

Alexandria University
Faculty of Fine Arts
Décor Department
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**Re-recruitment and development of the internal architecture
of negative spending in Alexandria (a study applied to the
tunnel of Sporting)**

**A Thesis introduced to the Décor Department
To the Requirement of Phd Degree in Fine Arts
Décor Department -Specialization Interior Architecture**

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An Introduction:

Since ancient times, mankind has been in constant search for a home that suits him and protects him from the surrounding circumstances, which may threaten his life, such as a weather with which a person feels uneasy and fearful, or animals that disturb his peace, or even dangers that come to him from his fellow man himself. Since the primary purpose of that dwelling called a home is to search for safety.

Primitive man, as we are told, took the caves as a home for him while blocking their openings with large pieces of stones in order to warmth and safety, and the farmers sheltered with trees that inspired them to come up with the idea of cutting them and collecting them to be converted into huts and dwellings to resort to, and the shepherds set up tents from their hides after pulling them to wooden legs and taking them Shelter them.

The first and most important goal of man is survival, and this is not limited to biological survival, but rather to physiological, psychological and social existence. And all aspects of survival try to find a balance between the individual and the environment of which he is a part. This balance is a process that takes place from two directions that are mutually related, whether towards up (skyscrapers) or downward and in this area like others there are many challenges and it is necessary to collect expertise and advanced technology And lessons learned from failure to achieve success.

Summary of the first chapter: What is negative architecture and its evolution

The topic of the research revolves around the importance of architecture in the ground as a realistic solution to the problems of congestion inside cities and the spread of slums and the environment has turned into an enemy of humans on the ground and the disappearance of many living organisms as a result of environmental pollution, including water and air, and with the technological development and the emergence of environmentally friendly materials And smart, there was the necessity to take a new approach that corresponds to human requirements on the surface without affecting the environment, which is to take architecture under the ground (development), so that the area of agricultural lands, forests and historical areas can be used This matter has a positive economic impact - and the research approaches the role of interior design in addressing empty space, the field trend to follow construction methods, stressing the importance of color and its effect on the ground by setting standards and sound treatments - emphasizing the psychological inside the void and How to fit in with this style of architecture.

The first man inhabited the natural caves, which soon narrowed their inhabitants, so he began to dig his priests himself to catch some metal blocks that later became a target for digging in their own right, to start another phase of underground

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architecture, which is the architecture of mines, where I found tunnels and mines dug in the ground in the Eastern Desert To Egypt and in many places of the world.

First: Factors affecting site selection

The site selection stage is considered one of the most difficult stages when planning a new site that includes underground or other buildings protected by soil, as the site selection method must be based on many criteria and comprehensive of all possibilities and based on accurate scientific analysis as well as imagining and simulating what the site might be like after construction. And in addition to being flexible to adapt to the changes that may occur, and above all, this choice must take into account the physiological and psychological needs of the human being.

One of the most important considerations of climatic guidance for any building is its location and orientation in relation to the sun, and despite the designation of the building (protected with soil), this does not mean that it is surrounded by soil from all sides, so there must be doors, windows, openings for ventilation and natural lighting, which cannot be dispensed with in any way. Conditions, grouping openings in a specific side of the building and directing them in a specific direction from the original or subsidiary sides, which is what we mean by the climatic directive of the building, and the most important determinant of the climate directive is the orientation with respect to the angles of the sun and the degree of its entry into the building

From the above, it is noted that natural sunlight can be provided in buildings protected with soil, especially built on a sloping surface, in contrast to the fact that many ordinary buildings above the ground in crowded cities sometimes do not enter natural light or sunlight in many cases, which improves the negative image. In the minds of darkness, the most important factor that should not be overlooked when choosing a site is topography.

There are many factors that affect the choice of a sloping site or a flat site and the intensity of moisture associated with building underground, if this is taken into account in the design.

- A- The construction was concentrated on inclined slopes often in the regions of the Middle East, the Mediterranean region, Asia and Europe. As for the flat places, it was generally chosen in North America during the past few centuries, and they were the first choices in the whole world.
- B - The building protected with soil on sloping sites with their advantages becomes a new choice that can be put on the architectural scene at the present time, as it allows the use of flat and paved areas in agriculture, main transportation roads, public service buildings, parks and natural areas.
- C - Although the choice of slope may require a greater initial investment cost than flat sites, this cost will be offset by the cost of the higher flat land, of course.

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D- The sloping site provides an environment that satisfies all segments of society, as it works to activate social communication between neighboring environments better than what is currently present in flat sites, in addition to that there are comprehensive and wide-ranging advantages in terms of the integration of the concept of using the slope and the ground space as natural environments and their overlap in an appropriate manner. With civilizational groupings.

Chapter Two Summary: Principles and Design Standards for Interior Architecture in Negative Buildings

The famous architect, Malcolm Wells, says: "If the architecture as we know it is placed above the mother earth, then the architecture of the subsoil falls in her arms."

Humanity has a long history of using underground space. In the depths of history, people lived in caves and underground spaces while using the aforementioned parts of the land to grow their crops. Looking at the experiences of mankind in the past, we can see that underground architecture is a future need. This type of architecture fulfills the principle of (containment) by covering the natural soil of at least three sides of the building.

Importance of negative architecture:

Underground facilities were caused by the elements of nature that created sheltered craters and caves, and the growth of these facilities was to meet many requirements, including religious beliefs (which called for buried temples) or climate modification (such as halls for the Chinese or Matmata dwellings in Tunisia) or a goal. Protection and safety (such as military bases or the underground city of Cappadocia), or to hide due to fear of a new religion or protection in case of war), and the continued use of underground facilities in the modern era, either to keep up with population growth, to protect against natural disasters, or to conserve energy in addition to Technology that helped increase the depths used and other characteristics of the installations underneath. The land that encouraged the continued use of those facilities in the past we found that underground facilities expanded for thousands of years, and became an important part of the development of architecture, as underground facilities developed in some countries such as (Japan, China, South Korea and Singapore), for example, It was possible to build a large number of floors underground. As the subway has become a model of innovation and renewal, there are also laboratories, markets, museums, garages, commercial buildings ... and other underground facilities that were built in the 20th century.

Planning considerations for internal spaces in negative structures

The performance of negative structures is not considered the same as normal buildings in most different aspects, due to the nature of the condition of those buildings underground or their intense surrounding with soil. Therefore, the most

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important points related to the design standards for spaces inside negative facilities must be taken into account with their different function.

The influence of buildings underground

The effect of this situation on the internal climate of the building, and on protection from various disasters and security, whether positively or negatively. The effect of the conditions of the underground buildings is divided into three main points that should be taken into account when designing the internal space.

Protection from the spread of fires

Negative buildings are considered among the most suitable environments that provide protection from the spread of fires, besides the fact that the soil is not combustible, it gives excellent thermal insulation properties to the structural structure inside, as for the worst case, if the fire completely destroys the internal furniture, the building block itself is not affected by the fire, They prevent it from spreading to neighboring buildings, but the contact points on the upper deck are the most vulnerable points.

The lack of openings and points of contact on the upper surface reduces the chances of escape in the event of a fire or an internal explosion, if this is not taken into account when designing, by making specific escape points that are visible to the public. In order to ensure the safety of the passengers in the event of a fire, it is important to consider and study the evacuation time of the passengers. If the evacuation time from the dangerous point to the safe point takes too long, the fire will be expanded and visitors will be injured due to the fire or smoke. Width and number of stairs are one of the main factors for evacuating visitors from the dangerous point. Visitor safety is enhanced if wider stairs are provided in the tunnel.

Vertical safe exit (stairs, elevators, and escalators)

Escape ladders are designed in such a way that they are isolated, have good smoke disposal and ventilation potential, open in the middle to provide visual contact with the sky, and the electric stairs provide an effective means and less effort than vertical climb, but they are not completely isolated like the emergency stairs with fire-resistant doors, which can be To users if there is no fire in the vicinity of escalators. Smoke can be controlled near escalators by using automatic smoke curtains in case of emergency only to a level higher than head height and this contains smoke inside while people are allowed to pass below.

Lifts are used for exits from deeper installations and require separate smoke and ventilated corridors. It is assumed that the user feels tired after only one minute of climbing the stairs compared to five minutes when descending, and he may not be able to climb more than 4: 6 floors. Therefore, it is preferable to resort to elevators and escalators in deeper passive installations and many different concepts can be

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used. The usual or unconventional to achieve security and safety that do not conform to the traditional method of exiting a building in an "emergency" situation.

Use clear emergency signs, signs and lighting:

Providing emergency lighting, especially in the event of a power outage. Due to the accumulation of smoke in the ceiling, down lighting on the corridors walls is desirable. In addition to general lighting. The strength of the illuminated emergency exit signs, the emergency lighting should be available within 60 seconds of the power outage. The use of photoluminescent systems, in emergency signs - they are luminous materials such as crystals, especially zinc sulfate or zinc sulfide, which absorb and store energy from artificial lighting - and in the event of a blackout, they emit light energy and appear to glow in complete darkness It decreases over time, but remains very strong for up to an hour and may take up to eight hours to disappear completely.

Reflection of the negative benefits of architecture on interior design

- If we want to re-solve the problems related to urban population density and limited space on land, we must develop underground architecture as it is part of environmentally friendly architecture.

- We can integrate the underground design with sustainable environmental design, because it has proven energy efficiency and less impact on the surrounding environment.

One of the reasons for the need to build underground is because of the increasing need to reduce the lack of green space, for example, when you need to find an extension to an existing building and at the same time we do not need to interfere with the existing landscape so the best way is to build underground.

Chapter Three Summary: Designing Strategies to Mitigate Negative Psychological and Physiological Effects on Negative Interior Architecture

The aim of this chapter is to introduce the psychological, physiological and social potentials and determinants related to the human condition in an underground environment, and to try to maximize the utilization of the available capabilities and reduce the problems associated with the determinants through some design solutions to overcome some problems and take advantage of the available features.

First: the mental image of underground spaces

- This negative imagination accompanying the underground depends on the real image inside the caves and primitive voids made by man under the surface, united with the earth's power derived from the mystery and the unknown, but in the relatively recent past it has become technically possible to give industrial lighting and

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mechanical ventilation and this contradicts the similar image A cave of dark, damp spaces with non-renewable ventilation, In many respects, the underground environments have become somewhat similar to modern environments above ground, which are considered to be completely manufactured in a self-enclosed manner. Despite solving these technical problems for the supply of ventilation and lighting, there are a number of principles for the negative imaginative view, specifically the underground, which clearly showed weakness. Link to the natural outdoor environment.

Second: Reactions as a result of the realistic experience of users of underground spaces and similar closed environments Many people live or work in cramped, sometimes windowless or windowed places on one side only, such as theaters, restaurants, offices, factories, malls, museums, libraries, and many other public gathering places. In all these buildings, their users face the same situations and conditions that the residents of underground buildings live, so that those buildings located in flat areas may have a design that contains only one exit to the external environment.

Underground places share some basic characteristics with other similar environments. This includes fully manufactured environments such as space capsules, submarines, and arctic and southern bases. The similarities are often evident in the complete reliance on the use of technology in lighting and ventilation, as well as the feeling of seclusion and isolation from the natural environment on the Earth's surface.

Visual comfort

Visual comfort takes on a fundamental and multi-faceted importance, as natural light creates perceptions of spaciousness, and provides a distinct character, as natural light is not used as the only source of illumination, but they view it as an important complementary element that addresses the deficiencies of artificial lighting in addition to the color that cannot be overlooked in the process. The design.

Technological methods of transmitting daylight to the negative interior space at a level deep from the surface of the earth

In the underground space, daylight not only meets the requirements of lighting and energy saving, but more importantly, satisfies the psychological requirements of people to understand natural information such as natural sunlight, sense of direction, night and night shift, weather change, season, climate. At the same time, the daylight in the underground space can improve the wide sense of space and improve the ventilation effect to reduce the negative visual and psychological effects caused by the underground space, Such as closed monotony, unknown tendency, and isolation. Therefore, daylight design has a multifaceted role in improving the subterranean environment, including but not limited to meeting the physiological needs of humans.

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Define climate design

Climate design is an aspect of the process of designing the built environment, and it is concerned with providing safe and comfortable climate conditions for the human being with the least amount of costs. This short definition defines the main objectives of climate design, which clarifies its nature.

Chapter Four Summary: Contemporary design trends for negative architecture depending on the nature of the interior space under the ground

After the tremendous technological progress, we will resort to the subsoil, but with different standards that were not only in line with the requirements and aspirations of the times, but rather looking forward to the future, taking into account the provision of the greatest degree of comfort for the users of the building, and environmental control to provide psychological, organic and social comfort, as well as control of the vacuum environment, including heat, ventilation, lighting, and acoustics. By following a sound design approach, using advanced technology, and solving non-technological problems related to the degree of social acceptance of the concept and perception of underground survival.

Classification of the subsoil void according to the nature of the construction

The study of the approved classifications and regulations for passive building is considered as a divisive basis on which the types of underground spaces can be clearly classified. This enables identification of the main types of passive construction, the characteristics of each of these types and their requirements.

One of the interior designers developed a logical zoning system for a database model that was intended to encompass all kinds of uses for underground spaces and put them into an overall structure.

Despite the multiplicity of classifications of passive construction and underground buildings, given the research topic of buildings protected with soil and its relationship to residential use, this part of the research focuses on the classification of the first and second groups of divisions: (functional division - and division according to engineering formation). This is because it is directly related to the architectural aspect that serves the field of research, as the functional division results in a difference in the interior design of the building according to the function of each building. And the division according to the engineering formation is what determines the shape of the final design and its relationship to the surface and the method of distributing the internal spaces, thus affecting the structural design and the method of construction.

Types of voids under the ground

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It is necessary, before examining the different uses of negative spaces, to first identify the different types of these spaces, as it is important to understand the types and shapes of underground spaces suitable for the different uses that require their presence under the surface of the earth.

Uses of underground spaces

Resorting to the use of underground spaces is not considered a new trend in architecture, as we preceded its use by the first human being thousands of years ago, in search of human needs such as housing, shelter and safety from the hazards of nature. His uses of underground spaces were limited to meet his requirements and needs at that time, but now the uses of these spaces have varied according to the different needs and requirements of man at the present time.

Thus, the goal of classifying underground spaces (negative construction) can be defined as the scientific art of constructing a building in the ground that meets the conditions of use, durability, beauty and economy and meets the material, psychological, spiritual and social needs of people, within the limits of the available capabilities and with the best means in light of the determinants of the place and the surrounding environment.

Chapter five Summary: Applied model for the internal redesign of the Sporting Tunnel in Alexandria

Architectural directions for future architecture

The growing development of architectural thought in our time has resulted in architectural forms and trends that did not exist before, as they appeared based on technology, informatics and digitalisation: which resulted in a sophisticated and different urban fabric in all its dimensions, shapes and measures than before.

The chapter revolves around the importance of architecture in the ground as a realistic solution to the problems of congestion inside cities such as Alexandria, the spread of slums, the environment has turned into an enemy of mankind on the ground, and the disappearance of many living organisms as a result of environmental pollution, including water and air, and according to climate changes and the energy crisis it has begun Returning to the architecture of the past to solve these problems through underground buildings, which have begun to appear in what is called movement Earth with the orientation to green architecture to conserve energy and reduce fuel consumption, as its idea is to combine the land and the building materials of the building. The land, in whole or in part, for the purpose of merging with the surrounding environment and the environmental simulation of the site.

And with the technological development and the emergence of environmentally friendly and smart materials, there was a necessity to take a new approach that conforms to human requirements without affecting the environment, which is to take

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architecture under the ground, so that the area of agricultural lands, forests and historical areas can be taken advantage of and this matter has a positive economic impact. The research approaches the field direction to follow the construction methods, stressing the role of interior design in addressing the spatial spaces in the subsoil through setting standards and treatments Sound treatments, stressing the importance of color and its psychological impact within the space and how to reconcile with this style of architecture The current architectural models inherited from previous eras suggest that there is a proven relationship between the technological development available in each era and between the shape, components and the form in which architecture is That era.

Technological progress has taken many forms and developed tremendous developments in all walks of life from creation to now, which allowed some architects to take advantage of the possibilities provided by this progress in achieving their visions and dreams for future architecture, and reaching an architecture that reflects the needs of the times and the spirit of technology that is available in it.

To add new dimensions of architecture that were not available or known before, towards a new world that does not see things in their logic, searches beyond walls and physical barriers, walks with his imagination towards virtual worlds, through which he sees different images from one place, playing with place and time, things move to it and not On the contrary, the environment around it moves to become a dynamic, moving architecture whose features are changing and unstable to a single vision in time, to give architecture a new aesthetic dimension, or it is now expressed by the fourth dimension in the design process "time" to transform the building from a state of stability to an active, effective building that is transformed It interacts with inside and outside at the same time.

Negative architecture in Egypt in general, an example of this is the "Greater Cairo City" and the "New Alamein City (o mall)".

Negative architecture in the city of Alexandria in particular, and a study of the most successful examples of negative architecture, which is the Alexandria Library, and an applied study of the Sporting Tunnel in Alexandria.

Applied study of the Sporting Tunnel in Alexandria

"The future idea of the Alexandria Sporting Tunnel next to the commercial center is" a new museum planned to be implemented in the city of Alexandria that aims to bring visitors to the sunken treasures that the public has not seen for more than 1,400 years.
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research results

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It includes some of the points reached by the study through the research study.

Recommendations

The study devised a set of points that the study recorded and referred to for taking into account and taking them into account when designing the interior of marine passenger terminals.