacaktır.

7.03- Yapının sıcak su kullanım tesisatı da, temiz su tesisatına paralel olarak, yükseklik zonlarına ayrırlacaktır. Sıcak su tesisatı, gereksinim olduğu takdirde, ayrıca kullanım zonlarına ayrırlacak, her zon ayrı bir boylerle beslenecektir.

7.04- Bakım yönetmeliği olmayan mahallerde kör rögar yapılmayacaktır. Bu gibi yerlerde özel bağlantı elemanları kullanılabılır. WC, lavabo vb. gibi elemanların bağlantılarında bunlar için imal edilmiş özel bağlantı elemanları kullanılacaktır.
7.05- Pis su tesisatında, ana kolon havalandırmasının yanında, üç nokta havalandırması yapılacak. vakum hesapları gerektirdiği takdirde sifonlar ayrı havalık hattına bağlanacaktır.

7.06- Her zonun en altındaki yatay borular düşü darbelerini karşılamak üzere pik veya çelik yapılacak. Diğer borular PVC olabilir.

7.07- Islak hacimlerde, düşük doşeme yapılmayacak, tesisat asma tavan ile gizlenecektir. Asma tavannlarda, ses izolasyonu sağlanacaktır.

7.08- Ana su deposu, yüksek yapının yapılacağı bölgedeki alt yapı koşulları, günlük su rejimi, ayrıca yangın rezervi de gözönüne alınarak hesaplanacak ve 0.00 kotonun altında yapılacaktır. Tali su depoları, tesisat katları veya mahallerinde olabilir. Ancak, yüksekliği 50 metreyi geçen yapılarda, ana su deposu dışındaki depolar çatında olacaktır.

7.09- Isitma ve soğutma tesisatı hesaplarında, güneş ısı kazançları, işletmedeki kullanım fonksiyonları gözönüne alınarak, zonlama yapılacak. Zon santralleri veya fan-coilleri, ait olduğu zonun maksimaline, ısıtma kazançları merkezi soğutma üniteleri binanın maksimaline göre seçilecektir.

7.10- Güneş ısı kazançları hesabında, yapı elemanlarının gölgeleme etkisi zamana bağlı olarak göz önüne alınacaktır.

7.11- İnşaatta, ısı ekonomisi sağlayacak ısı izolasyonu, çift cam vb. gibi önlemler öncelikle alınmalıdır. Yapının konumu, kullanım koşulları yukarıdaki izolasyon önlemlerinin birini veya birkaçını gereksiz kıldığı hallerde; her türlü enerji ekonomisi için yapılan ilave alternatif yatırımların geri ödeme süresi, işletme yoğunluğu gözönüne alınarak her türlü enerji giderleri ile karşılaştırılarak hesaplanacaktır. Bu süre iki yılı geçmiş olduğu taktirde ilave yatırımlardan kısmen veya tamamen vazgeçilebilir.
7.12- Isi hesaplarında, yükseklik etkisyle oluşan baca etkisi ve çevre koşulları ile bağımlı, rüzgar etkisinin yaratacağı infiltrasyon ayrıca gözönüne alınacaktır. Isi ekonomisi yönünden infiltrasyonu azaltacak, döner kapı, rüzgarlı kapı, hava perdesi vb. önlemler alınarak mekanik tesisat projesinde ayrıca analiz yapılacaktır.

7.13- Isi hesaplarında, yangına karşı önlemlerde söz konusu edilen pozitif basınç sağlamak üzere verilen dış hava fazlası yanında, kullanıcılar için gerekli taze havada gözönüne alınacaktır.

7.14- Pis su, temiz soğuk ve sıcak su tesisatı, fan-coil ve klima santralı boruları, taze hava kanalları exhaust kanallarının geçişi için tesisat şafıları yapılacaktır. Şafılar en fazla üç katta bir girilecek, şafı kapakları konulacaktır. Şafı kapakları, yangın sirayetini önlemek üzere, sızdırmaz ve yangına dayanıklık sınıfı en az F 60 olacaktır. Şafılarla, çalışmaya platform ve gemici merdiveni yapılacaktır.

7.15- Her türlü tesisat mahalı veya tesisat katı, tesisatın imalatını takiben, yangın zonlarına uygun olarak sızdırmaz biçimde kapatılacaktır.

7.16- Her türlü boru, sağlam şekilde sıcaklık etkisi altında uzama ve buzülmelere izin verecek şekilde, kayıcı sabit suportlarla tesbit edilecektir. Duvar ve doşeme geçişlerinde, kovanlar kullanılacaktır. Mekanik tesisat projesinde, tip suport detayları verilecektir.

7.17- Boruların genişleşme ve buzülme başladı alacak kompansatörlerin kullanım yerleri gösterilecektir.

7.18- Binaların dilatasyon geçişlerinde tesisat boruları ve kanalları için gerekli önlemler alınacaktır.
8.01- Yüksek yapılarda, kuvvetli ve zayıf akım tesisat odaları bulunacaktır. Yapıda birden fazla bağımsız bölüm olması halinde, bu oda veya odalar amacına uygun olarak belirli katlarla ya da her katta olabilir.

Sayac dolabı, panolar, tablolar gibi techizatın önlerinde en az 1 metre geçit mesafesi bırakılacaktır. Karşılıklı her iki duvarda da tesisat dolabı olması halinde bu mesafeye 1,20 metreden az olamaz.

8.02- Yapı içinde, kuvvetli ve zayıf akım için tesisat şaftları ayrılarak olacaktır. Gereklı hallerde elektrik tesisatlarının mekanik etkilere veya suya karşı korunması koşuluyla mekanik tesisat şaftları da kullanılabilir.

8.03- Trafoların zemin üzerinde normal katlarda tesis edilmesi halinde kuru tip trafo kullanılacaktır. OG şalt sistemi ise kapalı tip olacak ve koruma sınıfları en az IP 40 seçilecektir.


8.05- Yangın algılama ve ihbar devreleri (dedektör, buton, kulakson, ışıklı alarm vb) yangın su pompaları, sprinkler pompaları, toz pompaları, pozitif basınçlandırma fanları, duman tahliye fanları, asansör vb. tesisatlarda kullanılan kablolardan alev iletmeme özellikte olacaktır. Aynı zamanda bu tesisatlarda çelik veya yine alev iletmeye borular ve ek malzemeleri kullanılacaktır.
8.06- Yangın Algılama Ve Uyarma Sistemleri:

0.1-Yapının konut amaçlı inşaat edilmiş halinde; asansör makina darişesi, kalorifer dairesi, kat holleri, tesisat kat ve mahalleri, asansör boşlukları gibi müşteri kapalı mekanlarda yangın algılama deyektörleri konulacak, kat holleri ile yangın merdivenlerinde ayrıca buton tesis edilecektir.

0.2-Yapının otel, yurt, iş han gibi konut dişı bölümlerinde, yukarıda açıklanan özelliklere ek olarak bütün mekanlarda yeterli sayıda ve özellikle deyektör tesis edilecektir.

0.3- Her katta en az bir adet ışıklı uyarma sistemi bulunacaktır. Tüm yapıda, 2 tonlu ve tonlardan birinin 500 Hz ile 1000 Hz arasında çalışma frekansı olan, ses seviyesi bütün mahallerde en az 65 dB veya ortam gürültüsünün 5 dB yukarısında, yeterince kornodan oluşan, Sesli Uyarı Sistemi bulunacaktır.

0.4- Yangın algılama sinyalinin algındığı katın belirlenmesi amacıyla, yangın merdivenlerinde her kat çıkışında ışıklı uyarı armatürleri bulunacaktır.

0.5- Her katta yangın kaçış yollarını gösteren, uygun aralıklarla yerleştirilmiş, enerji kesilmesi halinde bile en az 90 dakika çalışabilen acil kaçış yön armatürleri bulunacaktır. Ayrıca, güvenlik aydınlatmaları amacı ile genel mahallerde en az 90 dakika çalışabilen akülü aydınlatma armatürleri bulunacaktır.

0.6- Yangın anında itfaiyinin binaya girmesi istenen girişin üzerinde ışıklı ve sesli ikaz bulunacaktır.

Yangın santralinde; yangın ihbarını alındığında asansörlerin önceden tariflenmiş açılır çıkış katına yönelmesinde kullanılacak özel kontak bu-

8.07- Konut dışi yapılarda ve 17 katlı an konut yapılarda elektrik kesilmelerinde binanın acil gereksinimlerini karşılamak üzere otomatik ol-

8.08- Yapıldaki tüm prizler güvenlik hatıları olacaktır. Konutlarda banyo ve mutfaklar için en az bir adet, işyerlerinde ise her bagımız bölüm için en az bir adet 2 kw. gücünde özel priz hatları bulunacaktır. Elektrik te-

8.09- Haberleşme kabloları, haberleşme sisteminden sorumlu kurum ta-

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8.10- Her türlü topraklama tesisatına ait toprak altında kalacak topraklama elemanları inşaatın temel safhasında çözümlenecektir. Tesiste ana tablodan tali tablolara ve alıcıların madeni gövdelerine kadar devam eden bir topraklama şebekesi kurulacaktır. Kuvvet ve aydınlatma tesisatına ait metal gövdeli alıcılar, hava kanalları, her türlü boru donanımları, asansör ray ve makinaları koruma topraklaması ağ ile irtibat-landırılacaktır.

8.11- Yüksek yapılarında, yıldrımından koruma sistemi yapılacaktır.

8.12- Yüksekliği 60 metre yi aşan yapıların çatılara yüksek yapı uyarı ışığı konulacaktır.

9. ARANILACAK BELGELER:

9.01- Binanın yapılacağı arsaya ilişkin madde 6.02 de istenen bilgileri içeren zemin raporu.

9.02- Zemin etüdü (zemin yapısı ve depremsellik vb.), meteorolojik rüzgar ve dış sıcaklık veri raporları, malzeme etüdünü içeren yapısal analiz raporu, itfaiye raporu.

9.03- Mimar, Şehir Plancısı, İnşaat Mühendisi, Elektrik Mühendisi ve Makina Mühendisi, tarafından kendi ihtisas dallarında hazırlanmış binada yaptıkları işlemler ve aldıkları önlemleri belirleyici raporlar, yapıya veya yapılara göre imar koşullarını ve kentsel tasarım koşullarını içeren rapor.

9.04- 17 kat ve yukarıls için ÇED raporu.
9.05- Kentsel Tasarım, Mimari, Statik, Mekanik Tesisat, Elektrik ve Asansör Projeleri ve eklerinde gerekli olan oda tasdik belgeleri.

0.1-Mimari Uygulama Projeleri

0.2-Statik Hesap ve Betonarme Projeleri

0.3-Mekanik Tesisat Projeleri
  • Sihhi Tesisat (temiz su, pis su)
  • Yangın Tesisat (sulu sistem, kuru sistem, sprinkler sistemi)
  • Fan-coil veya diğer borulu ısıtma, soğutma sistem
  • Havalandırma, Klima ve diğer duman emme ve basınçlandırma hava kanallı sistem.
  • Mutfak, Çamaşırhane vb.
  • Isıtma-Soğutma Santralı
  • Otomatik Kontrol Sistem
  • Gerekli görüldüğünde Aritma Tesisı Projeleri

0.4- Elektrik Tesisat Projeleri
  • Kuvvetli Akım (aydınlatma, motor, kompanzasyon vb.)
  • Zayıf Akım (haberleşme, tv, güvenlik, çağrı vb.)
  • Yangın Algılama ve Uyarma
  • Topraklama
  • Yıldırmından Korunma

9.06- İZ-SU tarafından onaylanmış pis su ve temiz su tesisatının şehir şebekesi suyu ve kanalizasyon ile bağlantısının nasıl kurulacağını belirir proje veya rapor.
9.07- Haberleşme sisteminde sorumlu kurum tarafından onaylanmış tesisat projeleri ve enerji veren kurum tarafindan onaylanmış elektrik projesi.

9.08- 9.01, 9.02, 9.03, ve 9.04 maddelerinde istenen belgeler ön olur için yapılacak müracaatta; 9.05, 9.06 ve 9.07 maddelerinde istenen belgeler ise inşaat ruhsatı için yapılacak müracaatta aranacaktır.

EK MADDE

Bu yönetmelik ekinde yer alan şemalar (çizimler), yönetmelikte yer alan bazı ifadelerin açıklanması amaçına yönelik olup, bağlayıcı niteliği bulunmamaktadır. Bu çizimler inceleme kurulunun teklifi başkanlık makamının onayı ile artırılabilir.
2 ASANSÖR

3 ASANSÖR

4 ASANSÖR

YANGIN BÖLMESİ (FIREWALL)