

## 論文の内容の要旨

論文題目

### Design Method for Contemporary Neighborhood and Architecture in Saudi Arabian Society and Environment

(サウジアラビアの社会・環境における現代的住区と建築の設計手法に関する研究)

氏 名 マダ ラヒフ アブドゥルケダー ハ

The research highlights the issues of planned neighborhoods in Saudi Arabia. Nowadays, in the urbanization process, planned neighborhoods in Saudi Arabia are sprawling rapidly in parallel with decreasing the informal settlements that were grown as a result of lacking of a city structure plans. In this research we hypothesized that the unsuitability and unreality of residential building design standards, street related standards, and open spaces related standards to the Saudi Arabian society and environment have resulted decreasing the usage of open spaces in planned neighborhoods. In addition, a low population density in villa type neighborhoods that was set up via city structure plan, and residential lot minimum area standards were the main factors behind housing shortage the city has been experiencing. If the growth and expand of planned neighborhood would continue without taken into consideration the spatial factors, open spaces user's activities factors, and economic factor, more unneeded open spaces and increasing in housing shortage would be practiced in the future. Based on that, three sub-hypotheses are developed. 1) The conflict between the life style and residential building standards, and street related standards have created an adverse effect on the walkability of in planned neighborhoods. 2) The minimum standards for the villa type lot is the primary factors in nowadays housing shortage crisis. 3) The WHO recommendation area for parks per person is unsuitable for Saudi Arabian society and environment.

Based on that, the research aims to clarify a design method for contemporary neighborhood and architecture that suitable and fits to Saudi Arabian society and environment. To achieve this aim, the dissertation has four main objectives: 1) To make arrangement for the population growth of the regions and governorates, administrative division, the concentration of population in important governorates, characteristic of residential areas and housing in Saudi Arabia, population growth and urbanization for important cities in Saudi Arabia (chapter two); 2) To make arrangement for historical transition, chronological urban growth, housing shortage and future demand of Jeddah City. Afterword, make arrangement for the transition of 1) residential areas related standards, 2) open spaces related standards, 3) decision making flow, 4) structure plans, and 5) urbanized area (chapter two); 3) To make spatial configuration arrangements in design standards and open spaces, including streets in planned neighborhoods. Define the combinations of patterns in the spatial configuration of streets and residential buildings. Clarify street use characteristics based on the spatial configuration patterns; identify issues for existing streets; and suggest future neighborhood planning issues for Jeddah City (Chapter Three); 4) To clarify the pattern of open spaces in planned neighborhoods, frequency of use, user's activities through whole year (Chapter four); 5) To clarify the trend and diversification of villa type neighborhood in Jeddah city, housing shortage problem and related factors, population density in residential districts, villa type neighborhood patterns and methods to decrease the vacant lots in these neighborhoods (Chapter Five).

The accomplish the above objectives the research consists of six chapter as follows:

**Chapter one** explains the research background, objectives, hypotheses, and questions. It also outlines the research methodology, significance and expected outputs.

**Chapter two** makes the beginning of the research work. Chapter two is presented in three sections. First section overviews the geographic, historic, economic, social characteristic of Saudi Arabia. Second outlines the historic, population growth, annual population growth rate, and characteristic of the important cities in Saudi Arabia. Third section analyzes the profile, and chronological growth and characteristic of residential area of Jeddah City. In addition to that, the section makes arrangement of the changing in city growth, physical plan, vision plan, decision making in the national and local level, the role of the private sector, residential areas related standards and organizations, housing crisis including the shortage and the future projected demand, and finally the population growth in addition to the projected population.

This chapter can be concluded that, 1) internal immigration from small cities to main important cities is notable in Saudi Arabia, which make a pressure on these cities reflected by a rapid city growth. 2) The typography plays an important role in the type of housing in each governorate, as notable the increasing of traditional housing in western part of Saudi Arabia where the Al-Sarawat mountain chain is crossing Saudi Arabia from southern to northern part. 3) In parallel with the movement of internal immigration the country is facing, the population is projected to increase till 2080 to be approximately 48,720,000 people, which is a strong indication for more pressure is predicted to be occurred in these main cities. 4) Based on a religious, conservative, traditional, and family oriented background society, the most likable and favorable type of housing is villa type housing (detached housing), where Saudi Arabian can find their privacy protected in this type of housing.

From the above conclusion, it is clear to say, 5) Jeddah City that is characterized by its historical background it had in Saudi Arabia due to its location that close to the most important religious cities that are Makkah and Madinah city, is struggling with a problem of a low amount of the likable villa type housing. 6) In addition to that, Jeddah City is facing a high amount of housing shortage that is reflected on the actions the have been taken in changing the residential building related design standards several times as an initials to fulfill this shortage, in addition to that, the city is putting lot of efforts in responding to this shortage by conducting new housing project that can be owned by a long-period-loan for Saudis. 7) Indeed, the city is unusually experiencing a movement of owing units in apartment instead of having one's own villas, this is due to the high value of villas, it became difficult-to-get especially by the low and middle income people. Finally, 8) From the above, it is clear to say that there is a need to take Jeddah City as a case study for this research as a) it is the most traditional city in the country, b) its location along the Red Sea and closeness to the most religious cities, and the second important city economically and commercially after the capital, c) Although it has the largest urbanized area in Saudi Arabia, it is experiencing housing shortage.

**Chapter three** attempts to make spatial configuration arrangements in design standards and open spaces, including streets in planned neighborhoods. Define the combinations of patterns in the spatial configuration of streets and residential buildings. Clarify street use characteristics based on the spatial configuration patterns; identify issues for existing streets; and suggest future neighborhood planning issues for Jeddah City. It was clarified that the Jeddah City pedestrian environment is influenced by three main factors: 1) the mismatch of design standard dimensions with the reality, 2) motor vehicle-oriented neighborhood planning, and 3) using sidewalks for semiprivate purposes, which originate from the historical and cultural background of the city. It is necessary to consider these three factors in planning future pedestrian-oriented neighborhoods in Jeddah City. 1) This chapter emphasizes a periodical revising for the spatial configuration related design standards such as residential building floor limitation, setback area, sidewalk, and street composition to be after examining the previous design standards on the real world taken into consideration the factor of safety between motorization and pedestrianization. 2) Setup a new article to clarify to what extent the sidewalk space in villa type neighborhood can be used semi-privately. And create a

design guideline for sidewalk space to be maintained and managed under the authority of local government.

**Chapter four** makes arrangement of the residential hierarchies and open spaces system in Saudi Arabia. Then it analyzes the usage of open spaces and the frequency use in a villa type neighborhood and an apartment type neighborhood three times a year (Month of Ramadan, Winter, and Summer). As this study was conducted in two case studies. An apartment type neighborhood, and a villa type neighborhood in Jeddah City in three seasons throughout the year.

The key findings from the survey in the villa type neighborhoods are as follows:

In Ramadan season: 1) the sidewalk users annoy the pedestrian and the people who use mosque. 2) vacant lots are the place where football group usually play. 3) the majority of open spaces users use open spaces from 21:00 till approximately 02:00. 4) Parents of 4-15 years old children do not allow them to use the parks due to the use of the adults for the sidewalk till late time. 5) Only two parks were used out of 8 parks throughout the survey days. Regarding winter season, only three main parks were used, and the children between 4-15 were appeared with their parent these parks between 16:30 till 18:00. Some parks users usually come every weekend to barbeque from a 5 km distance neighborhood. Sidewalk users appear in time between 18:00 and 22:00. In summer, despite of a hot weather, the open space was more active than winter, this was resulted due to increasing the number of joggers along streets, and the playground users.

Moreover, the key findings from the survey in the apartment type neighborhoods are as follows:

In Ramadan season: using the only playground in the neighborhood by the adult (age between 14-29) made some of children (age between 4-15) to 1) use in front of mosque space for gathering, which annoyed the prayers in mosque. 2) and some of them use the parking area of some mosques as football playground. In winter, the most frequently used open space are vacant lots, and sidewalks. The vacant lots were used by football team player between 16:00 and 18:00. And sidewalks were frequently used in two ways 1) sidewalks that surrounded vacant lots were used by joggers as the sidewalk along inner street in neighborhood are not available. 2) sidewalk that isolated (usually located at the edge of the neighborhood) used by adult (age between 15-29) for gathering, smoking, playing card game. Regarding usage of open spaces in summer season. It is similar to winter season with a noticeable increase for the park users (children) during the time between 16:00 and 19:00.

**Chapter Five** describes and makes arrangement of the prime factors that resulted the housing shortage. Then it makes arrangement for the regulation that must be complied in the process of residential new development in Saudi Arabia, so called Procedure Manual for the Preparation of Residential Land Subdivision. Then it draws villa type pattern (based on analyzing 103 locations in Jeddah City). Then it analyzes the all locations via regression analysis, cluster analysis, and principle component analysis. This study was applied on all villa type neighborhoods (total of 103 locations). Via several surveys as mentioned in chapter four followed by several analyses from correlation analysis, multi regression analysis, to cluster analysis, it was clarified that a combination of 6 criteria (out of 27) have a correlation in the growth of villa type neighborhoods in Jeddah City. That are 1) Ratio of vacant lot(net), 2) ratio of villa lots that range between 300m<sup>2</sup> and 400m<sup>2</sup>, 3) ratio of villa lots that range between 1,000m<sup>2</sup> and 1,400m<sup>2</sup>, 4) average of land price, 5) total area of vacant lot, and 6) distance between a mosque and a park, total length of roads. Via cluster analysis, the 103 was grouped into six groups. With a different suggestion and recommendation for each group.

Finally, **Chapter six** concludes this dissertation by reviewing the discussed issues, the major findings, as well as raising a number of general recommendations for design method for planned neighborhood in Saudi Arabian Society and environment.