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An Investigation into the Factors Affecting the Design of Nature-Compatible Recreational-Residential Complexes- Instance Analysis

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Abstract

Explaining tourism concepts, standards of recreational-residential complexes and the methods for accurate treating with nature, this paper tries to study the suitable instances of recreational-residential complexes and to adopt their positive aspects as a design strategy. SWOT matrix was built based on the weaknesses and strengths of the project site and design principles were derived by observing the extracted influential factors.

Considering land topography, for example, different areas of buildings were shifted and combined with the nature.

- Residential and public zones gained a nice view towards the nature by keeping their orientation and extending them in east-west direction
- Service section connected more appropriately with residential and public areas
- Sections which do not need extra light such as W.Cs, storages and installation rooms, were considered in a side of the building which was adjacent to soil
- In residential section, rhythm was implemented in ceilings and windows
- Golden values and proportions were used to design the plane and façade of the complex

Keywords: Nature, Tourism, Nature-compatible samples, Recreational-residential zones.

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Introduction

Human has been always in connection with the nature and has always tried to make use of the nature by manipulating it. This kind of coexistence is seen over human history. In other words, since the time he has built a shelter, a building and an environment, human has always considered the elements of nature and the nature as an important and essential party in his maps and designs (Nasr, 2001)

Recreation and exhilaration are two essential elements for the mental calmness and health of human in all ages. Recreational spaces are built in different cities of the world considering addressee types and their age range and the mental and physical needs to which they should respond. Relying on the innovation and creativity of architectures, such spaces should be built in a manner that they attract tourists. In addition, one should note that any recreational space needs a service space and different factors including proper layout, accesses, fit façade and so on provides tourists with attractive and useful spaces.

Harmonization of the architecture of recreational sites with human needs and meeting such needs demands the understanding of available environmental features and climate conditions in order to create a calm and cozy place to users by taking environmental condition and available climate problems into account. Iranian ancient architecture has accurately observed this coexistence with the nature. Old Iranian architects have considered the understanding of the nature features. Such an understanding and awareness has at least two aspects. One is associated with the understanding of geographical features, including weather, and the another one is associated with materials available in the nature and utilizing such materials in line with available topographical features.

Problem Statement

Undoubtedly, tourism industry is currently the greatest service sector. It ranks the first in terms of its broadness all over the world. Specialists predict a considerable growth rate for this industry in future. Therefore, the accurate investigation and analysis of it can aid the identification of its dimensions and features in line with the development of national economy. This, in turn, promotes and improves the quality of life in different regions of Iran. (Heidari Chîyane, 2004)

Today, tourism, as a global dynamic phenomenon, has its own complexities beyond a mere industry (Doswell, 2005)

Currently, it is the greatest industry of the world in terms of broadness and has had the maximum growth in recent years. According to predictions, it will be the first industry of the

world by 2020s so that in 2020 more than 1,600,000 people will travel internationally (Rahnamaee, 2001)

Relaying on its features and economic implications, tourism can play an effective role in the dynamism and mobilization of different economic sectors of local communities, which in turn will help the development of non-developed regions (Bártolo, H. M. G. & Bártolo, 2002)

Natural attractions are free and granted attractions and human communities use them as tourism attractions. Mountains, flats, deserts, weather, plant coverage, environment, animal habitats, sea and beaches are among natural attractions (ARCOM Conference, 2002)

The growth and development of tourism industry causes other sciences and phenomena to be analyzed from tourism point of view. When we study the history of tourism, we can clearly observe the relationship between tourism and architecture so that architecture always plays a special and considerable role in tourism.

Study Body

Tourism Industry

Tourism is referred to a set of trips between origination and destination with the purpose of resting, recreation, fun, conducting sport activities, visiting, commercial purposes and having leisure time where the traveler does not wish to permanently stay or work at the destination place (Rahnamaee, 2001)

Tourism Definition Standards

- Time standard: time standard differentiates three types of tourism activities: short-term (less than one day), middle-term (one to three days) and long-term (more than 3 days)
- Place standard: place standard differentiates near region, middle-distance region and outside or far region tourism activities.
- Motivation standard: motivation standard differentiates resting, leisure, treatment, pilgrimatic, cultural, economic and sport tourisms.
- Season standard: season standard classifies tourism seasons based on calendar seasons.
- Form and organization standard: form and organization standard differentiates single, group and family travels defining tourism arrangement.
- Vehicle standard: vehicle standard classifies tourism based on vehicle used for travelling purposes

- Residency standard: residency standard classifies the residency of tourists from both qualitative and quantitative point of view. For example, it defines that whether tourists stay at hotels, villas, boarding and camp

Ecotourism

Ecotourism is a branch of tourism. It is based on natural attractions. Since 1990, ecotourism has been introduced and studied by non-public organizations, specialists of the development field and universities as a tool of the sustainable development. (Megan Epler, 2007)

Definition of Hotel

Hotel is a French word. It means a location providing travelers with necessary accommodations at destination or during travel. In other words, hotel is a service provider complex which works to make money. Its history backs to Industrial Revolution of Europe. Its Persian equivalents are Karvansara (caravansary), Mehmankhane (guesthouse), Mehmanpazir (hostelry), Zaersara (pilgrim house) and Mosaferkhane (inn). They have thousands of years of background across the world regardless of their degree of quality.

Hotels-Spaces and Standards

Different spaces of hotels are divided into different sections based on their functions. One classification is explained in below:

Public space –residential space-support section-administrative room-sport division

- Public spaces include hall, spaces for serving foods and drinks and meeting spaces
- Residential space includes resting rooms
- Service section includes kitchen, laundry and W.C. spaces

The price difference is mainly associated with the public spaces of hotels. Although guest rooms occupy the main area of floors, this is public spaces making difference in the rate of occupation from a hotel to hotel. The following table shows different types of hotels.

The following table shows the market of the main customers of hotels and their features. In addition, it shows the influence of customers on the decoration and design of resting rooms.

The characteristics of hotel customers

Hotel type	Customers' characteristics	Aim of travel	Design factors of resting rooms
Recreational, family	Room is occupied in the form of two or more stairs (including child), residence duration: 1 to 4 nights (this is extended in recreational hotels), price: cheap to moderate	Vacations, family trips, visiting trips landscapes, exercise and family-based activities	King size beds, dinner and work-fit tables, fit capacity of drawers, large-area multi-sectional bathrooms

Storages

- Storage and logistics custodian room
- Central foodstuff storage
- Kitchen utensil and restaurant storage
- Laundry central storage for storing blankets, bedsheets and so on

Figure1: Percent of storages in hotel

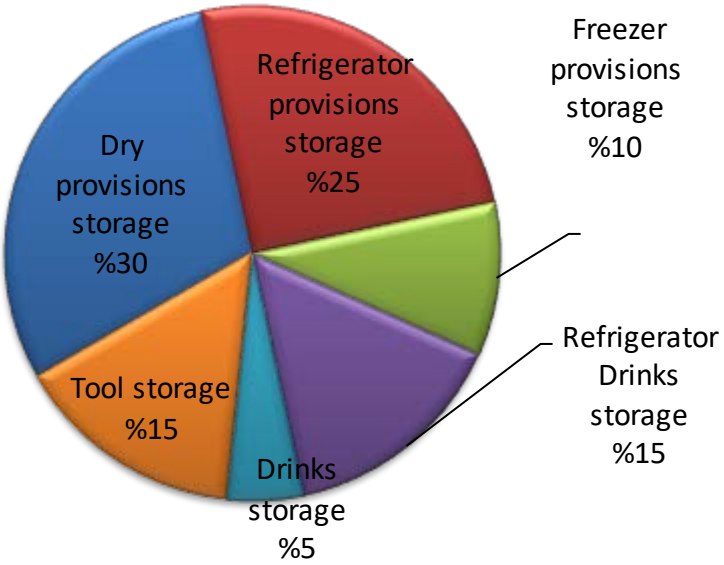


Fig2: mean area of different spaces of a one-floor hotel

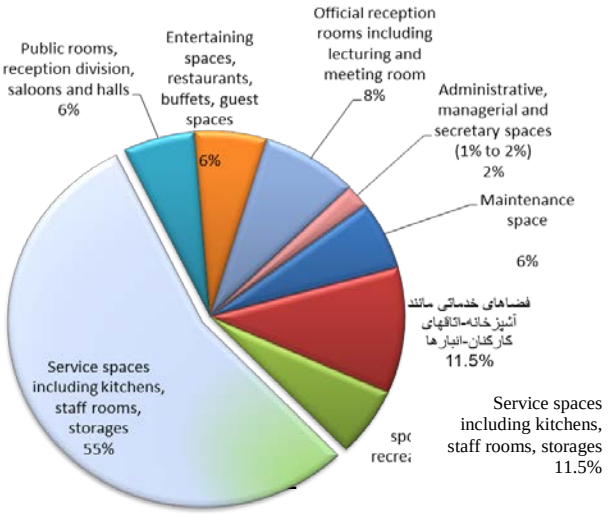
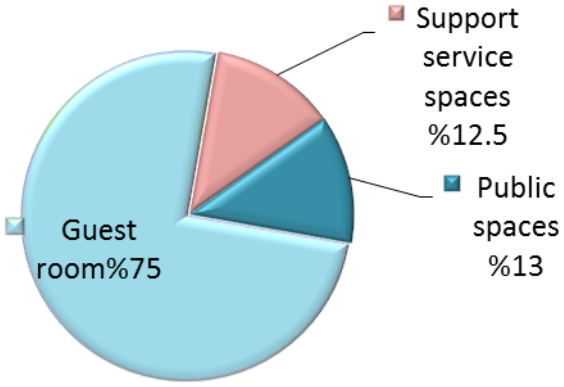


Fig3: Mean area of different spaces of a hotel

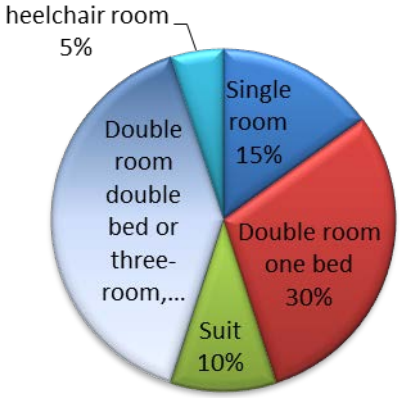


Resting rooms occupy 65% to 85% of total area of a hotel. In inefficient plan designs, this is 60% up to 85%

Service and supporting spaces occupy 10% to 15% of total area of a hotel in different types of residential hotels

Public spaces occupy 6% of total area of, for example, a cheap motel up to a 20%, for example, for a conference center (Walter A. Rutes, 1985)

Fig4: graph showing the percentage of different rooms of a hotel



The effective standards of Iran Touring and Tourism Organization for 4-star hotels in summary:

- Hotels are obliged to provide accommodations for handicapped and individuals with physical disabilities at least in 1% to 2% of their rooms, ground floor is preferred
- 5% of rooms should be fit for handicapped individuals who use wheelchair At least 15% of rooms should be single rooms
- At least 30% of rooms should be double rooms with single bed

- The number of suits should be proportional to 10% of the total rooms

Percentage of different kinds of suits in hotels

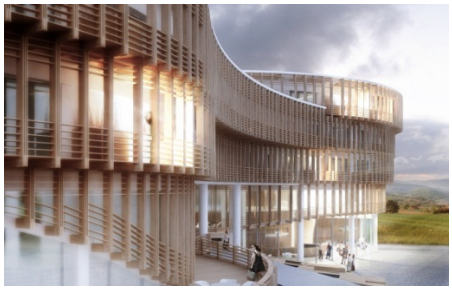
- Mini-suit: 1.5%
- Conference suit: 3%
- General suit: 4%
- Suit for executive managers: 1%
- Deluxe suit: 0.5%

Samples

In any field, studying available samples can significantly aid the avoidance of previous faults or finding positive notes and adopting them in new works.

Important notes derived from studying sample hotels

	**Naoshima hotel** - Conservation of nature and integrating it with all buildings of the complex, completely in some zones and partly in some zones - Laying out a garden at the center of plane ellipse as a sculpture - Creation of a pure architecture with an accurate geometry in a beautiful space
	**Kandalama Hotel, Dambulla, Sri Lanka** - Skillful integrated design - Designing the entrance of hotel as a narrow doorless entrance leading to the lobby and resting saloon - Buildings are surrounded with the nature without any mediator and the hotel has a nature-compatible design
	**Explora Hotel** - Maximized nature view - Harmonized with background-snow-covered Mountains
	maxx-royal-kemer-hotel

<table>
<tr><td>  </td><td>- Optimal and accurate use of available limitations including forest, climate condition and sharp steepness of land
- Moving terraces in accordance with land topography
Accurate use of bushy plant coverage to cover the hotel building</td></tr>
<tr><td rowspan="2">  </td><td>GRAFT+penda to Break Ground on MyrtleGarden Hotel
(Telfoni flower garden hotel)</td></tr>
<tr><td>- Mitigating the coordination between architecture and natural environment
- In order to be integrated with around topography, the hotel is located inside the steepness of hill and has a different appearance
- Plant space is located at the center of each circle that provides whole the hotel with a natural ventilation system
- The hotel is permanently surrounded by the yard
- Green-space is used as the entrance guidance of rooms</td></tr>
</table>

Other strategies

- Adopting modern architectural forms and maintaining the traditional architecture appearance at the same time
- Adopting strategies and solutions leading to the use of natural and local materials, this serves as a valuable tool for preserving the cultural and natural balances of the region and reducing energy consumption. This in turn leads to environment stability and increased strength of buildings
- Nature-friendly designs

The following items have been identified as the influential factors of nature-compatible designs. They are used to design M.A. thesis: Architectural features and climate-based solutions

Different climate conditions and fit architectural solutions

Climate	Fit-architectural solutions	advantages
Hot and draught	Connected buildings, designing dams for buildings, designing basement for buildings, surrounded and introverted buildings	Avoidance of transferring heat into the building, providing a natural ventilation system, increased strength of buildings
Hot and humid	No basement, constructing buildings towards breeze direction, adopting low thermal mass materials	Providing shading, benefiting from wind flow
Temperate and humid	Benefiting from open yards and spaces, sloped roofing	Benefiting from wind flow and beautiful nature

cold	Central and introverted yard, low height rooms, small openings, thick walls, flat roofing	The avoidance of transferring cold weather into the buildings, dry-weather resistant

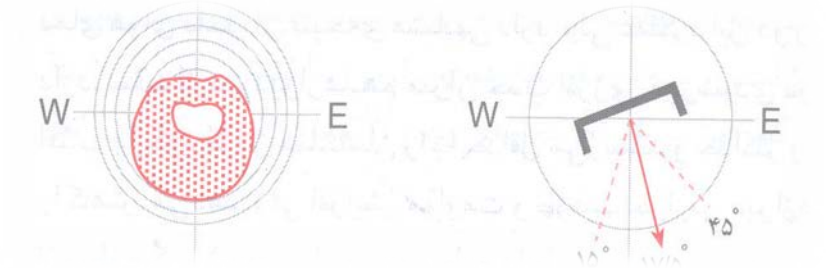
Naseri pp. 2-8

How to protect buildings against rainfall

1- The direction of rainy winds should be taken into account in calculating the direction of building

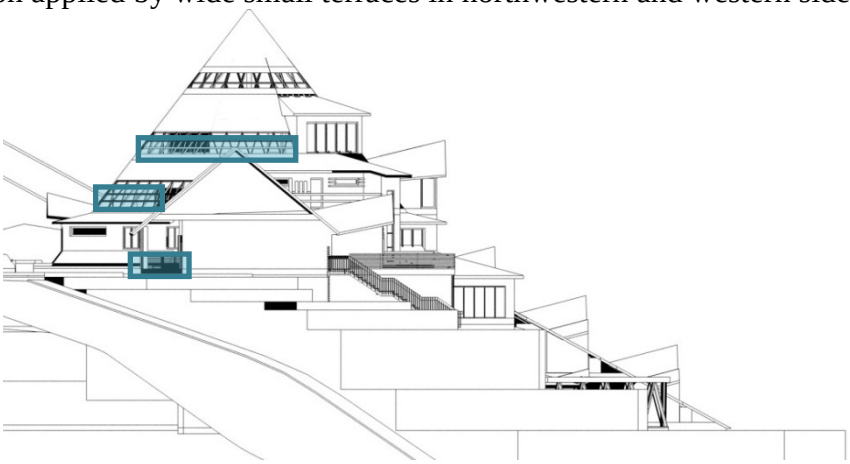
Appropriate orientation for buildings in temperate and humid climate

Figure5: building orientation in temperate and humid climate



2- Proper waterways should be predicted to collect and direct rain water
3- To protect inclined rainfall, enclosed loggia will be designed around inside spaces in west-northwest side

Fig6: Recession applied by wide small terraces in northwestern and western sides



How to reduce heat loss:

1- Appropriate physical forms for reducing wind effects should be predicted
2- The area of the main entrance should be higher than the external finished floor
3- All doors, windows and openings should be weatherized. In addition, insulated glazing (double-pan) should be installed
4- Constructing buildings in negative slopes should be avoided, especially in alpine regions
5- Buildings should be constructed in an indiscrete manner in the middle zones facing south. This reduces the external surface of energy and a small portion of heat is reflected and exchanged with external environment.

How to generate draft in internal spaces:

1- Big fully-opened doors and windows should be used to benefit from the outdoor air in appropriate times when it is satisfactory
2- Buildings should be constructed in big lands in order to maximize access to favorable weather
3- East-west extended plans should be used in order to minimize heat and to maximize access to outdoor condition
4- Accessible outdoor spaces should be predicted for conducting different activities (terraces)

Compatible with nature

Adopting a number of the physical properties of Guilan historical architecture and considering the climate condition of this region, this project tries to use the patterns in order to optimize the project and to give it an identity. Designing semi-opened terraces towards the intact nature of this region aimed at having a better landscape and a nature-compatible architecture is a pattern used by current architecture of this region.

- Human is more capable of change and evolution than the nature. He can manipulate the nature and make it more complete and more beautiful
- Buildings should be oriented with respect to the direction of the dominant local wind and natural light
- The compliance of buildings with the site energies should be maximized and the site and its attributes, including its topography, should be respected

- Buildings should be constructed horizontally and should be harmonized with outdoor environment. It has been proven that horizontal outspread surfaces are the best tool for creating correlation

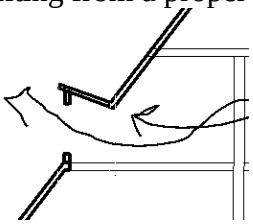
- Buildings should be integrated with the nature and they should not be dictated to the nature

- The need for natural ventilation should be minimized and the use of natural light should be maximized

- Spaces should be flexible in order to be used in all seasons

- Buildings should benefit from proper view and landscape (natural landscapes of the region. Example: Olasabelangah-Masal)

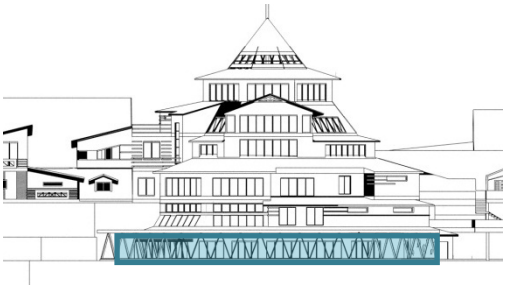
Considerations for benefiting from a proper view to landscapes Fig:



- Existence of terrace, appropriate shading, ventilation and relationship with the nature

- Considering open space (nature) and integrating buildings with the nature

Fig7: Integrating buildings with green-spaces

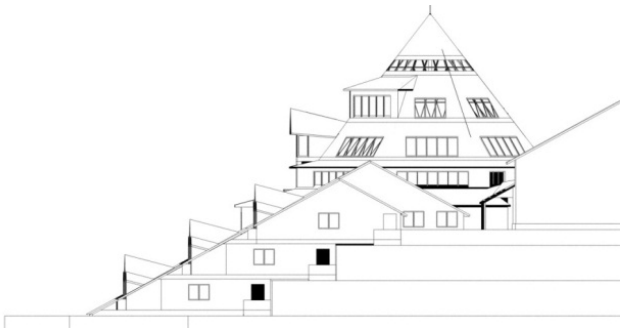


- The complex has been harmonically spread across the site and the nature and its signs are present in all public, semi-public, semi-private and private sections in order to further benefit from the nature

- The element of tree is present near buildings in order to provide shades in summers and to avoid cold weather in winters

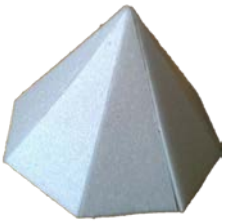
- The form and function of buildings have been designed proportional to the form of the site and region

Fig8: Site-fit form



Since the studied site is a sloped site and the region is a temperate alpine region with cold and snowy winters, buildings are being spread along the direction of the site topography with sharp-sloped ceilings in order to easily remove snow from ceilings.

Fig9: Ceiling slope



- Optimized use of materials and the use of local materials (wood) compatible with the nature and combining recoverable thermal and humidity insulator with new materials

Fig10: Optimized use of materials

Fig11: Taking the traditional architectural form of the region into account

Soil, stone and plants are among abundant materials of the region used for constructing buildings. The general framework of buildings is formed by wood as it is abundant in the region on the one hand and it can promote the exchange of inside and outside air on the other hand.

The traditional architecture of the region should be taken into account. In addition, buildings should be designed with new materials in a modern fashion. For example, a rag-like ceiling which is seen in the traditional architecture of the region in old buildings has been replaced by tin-plate coverage. Therefore, it is suggested that the ceiling of buildings should be selected in a manner that at least the appearance of the traditional architecture of this region is preserved.

Certain Teed ceiling, which is a kind of shingle ceiling, has some advantages as follows:

- It is a perfect thermal and sound insulator
- It can resist to the extreme variations of temperature
- It firs to all climate conditions,
- It is an environment-friendly material thanks to its ingredients
- It is easily installed in sloped surfaces of villas
- It has fixed and durable color due to having silica pigments
- It is possible to harmonize design, ceiling color and building façade
- It avoids entrance of the sun radiation, including ultra violet, to the building
- It is consistent with light-weight construction principles aimed at reduction of earthquake-induced damages
- It can be quickly replaced by similar traditional ceilings with no need to any change in the building
- It is possible to use special colors to harmonize it with colors used in façade
- It provides a prefect thermal insulation through avoiding the transfer of environment temperature which in turn results in energy save
- It has a good coordination and harmony with doors, windows and UPVC-based openings appearance

Site analysis

Site design principles

In order to have a better understanding of the site, one needs to take into consideration the area, form and specifications of site as well as the area of the under-constructed recreational-residential complex. If one knows the data, he/she can accurately specify the relationship of different sections, the entrance of VIP guests and persons, and the location of services, staff

and car parking. The studied site was selected in a very beautiful sample tourism region inside the nature i.e. Olsabelangah-Masal, with an area of 25000 square meter

The topography of the studied region

The project site is located in a sloped land (variable and positive slope) within 19^{o} to 22^{o}. The direction of slope is from northwest to southeast.

Fig12: Cross section of the studied site

SWOT table was used to analyze the recreational-residential complex of Masal

strength	opportunities	weaknesses	Threats
Providing a relative proper space for conducting individual and group activities	Making it possible to distribute population in a relative proportional manner considering the concentration of population in populous cities	incompatible architecture of residential and recreational complexes	Tourists do not visit this region due to the low-quality architecture of residential complexes
The access of site to the main road	appropriate design appropriate access	Lack of spaces appropriate for eating and resting activities	Untidiness, creation of rubbish and creation of insecurity
Availability of local materials (stone and wood) and skilled masters	Local material-based construction	Pollution and lack of proper sanitation	Untidiness and creation of rubbish
Existence of diverse green spaces	High-quality of life and strong feeling of attachment to the environment	rain and snow are not stored to be then used as consuming water and power	The project is not justifiable in terms of economy and energy save
Higher rates of social participation in the environment	Fit designed group spaces in the yard of the residential-recreational complex	Shortage of residential complex considering the ever-increasing growth of population	Excessive construction of personal villas for staying purposes

Local ceremonies and games in special occasions and different rituals	Fit designed group spaces in the yard of the residential-recreational complex, strong feeling of attachment, higher rates of social participation	Existence of non-designed and solitude places	Creation of insecurity
Existence of natural, beautiful and intact landscapes including mountains and forests	Considering appropriate designs including terrace for benefiting from around nature	Shortage of accommodations, lack of landscaping and various paths, no use of ideal visual effects including fountain and element, noise pollution induced from streets	Developing residential-recreational complexes is not possible in future years

Fig13: M.A. project of the author

Conlusion and suggestions

According to investigations, the application of natural elements in the architecture of current residential-recreational complexes is a factor, which has received less attention. In other words, manmade structures should be compatible with climate conditions and inherent requirements of human in order to create a fit space in the design if residential-recreational complexes in terms of psychology and aesthetic. Although old architecture has pure and simple buildings, which are compatible with the nature, in the new era, the buildings of residential-recreational complexes have no relation with the nature but a few samples (the samples were discussed above).

Compliance of buildings with climate condition is the best solution for reducing building costs and fighting unfavorable climate factors. In regions where buildings are constructed in

accordance with designing principles, the need for cooling and heating devices has been minimized. This means that without overloading cooling and heating devices the building, itself, provides a comfortable condition for residents with no noise and with no need for additional devices. This, in turn, results in considerable save.

The results obtained from national and international instances, discussed in above table, can be used in our design.

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