

# Commercial Building Design Solutions with Context-Specific Lands Approach

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## **ABSTRACT**

Trading is a lasting and constant social phenomenon that is as old as human history and civilization. The idea of establishing a recreational and commercial center within an urban setting, most importantly, is the reflection of the physical and social development of a city and also by considering the definition of spare time and the fact that recreation is not just a right of people but also a must for them it can be said that it is a natural human need for anyone. Physical development and the sociopolitical growth of a city on one side and, ways of enjoying spare time using natural, cultural, economic facilities, and the flourishing of new ideas in urbanism and urbanization, have led to the creation of new land uses in all categorizations of a city such as towns, districts, etc. and designation of special points of the city for commercial and recreational uses. Because with the industrialization of the cities, people will have more need for recreational times and properly designed locations with suitable prices. Hence, in the presentation of this project, which is located in Tehran, it is attempted to design a recreational commercial complex with this issue in mind that other than meeting these needs of the residents and reducing city trips, it helps create recreational space for the visitors.

This project includes commercial spaces, apartment hotels, restaurants, coffee shops, fast foods, playing spaces, and vertical parking, and based on the design of the plan being about movement and dynamics; it is attempted to design these spaces as half floors so that they create an increased feeling of movement and dynamics for the visitors during the visits.

*Key words: Commercial Building, Architecture Design, Land Use, Climatic Studies.*

## **INTRODUCTION**

The land is known as a valuable and limited asset which is a constant need of the human race, which creates a base of living and continuity of life and satisfies the constant needs of the human beings. Since the old times, land ownership has been a symbol of wealth, welfare, and power. With the growth in population, industrial development, and machination, we need management in the distribution and ownership of the lands. While in the early days of human civilization, there was no permanent concept of ownership due to migration and animal husbandry, and with the initiation of agriculture and a sedentary lifestyle, the concept of ownership became similar to what it is today. Following the subject of ownership, the authority of the asset by the owner and free use of the owner of their lands caused issues that require management on the types of land use. Although throughout history, exploitations made through land management which were mostly done by the ruler or the government at the time, led to some doubts about the benefits of this management or have caused problems, none of them diminished the need for the management. Sometimes the land ownership is given to the government or the people, the effect of which can be clearly seen in land location and architecture based on construction patterns. No activities can be implemented within a land without paying attention to the consumption methods, and land uses. Land needs suitable management for development and proper distribution of uses at town, urban, regional and national levels. Any land use requires a specific land size for specific activities. Defining land use is for the goal of the optimized and complete use of the land's potential.

The system for land use and its scope is related to environmental, social, economic, and physical factors. Factors that are related to the conservation of natural resources, historical monuments, reduction of land inequalities, optimized economic exploitation of the land, balanced ownership rights and prevention of incompatible uses, and promotion of diversifying land use. The land as the main substrate of development has a defining role in the formulation and execution of the development plans. Experimental findings suggest that in a lot of cases, land development patterns follow land ownership patterns.

The land is the basis of natural resources, and throughout history, mankind has met most of their need from the land (Jalali Farahani and Araqizadeh, 2012). A land has features that separate it from other assets: 1) It is limited in quantity; 2) it can't physically disappear although its appearance may change, 3) it cannot be relocated, 4) it is used for investment in most countries, 5) is an asset without which no one can live, and all activities need space and 6) is indestructible and as a result, other than various uses, it is possible to save it for individuals as well as society (Von Miss, 2013). With time, the concept of land and land use planning and its objectives have also changed; some of these changes are about the socioeconomic concepts of the land, changes in the physical concepts of the land, and new priorities in land uses and per capita. Generally speaking, during the last couple of decades, significant gravitation in defending land as a resource and public wealth has come about that has changed the methods of land use and distribution. This change has happened in two regards: A) Spreading public ownership in terms of environmental protection and sustainable development; B) Expanding the "public supervision" right on the performance of private urban lands (Rashid et al., 2019). Furthermore, following the rise of ecology and the global prevalence of sustainable development in the 1980s, qualitative changes in views and planning methods and urban design emerged. Since then, the goals of urbanization were focused beyond physical and functional objectives, and the role of land and space in the realization of sustainable urban development and improvement of living environment quality became more defining (Li and Mahalec, 2022). Therefore, land plays an important role in the realization of sustainable urban development. But the true effect and significance of land on sustainable development are understood only when the pre-requisites receive attention as well. Among

these pre-requisites is the issue of land governance. That proper governance of land has gained significance like a distinct pole in the governance discourse of the recent years and generally is considered the most effective land-related issues management practice.

### **Climatic Studies**

Architecture and climate are closely related, and ever since mankind took shelter in the caves due to unpleasant weather, this strong relationship between architecture and climate has been displayed. Hence we can create different forms based on various climates, and at the same time, this creation of ours can be in alignment with the climate because we are a part of nature and are inspired by it; how much better would it be if our architecture is also inspired by it, in contrast to 19<sup>th</sup> and 20<sup>th</sup> centuries which were based against nature. Generally speaking, we shouldn't claim the liberation of architecture and must design our structures according to our climates.

### **Climatic Conditions and Characteristics**

Extreme cold in the winter and moderate climate in the summer, a high difference of temperature between night and day, heavy snow, low humidity, ten °C average temperature in the warmest month of the year, and less than -3°C average temperature in the coldest month of the year.

Temperature fluctuations during day and night are higher in the mountain areas. In this climate, the valleys are very warm in the summer and moderate in the winter. The Sunshine amount is high during the summer and very low during the winter. Rainfall is low in the summer and high in winter, mostly in the form of snowfall, winters are long, cold, and difficult, and for several months of the year, the ground is covered with ice. The cold starts in early December and lasts more or less until early April. Snow can always be found at altitudes above 3000 meters, and these mountains are the source of rivers and aqueducts in the country.

There is more snowfall in the northern and northwestern regions compared to southwestern regions. Despite heavy rainfall, the humidity level of this climate is low. Unlike the northern regions of Iran and the shores of the Caspian Sea, where the air concentration is high due to shallowness of the ground and heavy rainfall, this concentration is lower in the cold climate and thus reduces the use of natural air conditioning.

### Determining the Direction of the Building in Relation to the Sunlight Angle

Increased use of solar energy in warming up the interior spaces and prevention of these spaces from warming up in the warm times is related to the direction of the building according to the annual position of the sun in the sky. Provision of these items requires the position of the building to be in a way that at the cold times of the year receives the most solar energy and the least solar energy during the warm times. Using the calculated amount of solar energy radiated on the vertical surfaces located in different geographical directions indicates that most of the times of the year, southern to southeastern directions are suitable.

Using horizontal or vertical shades is among the easiest solutions for blocking sunlight from entering interior spaces. For the calculation of the effective depth of the shade in every geographic direction, it is required to determine the position of the sun on the warm days of the year, the days the rays of the sun must be blocked from entering the building.

### Results of Methods of Achieving the Main Objectives of Climatic Design

Paying attention to the main objectives of climatic design in each and every climatic group of the country and predicting the issues regarding the realization of these objectives will create compatibility and coordination of the buildings and residential environments, energy savings of different dimensions, and architectural identity for every climate, the same way that traditional architecture of different parts of the country has their unique identity. Obviously, achieving the main objectives of the climatic design can come true in various ways, and by considering all aspects of the work, the best methods can be selected for the desired design. In this segment, we discuss some of the items, the realization of which can lead to the desired result. Also, due to the other conditions affecting the conceptualized design, it is possible to choose the most suitable item(s).

Table 1. Solutions for Dealing with Climatic Factors in Designing Commercial Buildings

Heat Loss Reduction of the Building	<ul style="list-style-type: none"> <li>-Refraining from the construction of such buildings in negative slopes and depressions</li> <li>-Establishment of interconnected buildings in the middle parts of south-facing slopes</li> <li>-Covering the outer edges with evergreen shrubs and plants</li> <li>- Construction of the building inside the ground or covering the external walls with soil</li> <li>- Provision of compact and dense plots</li> <li>-Provision of two-story buildings</li> <li>- For this building, maximum use of common walls and creating a cohesive and dense texture</li> <li>-Provision of exothermic spaces in the center of the plan</li> <li>-Provision of less significant spaces as thermal insulation for walls and cold parts</li> <li>-Making use of appropriate thermal insulation in the external walls and on the roof especially, or using attics as the thermal insulator</li> <li>- If necessary, windows should be used in this building; big windows, especially on northern views, should be avoided or use double or even triple glazing glasses</li> <li>- Provision of thermal insulation sheets inside the openings</li> </ul>
	<ul style="list-style-type: none"> <li>- Avoiding the higher side of the hills for construction, the lower side is the best option</li> <li>- Construction inside the ground in the slopes opposing the wind</li> <li>-Provision of compact plans and creation of segments with dense texture</li> <li>-Provision of appropriate physical forms in terms of reducing the impact of the wind</li> <li>-Provision of sloped roofs and establishment of steeper slopes in the direction of the wind</li> <li>- Using one-story and low-rise buildings for fronts facing extreme winter winds</li> </ul>

<p>The Impact of Wind on Heat Loss of the Building</p>	<ul style="list-style-type: none"> <li>- Using trees, walls, and fences as a windbreaker</li> <li>- Using spaces like parking or lots as a windbreaker</li> <li>- Minimizing the number of entrance doors of the building and placing the main entrance on the side not facing the wind</li> <li>- Full protection of the main entrance using trees, fences, landscaping, etc.</li> <li>-Provision of duplicate entrances or entrance yards</li> <li>- Raising the main entrance level in relation to the finished exterior floor</li> <li>-Using integrated and insulated doors in windward views, glass doors should be provided only in views that are protected from the wind</li> <li>-Sealing all the openings</li> <li>- Paying attention to the direction of common winter winds in determining the establishment direction of the building</li> </ul>
<p>Protection of the Building Against the Warm Outside Air</p>	<ul style="list-style-type: none"> <li>- Construction of the building inside the ground or covering the exterior walls with soil</li> <li>- Fencing the used spaces on the warm days using the heavy and insulating materials and used spaces in favorable times with light materials</li> <li>-Provision of a compact and dense building</li> <li>- Separation of heat-generating spaces from other spaces</li> <li>-Using heat insulation with any kind of material</li> <li>-Making use of double glazed windows</li> </ul>
<p>Making use of Daily Temperature Fluctuation</p>	<ul style="list-style-type: none"> <li>-Using underground buildings</li> <li>- Construction of a part of the building inside the ground</li> <li>-Covering the exterior walls with soil</li> <li>-Using heavy and dense construction materials (with high heat capacity)</li> <li>-Using heavy materials and integrated heat insulators for exterior surfaces</li> <li>-Provision of some spaces sheltered by heavy walls to take advantage of the delay time of the materials and some of the living spaces behind the light and insulated walls to take advantage of the quick reaction of such materials to the outside weather conditions</li> <li>-Provision of the appropriate distance between the exterior walls and shrubs and branches and leaves of the adjacent trees to provide for a chance of heat reflection from these walls</li> </ul>
<p>Creation of Air Streams in Interior Spaces</p>	<ul style="list-style-type: none"> <li>-Maximizing airflow around the buildings through properly distancing them</li> <li>-Establishment of the building in the direction of the favorable winds</li> <li>-Designing landscape elements in a way that the plants and adjacent buildings will guide the favorable winds toward the building</li> <li>-Planning and organization of the building must be in a way that prepares for air flow around the building</li> <li>-Building should be planned in such a way that maximum ventilation is provided at the top, bottom, and inside the building</li> <li>-Using elongated plans with narrow sections</li> <li>-Creating crawlspaces under the living spaces of elevating these spaces in relation to the</li> </ul>

	<p>finished floor</p> <ul style="list-style-type: none"> <li>-Using high roofs</li> <li>-Using the effect of chimneys (increasing the height of part of central spaces)</li> <li>-Provision of open and integrated interior spaces</li> <li>-Provision of communication doors between the stores using controllable walls with the aim of guiding the airflow to all the stores</li> <li>-Provision of exterior spaces according to the direction of favorable breezes</li> </ul>
Protecting the Building Against Rainfalls	<ul style="list-style-type: none"> <li>-Provision of sloped rooftops</li> <li>- Paying attention to the regular direction of winds with rainfall for selecting the direction of the building establishment</li> <li>- Provision of suitable trenches around the roof to collect rainwater and direct it to the ground or designing a suitable space around the complex</li> <li>- Provision of the protrusion for the roof or creating wide porches around the building</li> <li>-Provision of covered corridors for communication paths between different spaces</li> <li>-Provision of waterways with appropriate diameter for the building and the surrounding landscape</li> <li>-provision of suitable slopes for the walkways around the building</li> </ul>
Mitigating the Effects of Dusty Winds on the Building	<ul style="list-style-type: none"> <li>-Paying attention to the direction of dusty winds for selection of the orientation of the building</li> <li>-Fencing the building using the integrated and relatively long walls or provision of structures with a central yard and opening the interior spaces to this yard</li> <li>-Using vegetation to protect the building against the wind</li> <li>-Using compact and dense textures</li> <li>-Provision of small windows in case of existence of windows in the building</li> </ul>

### Standard and Study Principles of Spaces and Physical Program

In a commercial building, the communication between the merchants and customers is determined by the plan design order and performances. Hence the most important part of planning is preparing a plan that matches the needs of the dominant activities of the plan. Planning can help with the attraction of the population through the creation of workplaces with direct routes. The role of the physical program is to contain knowledge of understanding the functions so as to use them for creating the best space possible within created limitations by construction specifications and financial budgets, and so on.

Investigating the Traffic Issues:

In regard to traffic issues, paying attention to the following issues is crucial:

- 1- Selecting the location of the complex
- 2- Designing the parking and transportation facilities
- 3- Designing the access roads
4. Traffic signs

#### Differentiation of Various Types of Traffic

In this regard, it is necessary to pay attention to the separation of the pedestrians and car passengers as well as the separation of the visitor's cars paths from freight vehicles and public transportations and to provide proper space for them.

#### Standards and Requirements of Parking:

The importance of parking for the cities, especially large cities, is undeniable. The points and

comparisons offered below illustrate the significance of the concept. The average annual mobility time length for a vehicle is equal to 400 hours. Based on the annual hours, it is observed that each vehicle is in a still position for an average time of 8360 hours; in other words, it needs a place to be parked. Most probably, most of these cars will be parked inside private house parking or on surrounding streets of the residential areas. Therefore, it is observed that the amount of time required for a car to be parked is higher than it is in the moving state. The average surface dedicated for parking a car is about 14 square meters. The average number of car passengers is usually less than two people, which means that on average, about 7 square meters of city space per passenger is required for parking. On the other side, some space is used for parking the cars in the workplace or shopping centers and so on which are left rather unused at night or on holidays. Generally speaking, a car, due to the services it provides, takes up more space than all other invented vehicles.

Today one of the big issues that challenge citizens who live in industrial and large cities is the issue of parking spaces which usually need to be created in limited and expensive parts of the city. In most big countries and cities, the issue of parking is one of the significant ones. In New York City, the idea of preventing cars from entering the city center is being investigated. In San Francisco, where there is one car per every two people, and about 35000 cars which come from other places roam about the city, the issue of parking is one of the major problems. In Tehran and other large cities of Iran also, the issue of parking is getting more complex day by day. What is evident is that these cities are increasing in density every day. The only solution that is shared by most experts is to slow down the increase in the number of cars and provide public transportation methods. Although the construction of huge parking lots in necessary locations may seem a way of combating the parking issue, only through this method can the problem not be solved. In addition, building numerous large parking lots in areas like the city center will not always be helpful.

It must be kept in mind that even in those cities where personal vehicles have reached their maximum limit either in number or in terms of functionality, the number of pedestrians in the city centers or shopping centers and places like that is increasing, and in no country, the number of the car owner has exceeded the number of the people who don't own a car (in terms of the number of the individuals, not families). Hence if we dedicate city

centers and crowded parts of cities to the mobility of individual vehicles and the construction of various parking lots, we will be increasing the problems of those residents. Therefore, parking plans and their locations must be meticulously selected, and this must be in alignment with other policies such as pedestrian crossings and increasing the capacity and the standards of public traffic. In a regular car park, lanes and entrances must be clearly marked with pedestrian safety tapes.

Space required for each car with lanes but outside the main and exit lanes:

-Parking arrangement for 90° park equals almost 20 square meters, and for 45° park about 25 square meters

-The parking entrance opening for each car is 5\*8.1 meters (for parking lots larger than 800 square meters, 20% is added for the larger vehicles)

- Parking is the first connection between the visitor and the shopping center. Providing the required parking space for the complex is an effective factor in constructing a commercial complex, and in this regard, the following issues must be discussed and evaluated.

-The order of parking placement must be in alignment with the visitor's comfort and provision of maximum parking spaces.

-The pathways must be designed in such a way that the visitors can easily transport from one part of the complex to the other without using pathways outside the complex.

- The traffic near the main building should be kept to a minimum.

- It is better to design the car parking spots with non-perpendicular angles to the sides and parking corridors perpendicular to the buildings.

-Parking lots can be either designed in an open or covered fashion in the yard or in the basement of the complex.

#### Different Types of Parking

1. Linear shopping centers and oblique parking lots: These types of shopping centers are designed in a linear fashion and are usually on the side of the streets, and the cars are parked obliquely. In this method, walking is reduced to a minimum.
2. Linear shopping centers and vertical parking lots: In this method, the shopping centers are linear like the previous method was but with the difference that the stores are not on the side of the street and have a proper distance from the

street, hence makes it possible to create a parking lot in the distance between the road and the shopping malls.

3. Two-way shopping centers: In this method, the shops are located in opposing rows, and the sidewalks are located between them. In this method, parking lots can be located on all four sides of the shops.
4. Centralized shopping centers: In these shopping centers, all stores are located inside a large complex. This shopping center can be a dense building in the form of a passage or a bazaar. The center may consist of two or more buildings. In all these cases, each of these parking lots is conceivable.

#### Methods of Calculating the Number of Required Parking Spaces:

1. In the shopping centers where most of the visitors use automobiles, for every 100 square meters of gross infrastructure, a set of 17 to 18 parking spaces is required.
2. In the shopping centers where a portion of visitors use personal vehicles (city center commercial complex), the calculations are as follows:
  - A- For centers with an infrastructure of between 400 - 2500 square meters for every 100 square meters of infrastructure, four places
  - B- For centers with an infrastructure of between 6000-4000 square meters for every 100 square meters of infrastructure, 4.5 places.
  - C- For centers with an infrastructure of more than 6000 square meters, for every 100 square meters of infrastructure, five places.

#### Communication Spaces

1. Pathways and connecting passages between stores and different parts of the complex
2. Open spaces for resting, seating the visitors, and holding drawing ceremonies

#### Green Spaces

1. Public green space, including planting trees in the public yard, gardens, pools, fountains, and so on.
2. Specialised green spaces, including flowers and plants exhibition (Considering the texture around the site by presenting plants adapted to apartment conditions, creating such an exhibition space can be one of the effective factors in the attractiveness of the complex).

#### Equipment and Facilities Spaces

1. Engine room (including heating and cooling facilities)
2. Electrical and telecommunication facilities room
3. Facilities related to wastewater and excess water and consumption water.

#### Important Points in Planning

Execution of the following concepts will help planning in a space in alignment with the formulation of the final effective plan in terms of performance:

1. Shopping stores must be at the best visibility level so that they receive attention from the customer.
2. Special care must be given to the security and safety of the commercial complex. Passages, entrances, and stairs should not be shut, and fire safety standards should be implemented on the stairs and the entrances.
3. Since these spaces are realistically designed for the customers, most of the considerations should favor the customers. First, we take on the planning and then explain the aforementioned spaces:

#### Function and Infrastructure Levels Categorization

The collection of required spaces for a complex is categorized as follows. It is worth noting that this categorization includes main and subsidiary spaces in various areas and with consideration of joint levels and their surrounding areas. Managerial spaces, supplemental and ancillary spaces. Technical and support spaces, main spaces, external and yard spaces.

#### Different Types of Space

Inclusion of passage and waiting room or both is desirable, and in most cases, it is necessary to provide a resting location for events like social meetings, public speeches, and discussions. The resting area could also act as a practice location.

#### Communication Spaces

##### Entrance Space Standards and Requirements

- 1- At least one entrance of public buildings should be dedicated to the disabled.
- 2- Suitable entrance for the disabled is required to let them access the street or the parking of the building.
- 3- On the sidewalk leading to the entrance for the disabled, there should be no complications.
4. On the pedestrian sidewalk leading to the entrance of the disabled, there should be sensory signs.

- 5- The sidewalk leading to the entrance for the disabled must not be slippery.
- 6- Access to the building should be as level with the sidewalk as possible.
- 7- If there is a difference in the height, the access to the building should be provided with a sloping surface.
- 8- The minimum depth of the front entrance space is 140 cm.
- 9- The minimum width of the entrance doors of the building should be 160 cm.

#### Corridors

1. When the corridor lights are provided by the adjoining street, we will have a luminous and bright corridor which is desirable for a matter of daily life.
  2. This place should guide the population coming through the entrance of the building and also should not break the line of people who are moving towards the complex.
  3. The width of corridors is decided by the volume of human traffic.
  4. The proportion between the length and width, and height of the corridor should be taken into consideration.
  5. In the long corridors, the uniformity should be prevented through logical depressions, breaking the corridor, and so on.
  6. The door of the stores should not open towards the corridor, and in traffic points like the elevator or the stairs, the corridor should be sufficiently wide.
  7. The width of a corridor should not be less than the width of three human beings.
  8. In Commercial complexes, the minimum width of the corridors is set to be 4 meters.
  9. The minimum corridor width for the passage of two wheelchairs should be 40 centimeters.
  10. The floor of the corridors should not be slippery.
  11. It is necessary for the flooring gaps to be less than 2CMs using mosaics, bricks, and so on.
  12. The floors should be completely level, and if necessary, ramps should be used.
- regulations. In the process of designing the dimensions and sizes of the stairs, their functions and objectives are prioritized.
1. Buildings with two stories and no more must have a minimum stair width of 0.8 meters and a height to floor ratio of 29/17.
  2. In high buildings, the width of the stairs should be equal to 1.25 meters. The length of the stairs that start should be  $\leq 3$  steps to  $\leq 18$  steps. In public buildings (such as commercial complexes), stairs should be at least 2 meters wide.
  3. The required time for complete evacuation should be calculated for the width of the stairs, like in the case of public buildings.
  4. Stairs and front entrances ascend slowly, so they can have a gentle climb. A stairway at a corner entrance or emergency stairway should have a quick and easy descent.
  5. It is not only important to reach the height, but also the trajectory with which this height is reached is crucial.
  6. For front door stairs, due to continuous use, the size of 30 x 16 cm is preferred, but work and emergency stairs should have a height that can be used quickly.
  7. Provision of sensory signs on the floor is compulsory to inform the blind before entering the stairs.
  8. The minimum width of the floor of the stairs should be 30 cm.
  9. The maximum height of the stairs should be 17.5 cm.
  10. The maximum height of the handrails for adults is 85 cm from the floor.
  11. The handrail bars next to the stairs should be at least 30 cm more protruding from the first and last stairs and parallel to the floor.
  12. The maximum diameter of the bar with a round or rectangular cross-section should be 3.5 cm.
  13. The minimum distance between the handrail bars and the wall should be 4 cm.
  14. The edge of the stairs should not be slippery and should be recognizable by the color difference.
  15. The minimum depth of the stair tread should be 120 cm, and for the two-way stairs, it should be equal to the width of the stairs.

#### Stairs

Calculations for the construction of stairs, slopes, and railings are carried out according to different



16. On the transverse sides of the stairs, installing a special step to prevent the cane from slipping is necessary.
17. The footrest of the stairs should be closed, and the preparation of the edge of the stairs should not exceed 3 cm from the footrest.
18. The maximum number of steps between two stair treads should be 12 steps.
19. Installation of any uneven edge of the stairs and rounding the stairs is prohibited.

#### Escalator Standards and Requirements

It is a device used by pedestrians for moving between two uneven floors and creates movements through a step or belt that is driven by an electrical power unit that includes mechanical and electronic components. The escalator should be located where most of the passenger traffic happens and move people to a higher or lower floor without disturbing the normal movements on the same floor. In cases of necessity and visibility difficulty, people should be guided toward the escalator using appropriate signs. At the beginning and end of the escalator, a suitable non-enclosed space should be considered so that the passengers can easily continue their journey, and congestion can be prevented at the entrance and exit. The minimum width of this space should be 0.2 meters more than the distance between the center of the two handles, and its depth from the end of the handle should be at least 2.5 meters.

- It is required for continuous and group movements of people. Escalators, for instance, in department stores, are located at angles of 30 to 35 degrees.

- It is needed for continuous and group movement of people. Escalators, for example, are located in department stores at an angle of 30 to 35 degrees.

-Escalators with an angle of  $35^{\circ}$  are more economical and take up less space in the plan. According to global standards, the width of a step must be 60 cm (for one person), 80 cm (for 1 to 2 people), and 100 cm (for two people). Steps with a width of 100 cm provide an extra bit of space for people to carry their belongings.

The distribution average within department stores is as follows:

2% Fixed stairs

8% Elevators

90% Escalators

- The escalator should be located where most of the passenger traffic happens and move people to a

higher or lower floor without disturbing the normal movements on the same floor.

-At the beginning and end of the escalator, a suitable non-enclosed space should be considered so that the passengers can easily continue their journey and congestion can be prevented at the entrance and exit.

- The minimum width of this space should be 0.2 meters more than the distance between the center of the two handles, and its depth from the end of the handle should be at least 2.5 meters. If the depth is equal to 2 meters, the minimum width must be twice the distance between the center of the two handles.

- Maximum escalator speed should be 0.75 meters per second if its slope angle does not exceed 30 degrees. If the slope angle is between 30-35 degrees, the maximum speed will be 0.5 meters per second.

- A minimum of 2 and a maximum of 4 flat stairs should be provided at the entrance and exit of the escalator to facilitate the disembarkation of people.

-Escalator railings should be on both sides of the stairs, and their walls are usually made of metal. In case the material of these walls is glass, it must be a type of safety glass with sufficient mechanical strength and at least 6 mm thick.

- The railings of both sides must be at least 300 mm after reaching the horizontal level of the floors.

#### Technical Specifications of the Escalator

- The escalator must be able to move in up and down directions. Changing the direction after disembarkation of the people is the responsibility of the technician at the site. The visitor should not have the ability to change the directions of the escalator.

- At least two and at most four flat stairs should be provided at the entrance and the exit of the escalators for easy disembarkation of the people.

-Escalator railings should be on both sides of the stairs, and their walls are usually made of metal. In case the material of these walls is glass, it must be a type of safety glass with sufficient mechanical strength and at least 6 mm thick.

- The railings of both sides must be at least 300 mm after reaching the horizontal level of the floors.

- Fixed, adjustable metal shoulder with appropriate teeth that match the shapes of stairs teeth or the belts must be installed and fixed at the entrance and exit sections.

- The handle on the railings on both sides of the stairs should be movable and in the same direction as the stairs, and its movement speed should be

equal to the movement speed of the stairs with a maximum tolerance of  $\pm 2\%$ .

- The distance between the outer sides of the handle and the surrounding wall or barrier (if any) should be no less than 80 mm.

- The distance between the stairs or the distance between the stairs and their side guide should not exceed 5 mm. The double crossovers should be placed on top of each other.

#### Elevator Standards and Requirements

In multi-story buildings, people's ascending and descending movements are usually carried out by an elevator. In buildings with more than four stories or with a maximum path length of more than 10.5 meters, the installation of an elevator is mandatory.

The designer must determine the correct positioning of the elevator within a building, ease of access, and commute of visitors and guide them towards the elevator. After determining the number and the capacity of the elevators, the design should finalize the correct positioning of the elevators.

- 1- The elevators must be located in the center or commute centers of the building. In a fashion that they could be accessed from any part of the building with the least movement of the passenger or the cargo.
- 2- Maximum walking distance from the entrance door of the building or the apartment for getting on the elevator is 45 meters for each floor.
- 3- Entrance and exits of the people to the lower floors or vice versa should be carried out without movement interference, and sufficient waiting space should be provided and the entrances and the exits.
- 4- For the comfort of the disabled, it is necessary for the buildings with more than one floor to have an elevator.
- 5- The elevator must be level with the entrance and be accessed directly.
- 6- The minimum space in front of the elevator on the ground floor is 180 by 180 cm.
- 7- The minimum space in front of the elevator on the floors is 150 by 150 cm.
- 8- The minimum width of the elevator for the wheelchair entrance is 80 cm.
- 9- The minimum space inside the elevator is 110 by 140 cm.

10- The maximum height of the elevator control panel for easy access for the disabled is 130, and the minimum is 91 cm from the floor.

11- The minimum protrusion of the elevator buttons is 1.5 cm.

12- Writing the number of floors in Braille on the elevator buttons is mandatory.

13- It is necessary to specify the ascension and descension of the elevator with an audible sound and directional sign.

14- The closed arm in the elevator must be controlled with an electric eye.

15- The minimum time for the elevator door to remain open is 5-6 seconds.

16- A handrail bar must be provided inside the elevator.

17- Clear signs for the different floors must be in front of the elevator door with large typography and with an approximate height of 150 cm.

18- The elevators must be positioned in groups and must be visible from the entrance, in department stores, and in the center of the building; the elevator should be distanced more than 50 meters from the stores, and elevators can be grouped back to back or used in combination with escalators. When the number of the commuting population reaches almost 2000 people, the provision of an escalator is necessary. The escalator must move in both directions and pass all the floors, including stores.

#### Entrance Facilities for the Disabled

- 1- A disabled person with a wheelchair should be able to enter all the public sections of a building without having to be transferred using the stairs. Moving to different floors must be provided by the ramps, the slope of which will not exceed 1 to 12 percent, and a flat surface must be available on top of the ramp.
- 2- If vertical access paths are too big to be matched with the ramp, there should be an elevator big enough that can move the wheelchair and its user, and instead of taking the disabled to use the normal chairs, it is better to create a special space for the wheelchairs and their uses. It is a lot better for the disabled to be in a wheelchair in a special space on the floor. Giving the disabled their own special space eliminates the traffic clogging, but this is not always possible, and if they share an entrance with other people,

the regulation management will probably insist that they should stay until everyone has left the salon.

- 3- There should be dedicated restrooms with a place for wheelchairs and handrails, and the toilet bowl must be accessible to a sitting person and must have a door that opens to the outside. Such a restroom seems enough for use because it is highly unlikely that there will be a lot of them at one given time.
- 4- The exits must open to the outside and must be designed in alignment with the number of people and their path length.
- 5- The height of the doors should not be less than 220 cm.
- 6- The width of the corridors should be 1100 mm for up to 100 people and 1600 mm for up to 250 people.
- 7- Stairs must have a width of 1100 mm for up to 100 people and must be 1600 mm for up to 250 people.
- 8- The minimum height of the stairs should be 14 cm and the maximum 18 cm.

#### Ways to Escape a Fire

Building regulations specify what measures should be considered to ensure that building occupants have a chance to escape during a fire. If the building is in a place that does not have direct access to the outside, then a fire-protected path leading to safe places should be provided. In commercial buildings and offices, shops, warehouses, and non-residential buildings, the maximum distance from the escaping stairs from each corner of the building is 45 meters.

#### Services

Among the requirements of public restrooms is that they should be spread in different locations, especially in populated areas, and they must have women's and men's sides separated, and for each toilet, there must be one bowl installed. Including mirrors and vents, toilets that open to the outside could be smaller ( $1/20 \times 0.80$  m) than toilets that open to the inside ( $1/40 \times 0.80$  m). There should be a room (about the size of a toilet) next to each service to place cleaning utensils with drawers and shelves for cleaning objects.

#### Restaurant

The location is designed in a way that less noise is emitted to the salon, and if possible, the restaurant must have a separate entrance for goods and equipment logistics. In restaurants, the main role is

played by the dining table designs. Tables can be arranged simply or diagonally. In the simple design, a wide pathway is required for providing service between each row of tables.

- 1- The necessary area for the tabletop includes  $1/42 \times 2/20$  square meter passages.
- 2- The required space for each guest and the space in front of the doors is approximately 1.5 meters.
- 3- The space between two tables can be filled with small tables of 65 to 70 cm.
- 4- Columns should be placed between a group of tables or in the corners of tables.
- 5- In the diagonal design of the tables, the required area for each table, including the passages, is equal to 31.3 square, and the required area for the guest is 83 square meters.
- 6- The columns should be placed in the corners between the tables. If necessary, the service should be placed in front of the tables.
- 7- Folding tables are stored very simply and comfortably next to folding chairs, and hence some space is saved.
8. The distance between the tables should be approximately 1.3 meters.
- 9- The benches are only 43 cm high and 10 cm away from the tables, which makes it easy to enter from behind. If the rooms are 4 or 5 meters high and have a light on both sides, their depth can range from 15 to 20 meters.
10. Depending on the depth of the hall, tables can be grouped in rows or two rows in the middle. In either case, the space used does not vary a lot.

#### Conclusion

In this research, a number of solutions were proposed for the establishment of commercial complexes in context-specific areas. Also, this research includes commercial spaces, apartment hotels, restaurants, coffee shops, fast food, playing fields, and vertical parking. And based on the idea of the plan, which is movement and dynamics, it is attempted to design these spaces as half-floors so that they convey more feelings of movement and dynamics to the visitors. The goal of the land planner is to provide more suitable conditions for human lives either inside or outside the artificial environment. In the meantime, the existing limitations required the land to be planned after the initial assessments. Perspectives should be gained through a collection of special information about the

subject at hand, and this information should be gathered in a way to provide access to the most appropriate environment improvement tools.

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