

THE DEVELOPMENT OF STRUCTURAL CONCEPT AND THE ARCHITETURAL FORM IN QSR KHARANA

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SUMMARY

A study was held the building process of Qasr Al Kharana. This study proves an organic and functional relation between the architectural form and the structural concept. Also it proves that there are two groups of elements controlling this issue: 1. the Islamic religion instructions;2. the site and environment, and these are representing the basis on which we have achieved the restoration project for Qasr Kharana.

BULDING PROCESSION

The relation between the architectural form and the structural concept in construction process in the Arab and Islamic world is applied in Qasr Al-Kharana. Based on historical background, this relation was most of the time considered in a way that both the form and the structure are consistent, which means that the structure is the mean support form. As a result of that, most of the structural elements became a special feature of the Islamic architecture in which they don't need to be covered, on the contrary they tried to show obviously the decoration like what have been done to the Muqrnas as well as the different types of arches in Qasr Kharana.

This relation in construction process was developed in the Islamic world and matured in the Ottoman era. In Umaweya era, the era when Qasr Kharana was built, also the relation was significant in which the owner chose the shape and the architect chose the construction

process, this fact was mentioned in most of that era writings. For example, the owner of Qasr Kharana with his Arabic culture who lived in Greater Syria chose the Syrian style, that was significantly affected by the Byzantine civilization which is consistent to Arabic and Islamic culture and traditions. So he chose the style of Syrian house (apartment) that was arranged as four or five rooms around a saloon, then to join more than one apartment around an open courtyard.

Also the construction system and techniques were affected by Persian style with some modifications according to the site requirements that Qasr Kharana was built in with the influence caused by the Syrian culture, so the construction system was depending on transverse arches supporting the barrel vaults, in the Qasr we find only three half domes. The new thing which not had been taken from Persia, was that those arches are not connected to the carrying wall. but it was only placed on sort of bearing arms (prop) driven from the wall, and the weight is the reason why all elements kept together. They using too some new techniques and materials like wood lintel that gives flexibility for the building to resist earthquakes, and that can be shown clearly when compare between our Qasr and the others, Al-Kharana still standing with some weak parts being destroyed, others in the same era were completely destroyed.

This interactive process of the cultures of owners and builders had enriched the architecture and its history, also due to this; a new flexible vision had been started. In this study a multi-discipline interactive process occurred joining the Arab, Persia, and Rome cultures enriched the human architecture culture, and this proved that the combination between different cultures is a product that deserves to focus on. And to know more about Islamic architecture and precisely about Kharana architectures.

ANALYSES OF CONTROLLING ELEMENTS

A full analysis for architecture control elements analysis should been done, and how it affected the relation between the shape and the structural concept are required.

One can divide these elements into two major groups:

1.Fixed elements: It's the Islam religion guidelines which gave and steer most of the directions that featuring the Islamic architecture considering the shape, in which the structure concept served this traditions. For example privacy and personality were satisfied with wide windows open on the internal surrounded courtyard, and small openings on the external surrounded faces. Also this can be seen clearly in the houses distribution, and the center of the south side that was implemented for praying, and the north terrace to separate between the tow apartments (Figure 1).

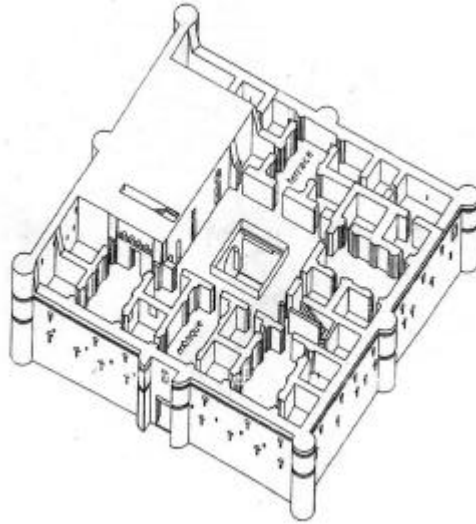


Figure 1 : Graphic isometric reconstruction

2.Site effect which is varied from place to another in Islamic world, this part comprises different elements of major influences on architecture shape creation, and the choice of construction techniques, from these elements we can mention, climate and environment effect, culture and local traditions, geography, topography and the underground resources.

This feature of site effect is the cause of existence of different architectural schools in the Islamic world with differences in the shape and construction techniques. But all of it is joined by Islamic architecture spirit, and what proves this is that these schools are divided according to geographic sites in the Islamic world. So we find the Arabic Islamic, Persian, Indian, North African and Andalosi schools, and so on.

Also it was noticed that these schools facilitates the experiences and information transfer due to the unity of the different nations in the Islamic world. So you can find some Persian architecture features applied in the Andalusian architecture like the polygonal vaults, also it was found that our Qasr contains a polygonal vault but as preliminary stages in the prayer which are the two perpendicular arches.

The identification and the characteristics of the site can be seen clearly in the Islamic architecture. For example Al Kharana is contains the spirit of Islamic architecture, in addition to what was mentioned in part 1 to control element of the form, and the structural concept of the Islamic architecture but with its special features including:

Climatic and environmental effect: kharana was built in a desert area, hot, and dusty wind. It was located on the diplomatic roads linked Damascus with other cities in the Umayyah era like Kufa, and Basra in Iraq, and Mecca, and Median in Hijaz (Figure 2).



Figure 2 : Kharana and his informant

This element was treated well with consistency with the religious issues with the appearance of development and improvements, like the small openings looking outside the Qasr of which oriented diagonally to prevent and control dust and sun light and passing breeze as a mean of ventilation. This ventilation system that depends on the difference of pressure between the inside and outside of the Qasr that is built on sucking air from high pressure zone outside to that of low pressure inside, and that what was discovered by Ventury in the twentieth century (Figure 3).

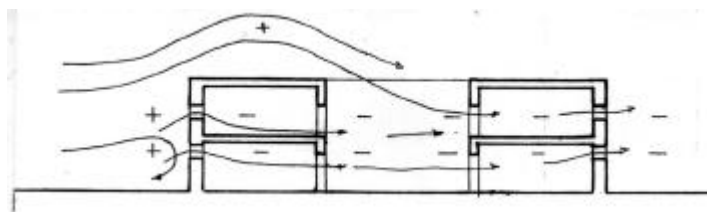


Figure 3 : System of natural ventilation

The dry weather and hot climate in the Arabian Islamic architecture lead the formation of high walls around the terrace.

- Culture and local traditions effect: it was mentioned before; the importance and role of culture weather considering the owner or the builder. Also it was a tradition to use wood,

nevertheless its scarce in the desert area, in addition to its function of affecting the flexibility of the building as mentioned.

- Geographic topography and underground resources.: These were of significant effect on control of shaping architecture, and in choosing the building system, for example in Greater Syria it was well known the existence of many types of stone, so stones buildings were popular in these area mainly in arches, halls, and so on. Also in Iraq they used to build using mud. Also the availability of water is of significant effect on the landscaping and the existing of gardens and fountains as in Spain. While in Al Kharana area with an arid climate the most important issue was to harvest water, also the scarcity of water lead to use of systems of Thamila to collect water, of which some were used in Al Kharana.

Knowing these factors and what had been developed by builders in Al Kharana, and knowing all details of production of culture in this Qasr deserves to protect and maintained, and this can't be achieved if one doesn't know what to maintain.

Qasr Kharana is suffering from many problems, many earthquakes caused a great damage to it. Cracks were grow to a degree that the west and south walls were isolated from the rest of the Qasr. It was restoration between 1976-1979 which caused a new damage to the shape of it, and its static stability.

A detailed and analytical study to historical and art issues and relating that to the system of Umaweya desert palaces that exist in Greater Syria between the period of 680-684 AC in the days of Yazeed Ibn Moaweah and 705-717 AC in the days of Al Waleed Ibn Abdmalik, and was found that two successive major earthquakes. Also the stability of arch was calculated using Mery method applied on lateral arches that push the south side of the Qasr and it was concluded its stable from different sides.

PRSENT PROJECT

Depending on the above analytical studies a plan to maintain Al Kharana was established, and this plan is as following:

1. Remove all damages and faults of the 1976-1979 AC restoration like:
 - Open the closed door in the east wall.
 - Lower the extra weight caused by casting the 25cm slab over the Qasr roof and make another one for maintainance purposes with lighter harmfully.
 - Remove the cement that was placed in the cracks incorrectly and with harmful.
 - Remove and replace the inconsistency plaster and redo it with a new suitable ones being more compatible with the old plaster.
2. Use metal ties to connect and support the cracked parties and sides in the Qasr with some cementitation materials.
3. To provide the functional and view of the Qasr that will reflect all beauty. We have proposed to rebuilt of the main open gallery, knowing that the techniques and system of the

building of the collapsed gallery were clarified based on antiquities on the inside walls in the middle courtyard and from what was discovered in that courtyard. It was discovered that there were stony entrances like that exist inside the palace in the east and west sides of the courtyard. Also in the south and north sides we discovered trances on the walls which meant that there were two wood roofs (Figure 4).

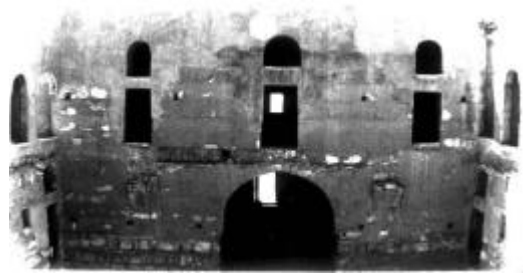


Figure 4 : Actual Interior courtyard

In addition, the excavation which was done by S. Urice {1} between the years 1979-1980 AC proves the existence of the foundation of the gallery columns (Figure 5).



Figure 5 : Graphic reconstruction of gallery in the courtyard

4. Give this Qasr a functional objective to guarantee the process of maintenance, and to improve its productivity which can be reflected by an increase of the income and number of visitors, like considering it as human life museum for Umayyah Arts, which respects the architectural composition, structural concept and the quality of space of Qasr Kharana.

REFERENCES

{1} Urice, SK.; *Qasr Kharana in the Transjordan* American School of Oriental Research
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