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Localization of Iranian Architectural Model in Low-Cost Housing Production Technology (Tehran)

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One of the important points in achieving sustainable development is providing welfare and comfort and security in the society to emphasize the necessity of overcoming poverty. Localization of the low-cost housing model plan is significant in facilitating the aforementioned process in the face of population growth. The studies of the history of housing industrialization and construction technology emphasize the principle of reducing cost and increasing quality and speed. Therefore, in order to obtain optimal results from the study of housing projects in Islamic and developing countries and their comparisons to obtain suitable points and finally the effectiveness of Iranian architectural indicators, we can reach the desired results in providing a suitable model of low-cost housing in this research. The research method in this article is analytical-descriptive. The projects of Iraq, India and Singapore have been used in the study.

Keywords: Localization of housing, Indicates of Iranian architecture, Industrialization, Transcendental architecture

1. INTRODUCTION

According to the research and studies carried out about housing, attention should be paid to the coordination of needs and the adaptation of human proportions and environmental and climate conditions. According to the opinions of architects of the modern and industrial era in developed countries, the importance of harmony, proportions, coordination scale of interior and exterior space, application of minimal, modular spaces, serialization, simplification of form and facade, following form from function in design and choosing the appropriate construction method It has been said. The ideals and slogans of the architects of the modern period, which have been implemented until the contemporary period, show the following of the goal and implementation.

"Less is more", "the car is the scale of life", "decoration is a crime" were among the slogans of the early, sublime and late modern periods. Currently, in the advanced construction industry and contemporary technology that has been developed from Finland, Italy and Germany, the lofty goals of industrialization in mechanized production with modern materials of reinforced concrete, self-compacting concrete and high-strength concrete in the production of panels with We see the same molds for mass production in the form of load-bearing and non-load-bearing walls and hollow-core ceilings. One of the debatable points in the research is the effectiveness of the criteria of native architecture, culture, identity and climate. The solution and proposal of encountering tradition and modernity and examining the indicators of Islamic architecture and industrialization will lead the way in achieving a suitable model of architecture.

2. LITERATURE

The interior spaces of residential buildings in Pessac (Chia-Chang & Chih-Ming, 2006, p. 77) showed Le Corbusier's ideal architecture for providing housing in the future, pure, clean, transparent architecture. The white color of the walls and columns of the interior was to emphasize purity. In his writings about collective housing, apart from standardization and industrialization, Le Corbusier pointed out the importance of "Taylorism" in this process; A kind of management that has a one-dimensional attitude towards man and considers him only as a material element and entity and looks at his life through an economic lens. His reference to Taylorism in the house building process referred to categories such as standard, planning and control. (Jamaluddin, 2016)

Figure 1: Site plan of Pessac residential complex (Cite Fruges, 1924, 2016)(Doshi, 2015, p. 108)

The lasting legacy and negative consequences of this project should be seen together. Le Corbusier's innovation and efforts to provide the model of an ideal house and solve the problem of mass house construction on a standard basis and put it in an industrial process to reduce cost and time and promote a healthy life were the strengths that were recorded in the Pessac collection, and the disregard for Public culture and people's biological activities, which not only Le Corbusier, but most modernist architects and urban planners were accused of, are placed on the other side of the scale of this evaluation. From the five types of houses designed by Le Corbusier, we will finally reach the following three views:

Le Corbusier is the first architect who uses the concept of cells to design houses with a low number of floors. Cellular units are designed according to the basic pattern without respecting environmental conditions, and larger units are connected based on a combination of small units. Combination of forms and discussion on serialization elements, which is the basis of design by addition-subtraction method. Sorting of serialized elements is analyzed for floor, wall and green roof. Le Corbusier emphasizes the harmony between the external and internal elements of the architectural structure. (Chia-Chang & Chih-Ming, 2006, p. 76).

In 1987, an obstacle to advanced technology was raised in Iran, which was incompatible with the current conditions and could not be updated suddenly in iterative development. The important issue of difference in Iran's culture, appearance, religion, history and political-social attitude has been mentioned in the places where the manufacturing technology is implemented, and therefore it has caused an inappropriate type of technology that originated from Iran. In 1989, "Parsa Ghanbari" states that in order to achieve the development of technology that is incompatible with local conditions in many countries, it includes a revolutionary and transformational process. The economic perspective of building construction and the attraction of modernity is a problem in developing societies that goes back to their different socio-cultural past.

Changes in the construction method in the form of industrialization technology that will pave the way for modern construction require reasons: improving production, reducing construction costs, increasing demand, improving the implementation of standards, reducing land consumption by traditional methods, and eliminating the weaknesses of some materials. traditional and overcoming the lack of traditional skilled labor. (Arbabian, 2004, p. 397). The combined approach of building industrialization based on environmental conditions and having the cultural value of Iran's tradition with the

prefabricated system was imported from Britain in 1960, which has a large and heavy scale of concrete panel production. (Arbabian, 2004, p. 399).

The first stage of influence of the Second World War on the industrialization policy in Iran continued from the beginning months of the war until the occupation of Iran in September 1320. At this stage, two factors affected the industrialization policy the most: the first factor was the slowness and disruption of international trade under the influence of war conditions, especially after England's decision to blockade Germany, which cut off the connection between Iran's industries and the outside world. It limited its requirements regarding the acquisition of machinery, spare parts and intermediate goods. The second factor was the military policies of the warring parties on both fronts, allies and allies, especially Germany's decision to attack the Soviet Union, which completely cut off the communication between Iran and Germany. It had very important consequences on the industrialization policy in Iran. (Shejaei Dioklai, 1389, p. 73).

The occupation of Iran by the Allies had three major consequences for industrialization in Iran. These consequences were:

1- Expulsion of German industrial specialists and experts from Iran
2- Reducing production or closing factories
3- Occupying Iran's factories by the Allies and using them for military purposes
(Shejaei Dioklai, 1389, p. 85).

3. RESEARCH QUESTION

1. Is housing industrialization the right solution to provide a model based on Iranian architecture and sustainable development?

2. Are culture and identity, spatial and functional hierarchies, well-being and comfort and security important in the adaptation of Iranian architectural indicators?

4. THEORETICAL TOPICS

4.1 Developments in housing industrialization design in Iran

In this section, general explanations are presented in connection with the first developments in the construction and design of low-cost housing in different areas of Tehran. Small residential units are mainly built in the middle and southern parts of Tehran for the low-income class and have a modest plan, while the larger residential units are in the middle and northern parts of Tehran and are built for middle-income employees.

The gradual change of the plans towards modern patterns: in the first constructed koi[1], the effects of using traditional patterns in the house plan can be seen, and the living spaces are located on both sides of the yard. This will give way to completely new plans in the next koi. This change corresponds to the evolution of lifestyle in this era.

Gradual increase in apartment construction: at the beginning, independent residential units were used as a construction model in the construction of koi (such as Koi Four Hundred Devices, Narmak and Naziabad); And despite the desire of designers to pay attention to apartments - due to the society's alienation from this lifestyle and the absence of necessary rules for apartment living - it was accompanied by caution. Gradually, with the increasing familiarity with apartment living, new quays with apartment sections were built. (such as Shahrara and Ken); And apartment units were added to some of the constructed koi (such as Nazi Abad).

Construction methods: In the construction of buildings, new construction methods were used, such as prefabs (Koi Kalad and parts of Koi Ken) or the combination of load-bearing walls, beam roofs, and arched arches (other Koi). It can be seen that these Koi have brought with them a baggage of modern architectural manifestations, they have been the manifestation of the transformation of the settlement in their time. Today, these koi are part of the fabric of the city of Tehran, and their street structure and system have generally remained, most of their single-family units have been replaced by residential

[1] residential complex

apartments. The apartment parts of these koi are still visible in some places such as Shahrara. (Talebi, Hojjat, & Farzian, 2013, p. 30).

Other high-rise residential buildings were built in the 1350s and 1360s with financial resources and government management, including Ekbatan town with 17,000 residential units and Apadana with 2,901 units. (Haqshen & Hanachi, 2019, p. 65)

4.2 Indicators of Islamic architecture and housing

After studying the architect's writings and extracting Islamic housing indicators from each one's point of view, a total of 321 indicators were mentioned by the architects, after removing the similar ones, 185 criteria were counted for Iranian housing. In the next step, criteria are listed based on the amount of repetition among architect's opinions, and the highest repetition of a criterion was eight and the lowest was one. In some cases, the indexes with 5 repetitions also include the table so that the number reaches eleven. (Table 1)

Criteria for the ideal Iranian house design

By studying and carefully examining the verses of the "Quran and hadiths", it is possible to extract patterns and principles as construction plans and architectural design. (Table 2). Therefore, if the privacy of the residents of the house is respected in the area of housing, the built house will not cause harassment to others, it will provide peace for the family members (it is mentioned in verse 8 of Surah Namal), and it will also prevent luxury and extravagance more than avoiding the size for building a house, it can be claimed that the general principles of Iranian housing have been observed in these houses. In the contemporary world, as people's way of life has changed, these principles can also be adapted according to the needs of the day in such a way that both the Islamic rules are observed and the daily needs of the society are met.

It should be noted that this set of rules will be more complete in each different climate with the addition of climatic occasions. With regard to the above, an Iranian housing pays attention to the peace, security and relief of the heart, body and sanctity of the residents before anything else and recommends balance and diversity in the house and provides the environment in such a way that the residents feel a lack of independence and not to violate their privacy, and by living in it, humans can achieve excellence while communicating with nature and have a journey to God. (Zarghami & Sadat, 2015, p. 71)

How to reflect Iranian identity (tradition) in contemporary architecture

Three general categories can be evaluated among the different views about the perception and reflection of traditional Iranian architecture. "Sultanzadeh" considers this to be the use of some traditional forms, combinations, elements or decorations in a more or less direct way, in a way that can be identified and understood not only by architects but also by non-experts.

Identity in Iranian architecture

Certainly, the features that existed in Iran's architecture came from the culture, geography, customs and way of thinking and the way of life of the people who lived before. Many of these characteristics originate from the principles that were mentioned in Islam as the official religion of the country and defining the way and way of thinking of Muslim Iranians. These principles and methods were effective in the formation of the past architecture of this land in such a way that they can be considered as factors to recognize our architecture from the architecture of other parts of the world. Therefore, the main identity-building factors should be sought in the characteristics of traditional Iranian architecture and Islamic teachings in this regard.

From the examination of the identity indicators in the Mehr house in Tehran, it can be concluded that formal and formal elements have not been used. The use of elements and abstract patterns of Iran's past has not been used either. Going beyond the appearance and examining the details, the quality that distinguishes it from non-Iranian and non-Islamic settlements is not visible, and the complex is only sufficient to meet the relative needs of some material needs.

Formal indicators: the use of traditional elements such as arches, arches, domes
Pattern indicators: the use of patterns such as cruciform pattern, four rows, four porches

Conceptual indicators: introversion, privacy, hierarchy, centrism, creation of stillness, tranquility, spatial definition and composition, climate, geometry, unity in the same multiplicity, valuing and staging different spaces, beauty, human scale, avoiding extravagance, showing off and observing moderation, innovation (Sadat Razavipour & Zakari, 2017, pp. 137-138).

In order to define the theoretical issues of good housing, a model of human needs is needed that determines the ranking and priority of these issues. Relying on Abraham Maslow's comprehensive model, it is emphasized that the symbolic aesthetic is not the main concern of a person who is struggling to survive in providing shelter. For residents whose main concern is security, physical and psychological criteria, especially those that distinguish territories, become more important. Then, at the top of this pyramid, the symbolism of the environment plays a role in satisfying emotional needs and the need to feel belonging.

Geometry is another component of the mosque building and one of the important pillars of displaying sacred concepts; Burkhardt, referring to the world view of Islam, which regards every art as a science and every science as an art, emphasizes that geometry is a science through which the artist can create harmonious and balanced forms and designs to express divine beauty. He gets According to Shovan's definition, the geometry of the existing inner truth that manifests in different levels, in different parts and elements; without losing the unity of that supreme truth.

Like other traditionalists, Burckhardt believes in the originality of Formalism.What makes the face important in the manifestation of transcendental concepts is the existence of this capacity in it. According to Burckhardt, Islamic art and architecture, having an objective nature, seeks to embody its inherent traits and inner qualities in the form of objects. And Islamic law has influenced Islamic art and architecture, not by determining specific artistic forms, but by determining specific limits in the expression of forms. He considers Islamic architecture to be derived from the architecture of the conquered lands, which has been expanded and developed through modification and modification, and finally, it has led to the formation of a work whose face represents the manifestation of the process of plurality to unity. (Jalali, Tahori, & Itsam, 1400, p. 116).

Geometry is a language to express the manifestation of divine truth in multiplicity and a way to combine parts into a whole and divide the whole into parts. Geometry is the best way to show allegory and the complex inner concepts of Muslim cryptography and symbolism, which works to convey the concept of unity through the transition from multiplicity to unity and vice versa. The multiplicity of the use of geometric shapes and decorative elements adds to the quality of the empty space by showing the infinite complexity in it, and focuses and limits the audience's mind away from any element outside itself and to a single form. (Jalali, Tahori, & Itsam, 1400, p. 118)

5. METHODOLOGY

In examining the course of developments and attitudes of housing provision and massification and construction methods and technology in the history of the industrial revolution and the modern and contemporary period and in examining case studies and projects to achieve results and important points in comparisons and the effectiveness of indicators from Analytical-descriptive research method will be used.

6. CASE STUDY

The countries freed from colonialism and backward were another group of countries seeking planned development, the most significant of which are the two most populous countries, China and India, with nearly one-third of the world's population, and two countries, Malaysia and South Korea, which are implementing the program. socio-economic development have achieved satisfactory success. After the Second World War, these countries engaged in medium-term and long-term planning, and after strengthening the economic system and following the path of development and growth, they gave up centralized planning and applied research, innovation, and informative methods, helped their economic system.

India was also able to get rid of the difficulties of the colonial era by implementing the development programs and changing the strategy, and from a centralized economy with a commanding nature to a directive economy and in sync with the new industrialization strategy, it achieved remarkable economic progress. In India, 10 medium-term programs (1951-2007) were implemented, of which 7 programs were of the instructional type and the last three programs were of the instructional type. So that the country's economic growth in 2006-7 reached 9.4%, the employment rate reached 6 million jobs per year, and the number of poor reached half. (Al Yassin, 2014, p. 27).

A- Low-cost housing in Iraq

In the project of low-cost housing accumulation complex in Bismayeh city, attention has been paid to the coordination of design conditions with human needs, and the application of knowledge has been associated with importance and optimization, and it has worked to improve and improve the comfort of human living conditions. Construction is related to various factors, including:

- A large number of departments are connected.
- Connections
- Standardization of the assembly location, preparation of structural members for installation on the site and preparation and assembly of materials for the construction of the building according to the environmental conditions
- Construction time and materials based on construction items including building materials and technical systems.

The construction process is based on the materials and the application of methods that follow the nature of the construction system. According to the reviewed factors, the diagnosis is based on the application and effectiveness of the hollow core roof structural system in the Bismayeh city project. (Kassid AL-Zaid & Hussein Ali, 2022, p. 531).

Figure 2: Bismayeh settlement perspective and distance from the city center

The two advantages of using manufacturing technology techniques are achieving a high degree of quality between assembly control factors and achieving higher efficiency, which results in reduced setup and manufacturing time. Modern manufacturing techniques follow the following:

Prefabricated panels 2- 3D construction. The role of improving construction technology techniques in construction optimization includes increasing aesthetics, functionalism, following the efficiency of the construction environment:

- **Form efficiency:** geometric form of the housing unit/building block shape/views
- **Job efficiency:** design based on site characteristics (coordination between site planning and public transportation, comprehensive development, coordination and communication between units, access to site services)
- **Adaptability to the climate:** orientation of the building/orientation of rooms and windows/opening dimensions/use of

renewable energies such as solar energy/coordination of building and site

- **The connection between design and local culture:** use of local materials/local labor/use of decoration techniques and local design art
- The Bismayeh New City project started in 2013 and has progressed to about 28% and consists of eight sections, each section being divided into several blocks.

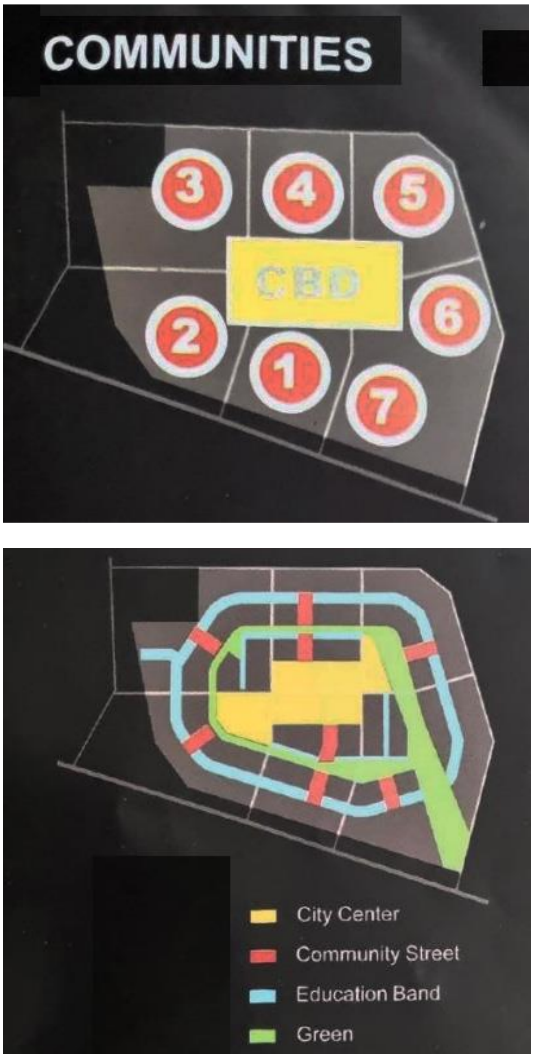


Figure3: Land use for residential use and mixed use of the site

Figure 4: The perspective of the residential town and the location of the blocks in terms of symmetry, color, filled and empty space and other uses of the complex in the plan site.

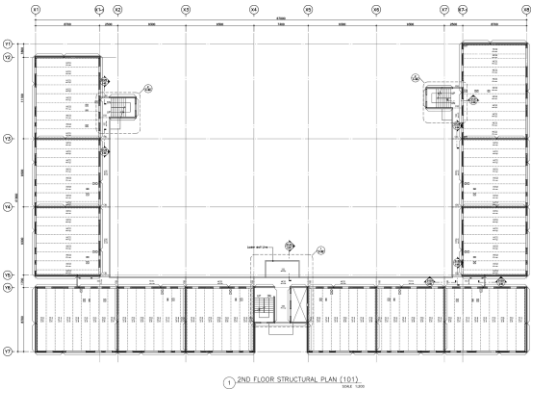


Figure 5: Divisions of residential units and open space - the plan of the first residential floor that shows the variation in the area of the units (100, 120 and 140 square meters) with similar buildings and the use of repetitive prefabricated parts.

In interior design, he has used the conditions of contemporary human life, and the opening of space and flexibility in architecture and attention to the harmony of contemporary life changes have been used. It is designed from freedom in the placement of walls that are not load-bearing (partitions) and based on an open plan. The modular system that has achieved flexibility in architecture and has led to the minimization of structural members and the coordination of other parts. Prefabricated technology saves time and improves the speed and economy of construction for the construction compounds in the factory and their connection with site changes. Flexibility between prefabricated units and their separation requires flexibility in the concept.

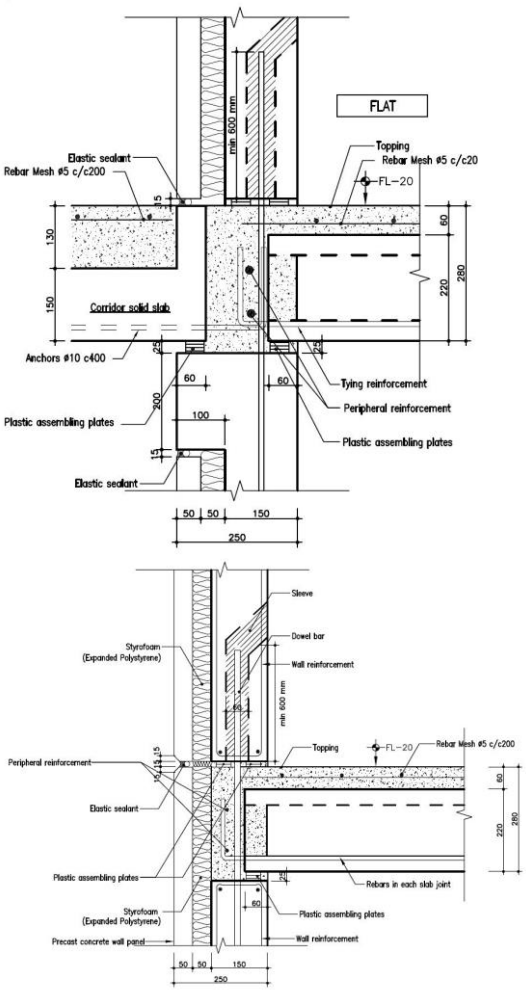


Figure 6: (a) Detail of the connection between the prefabricated parts and the internal corridor and the sandwich panel wall, which facilitates the flexibility of the design. (b) connection between prefabricated parts and ceiling and wall and simple structure technique that helps flexible design.

The results show that the environmental efficiency analysis makes energy efficiency possible, the effect of facilitating the use of materials and water efficiency of about 91% in the residential composition and improving the effectiveness of energy reduction in the use of materials and water follows. From an economic point of view, it will reduce energy consumption and reduce construction costs by about 87.5%, followed by a reduction in manpower and labor wages. The compatibility of design and climate and connection with local culture is about 91.6 percent. The design is based on the topography and hierarchy of the site.

Figure 7: A: Panel module of the peripheral wall of the facade; B: Precast concrete parts warehouse (Modern Type, 2022)

Elematic company, with the cooperation and responsibility of Hanwha company, launched one of the largest prefab sites of concrete panels in Bismayeh city. It has a production capacity of about 8,000 square meters of house construction in one day, which includes 7,400 square meters of hollow core roof, 380 pieces of sandwich panel walls, 370 pieces of stair box walls, and 50 pieces of foundation elements.

Iraq needs 2.5 million houses in the next 5 years, which will be developed near Bismayeh

city of Baghdad. The city contains 100,000 houses of traditional Islamic texture, and modern houses include units of 100, 120 and 140 square meters, which include roads, water and sewage facilities.

Figure 8: Bird's eye view of the Hanwha factory in Bismayeh

The experiences of Elematic company design the house unit in terms of wall construction technology and protection against winter cold and summer heat. The production line plant of the Iraq project produces 20,000 apartment units every year. This amount is around 6000 tons of concrete and 1700 workers every day. The project requires a total of 26,000 personnel, and Hanwha Company is planning to create 120 houses based on a military camp on 1,100,000 square meters of land. The construction of the new settlement is estimated in about 5 years. The new town needs schools, hospitals, sports stadiums and other things in the future. Elematic's investment in Iraq is 40 million euros. The estimate of the Iraqi government for the reconstruction of the city of Bismayeh is around 5.9 billion euros. (High-capacity precast plant will be delivered to Iraq, 2013)

B- Prefab Tower of Pune India

The landmark building built in India is the Namaste Tower, which is 316 meters high and has residential, commercial and sports spaces. Bilimoria Contractors had a prefab project in Pune which has the characteristics of cheap house construction in Maharashtra. The government has implemented 20 million affordable houses for 98 smart cities by 2022. If we use the traditional construction implementation method in India, we will need a lot of labor and time. Therefore, it results in high cost, long-term construction and quality that originates from human factors.

Precast concrete allows us to have more control over buildings. As we have an increase in the scope of projects, which is on a mega scale. The amount of manpower required is variable. Therefore, we will need to control cost, quality and time in the factory. Quality has the best interests, because the construction of walls, ceilings and columns controls the environment. Speed control is another important factor that tells you that the project will be completed in a short period of time. The prefabricated parts factory is located in Pune city in an area of about 116 acres. Two acres of this area includes warehouse and production space. The parts include ceilings, walls and stair boxes. The production capacity is about 1.5 million square feet per year.

Police apartment complex project in Maharashtra, India, which aims to build low-cost housing and includes retired residents of police personnel. The whole land consists of 180 acres, which Billimoria Contractors Company developed in about 40 acres to start, which includes 5,200 apartment units, and all units must be completed within four years. All buildings include ground floor and 14 residential floors. Except for the ground floor, other floors follow the prefabricated system.

Figure 9: 14-story prefabricated tower of Elematic Company in Maharashtra, hollow roof, load-bearing wall, prefabricated stair box

Figure 10: Bilmuria factory in Pune city, Police residential complex project

The site complex includes 4 tower cranes, each of which supports three apartment towers. The real estate trading company set the interest rate at 18 to 20 percent every year. The construction method follows the self-compacting concrete system of the RCC code. The production life of more than 50 years shows environmental control, which has good quality. Elematic technology is 60 years old and is supported in 100 countries of the world. It has a turnover of 65 million euros. The company's employees include 300 people who have offices in America, Germany, China, Russia, India, Hong Kong and the United Arab Emirates and have representatives in more than 20 countries. The head office is located in Finland. (Kapadia, 2022)

Figure 11: Precast concrete production is carried out by concrete sections and reusable molds or by advanced machines and processing and environmental control, transportation to the construction site and transfer to the site.

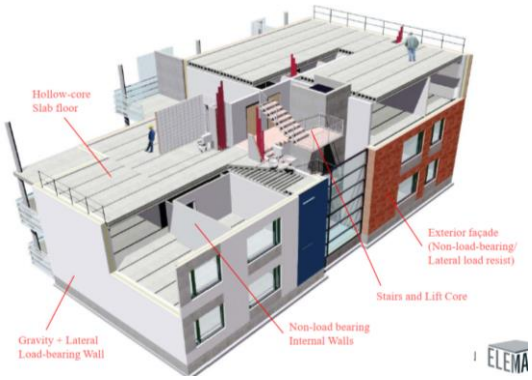
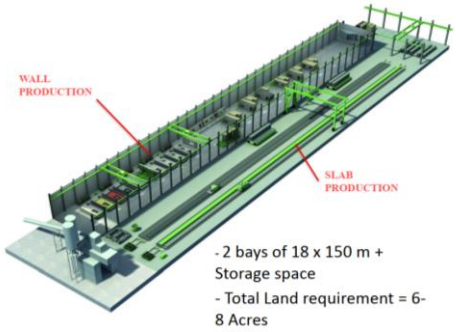


Figure 12: Different sections of prefabricated panels, hollow roof, prefabricated stairs, non-load-bearing internal walls, load-bearing external walls, exterior view; Figure 13: Variety in making ceiling and wall panels



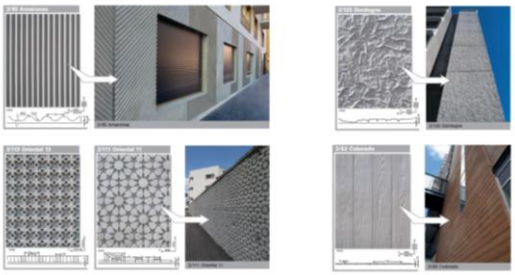


Figure 14: Modular panels with prefabricated geometric designs; Figure 15: Elematic prefabricated parts production plant

C: Architecture and precast concrete in Singapore

The main value of publishing an assistant engineer is to achieve two goals. The first objective of the study is evidenced on three residential projects in Singapore that were

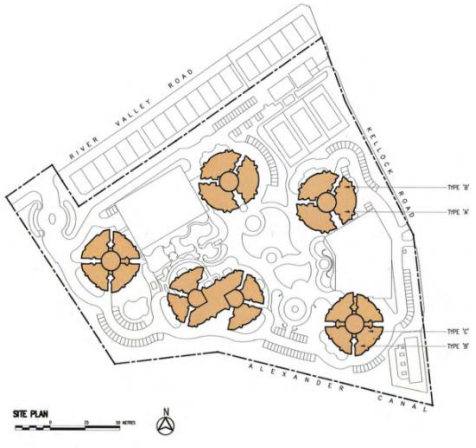
originally designed for reinforced concrete modifications, and the study shows that a wide variety of architectural prefabs and other industrial production details can be used in residential projects along with cost effectiveness. to be in the second objective, it is to propose standard sizes for stair boxes, internal walls, prefabricated bathrooms and protective shelters in war, which are of prefabricated type. If it is adopted on a wide scale in the industry, it will have a positive effect on production and cost. (Koon Hoe & Cheong, 1999, p. 4)

The Architectural Institute of Singapore has formed a committee, composed of construction and architectural responsibilities, to produce an Assistant Engineer with the title "Architecture in Precast Concrete". The focus is on increasing integration in the modular system grouping of dimensions and sizes and standardization in design and encouraging architects to use precast concrete structures in the planning stage, which will lead to effective construction methods. Therefore, the result will be improved production, quality and manufacturability. (Koon Hoe & Cheong, 1999, p. 5)

The high-rise project of Valley Park was revisited after the architectural design, and modifications were made in terms of size and equipment and the use of modular integrated system grouping. The amendments did not interfere with the planning parameters and the maximum difference in the floor level of the residential unit is from 0.1% to 2% for the development and increase of the ownership level which is the industrial production of prefabricated concrete panels on the site, which has the effect of reducing the transportation cost. And it will be quoted. The total number of units in the tower is 728 on 20 floors, the site area is 43,284.76 square meters, the gross area is 109,721.18 square meters, the building occupancy level is 30.49%, the construction cost is 210 million dollars, the year of construction is 1997, and the construction period is 32 months. (Koon Hoe & Cheong, 1999, p. 15)

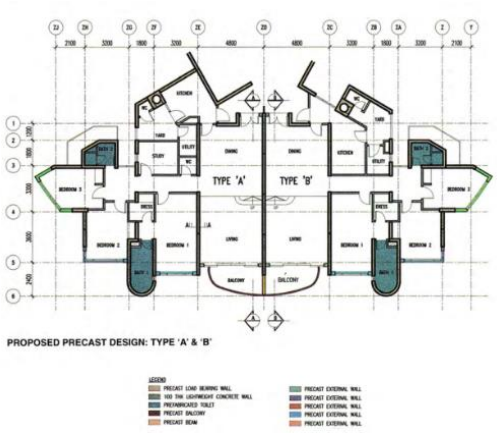
It is made of reinforced concrete, brick wall, plaster and prefabricated balcony in the original design. reinforced concrete beams and columns and walls with dimensions of 2.4 meters and thickness of 80 mm are in the form of shear walls and semi-prefabricated[2] roof of shear walls with 100 mm thickness of concrete cover. The outer facade is covered with a brick wall with acrylic coated spray material.

The master bathroom is designed as reinforced concrete, which consists of concrete wall and brick wall finished with reinforced concrete with marble on the wall and floor. The second bathroom and service are made of brick wall with ceramics for the wall and floor and plaster plates hanging from the ceiling. The windows include the installation of aluminum frames and do not have modular grids. The prefabricated system of the roof structure is made of hollow core with a thickness of 100 mm and a width of 600 mm. The cost of building each square meter of an apartment is about $1,400, and with prefab redesign, the overall cost will increase by about 2.7%, or about $38 per square meter of construction.



[2] Semi-precast

Figure 16: A: Site plan of low-cost prefabricated residential towers, Figure B: View of low-cost residential towers (Koon Hoe & Cheong, 1999, p. 17)



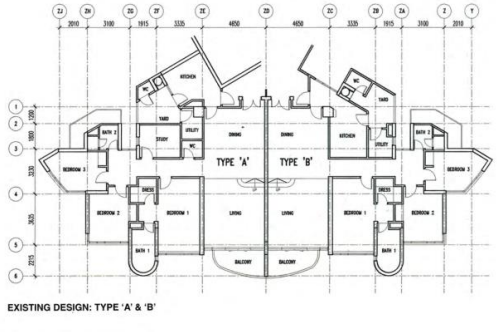
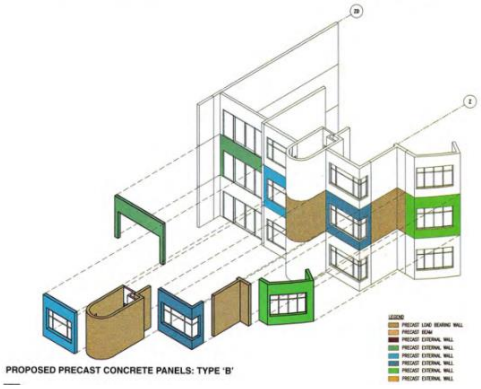


Figure 17: A: Plan of residential floors in the initial design, Figure B: Plan of residential floors in prefabricated design



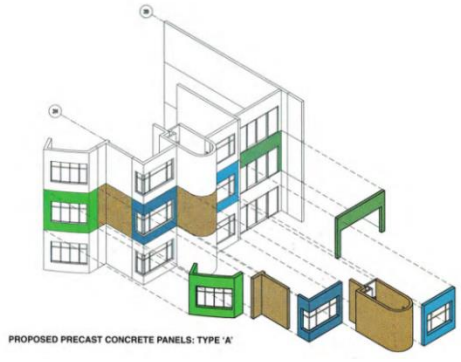


Figure 18: A: Proposed prefabricated facade panels (Type A), Figure B: Proposed prefabricated facade panels (Type B) (Amodio, et al., 2022)

Figure 19: Presenting a presentation from the architectural competition titled Life in Rows

From the study projects of the countries of Iraq, Singapore and India, which are leading in terms of cheap housing accumulation in the face of tradition and modernity and industrialization and development, with regard to the effectiveness of Iranian architectural indicators and housing industrialization, the following results were obtained we find The method of checking and obtaining the results of the degree of importance is from the description of the project's texts, and the variety of indicators is based on the studies of housing industrialization method and articles related to Iranian architecture and the consensus and opinions of architects.

7. DISCUSSION

In addition to the analysis of case studies, the importance of housing industrialization has been raised in international architecture competitions, and the comments of the jury for the second-

ranked design in the architecture competition entitled "Inexpensive[3] Housing in the City of Vancouver, Canada" are as follows:

1. New design from the attitude of modeling traditional housing
2. Focus on context and context on the site
3. Improving the quality of life with environmental considerations
4. Considerations of social infrastructure and ecosystem
5. Design based on the degree of street vibrancy
6. Help to integrate the building as a public communication space
7. The modular and flexible scale of internal and external spaces creates capacity and diversity for communication.
8. In addition, it is necessary to pay attention to the acceptability for transportation and service.

This paper discusses the traditional Malay settlement in East Coast Malaysia formed influenced by the activities of the people along the coastal plain and the river banks. It was identified that the seafaring society from ancient countries engaged in trading, agriculture, and spreading religion and thus they build their settlements.

8. CONCLUSION

From the review of the points table on the importance of the closeness of the indicators in the three studied projects, Iraq, Singapore and India are prioritized, respectively. All three projects do not emphasize the position of the prayer room. Pune India project is weak in terms of attention to the central courtyard and the towers are designed in parallel. Considering the advancement of technology in India, it is weak in terms of architectural design. Also, the need to pay attention to the speed, quality and production capacity of the Iraq project has a suitable position.(table 3)

In terms of the cost of construction, according to the advanced technology of Elematic company and the use of self-compacting concrete and the mechanized[4] process of producing and running a linear and fixed plant at the project site, it has increased the speed by three times the traditional prefab method and reduced the cost by 30% compared to the conventional method. One of the features of the hollow core roof system is weight reduction, due to the empty holes and the passage of facilities and sound insulation, compliance with the fire standard, and the bearing capacity of the structure, and the provision of column openings with large distances. (Webber, 2022)

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[3] Low cost

[4] Automation

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