# The Architectural Features of Facades in Arak Historical Monuments from Qajar Period

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**Abstract:** The aim of constructing Arak city was to have a military base and a center for monitoring the region in Qajar period so the city was surrounded by some high walls and gates in different directions which showed the military based outer facade of the city. The city hasn't been built gradually and it was not a village which turns to town. The main city was built in a very short time period and based on the map so the facades had been designed in old fabric of Arak based on the geometric principles. Goal of the research is to identify the architectural properties of facades in design of historical monuments in Arak from Qajar period including axis, hierarchy, compositional center, proportion, module, connection, symmetry & repetition. Methodology of the study concentrates on the documentation, descriptive and architecture analysis of facades in historical monuments considering their classification. The combination of qualitative factors with quantitative factors for analysis of monuments has been used. Conclusion of the study is presentation of the architectural characteristics of facades, separately for different groups including religious, public, residential, communal, memorial buildings & minor architectural forms.
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## Introduction

Arak city as the capital of central province is located in Iran central plateau and near the Zagros Mountains. Arak as a symbol of pre-determined designed historical cities in Iran was constructed in 1812 A.D & in the period of Qajar dynasty. Urban facade in Arak old fabric with page morphology is checker set which is located in the heart of the city. From aerial perspective, the historical fabric is an interconnected series of negative and positive spaces that ways such as vessels made these spaces are connected. In the axis of the fabric, a collection of mud domes present definition of a coherent historical fabric. Buildings (positive spaces) in various pieces and sizes are associated with a intertwined complex and the yard (blank spaces) is among them. Direction of buildings is toward south and east. East-facing facade of the building is for using the sun light in the winter mornings and getting away of sun light in summer. Buildings toward the south are often associated with balcony. Buildings outdoor façade are made of mud and clay which has the mildest color against sunshine and is the most appropriate insulation. The decoration of inner facade of buildings is made of brick with windows which has been extended to the floor. Arak old fabric as index sample of Qajar style has valuable monuments which each of them has unique architectural and historical values. Based on existing documents, monuments belonging to the Qajar period in Arak are divided into 6 groups including religious, public, residential, memorial, communal buildings and minor

Architectural forms. In each group, the buildings are divided into several types and an index building from each type has been analyzed as a representative of the type. The architectural properties of facades consist of axis, hierarchy, compositional center, proportion, module, connection, symmetry & repetition which are presented separately for each group.

## A. Religious buildings

In the group of religious buildings, mosques of Sepahdari and Sheikh Abolhassan have been selected as index buildings and representative of types. These two old mosques have remained with the original structure.

### a. Mosque and School of Sepahdari

The building has interior facades overlooking the courtyard and an exterior façade in the entrance side. Outline of facades is repetition of a module with 4 meters width and in number of 6 modules in eastern and western facades and 4 modules in the northern and southern facades. In the compositional center of each façade, there is a semi-open space as a porch that has a greater height than the view of adjacent spaces. In every module, components of façade are symmetrical compared to central axis of module and all façades are symmetrical compared to transverse and longitudinal axes. The all facades have the compositional centers which are on geometrical centers of façades and symmetry axes. The entrance axes are not on the symmetrical axes and the compositional centers of the façades and are symmetrical to longitudinal axis. In the

compositional centers of facades and at the ends of axes, facades are index. (Hierarchy) Proportion of façade frames in every module is 1 to 1.5. The facades and yard floor are connected through stone platforms creating a bond between the body and floor. Repetition of three- part modules with fixed rhythm has caused a connection between lateral facades. The connection in the corner of facades has been done by the porches.

**b. Mosque of Sheikh Abolhassan**

The building has interior facades overlooking the yard and an exterior façade in the entrance side. Outline of facades is repetition of a module with 3 meters width and in number of 5 modules in all facades. In every module, components of façade are symmetrical compared to central axis of module and are symmetrical compared to symmetry axes. The all facades have the compositional centers which are on geometrical centers of façades and symmetry axes. The entrance axes are not on the symmetrical axes and the compositional centers of the façades and are symmetrical to symmetry axis of the facade. In the compositional centers of views and at the place of symmetry axes, facades are index.(Hierarchy) Proportion of façade frames in the first and second floor is 1 to 1 and 1.5 to 1 respectively. The facades and floor are connected through plinth stone creating a bond between the body and floor. Repetition of brick columns between the modules has caused a consistency between the lateral facades. The connection between facades and roof has been done by brick arches. The Connection between facades and roof has been created by a Karbandi in the porches and by brick arches in rooms.

**B. Public buildings**

In Arak old fabric, the most important buildings belonging to this group are Timcheh and Sara. These buildings have commercial and chamber use. In the past, merchants who often travelled in from distant towns spent the night on Sara and Timcheh. This group of buildings is along the bazaar and their entrances are connected with the main axis of bazaar. All axes of the Sara and Timcheh are parallel to bazaar path. This group of buildings in Arak historical fabric is classified into six types based on the combination of Sara (central courtyard structure) and Timcheh (roofed space with central hall) compared to each other and their location in comparison with bazaar axis. Since for conducting of the analysis process, the sample of any type should be comprehensive and contain all the properties related to the type, so from any type, the building have been chosen that their Structure and details have changed less over the time and have greater diversity. Based on these criteria, the samples have been selected for the type 1, 3,4,5,6 are Timcheh and Sara of Naghshineh, Ketabforushha, Akbarian, Kashani and Nozari respectively. Because all the buildings belonging to type 2 have been demolished and rebuilt with new style, so this type cannot be analyzed.

**a. Timcheh of Naghshineh**

The building has interior facades overlooking the lobby and it doesn't have exterior facade. Outline of facades is repetition of a module in the form of three divisions that is repeated like a rhythm. The modules have been segregated by brick columns that are raised 10 cm from the surface of the façade. In every module, components of façade are symmetrical compared to central axis of module and all façades are symmetrical compared to longitudinal axis. The compositional center of eastern and western façades is located on longitudinal symmetrical and entrance axes. At the beginning of Symmetry axis and at the entry point, height of the facade is maximum. At the beginning of Symmetry axis, decoration and proportion of façade is different.(hierarchy) Proportion of façade frames in every module is 1 to 1. In the center of each module on the first floor a large wooden door and on the second floor a three part door has been enclosed in the frame structure of façade. The facades and floor are connected through platforms and the steps located on entrance of rooms. Repetition of brick columns between the modules has caused a consistency between the lateral facades, and in the corner of the central hall, connection has been created using cornering techniques and 45 degree angle alteration. The connection between facades and roof has been done by brick arches.

**b. Sara of Ketabforushha**

Since the building is overlooking the passageway from South wing, it has an outdoor view as well in addition to the interior view of the courtyard. The building is among the few buildings with Arak historical fabric that has exterior view. Schematic view from North and South is in the form of three divisions that is repeated like a rhythm so that in each module one door is located in the middle and two windows on either side. The modulus have been separated from each other by brick columns that are rising 10 cm above the surface .The columns continue from the floor to the ceiling, and conform to the form of roof edge at this point. In every module, components of façade are symmetrical compared to central axis of module and entire façade is symmetrical compared to transverse axis of courtyard. In the eastern front of the yard, the facade has been defined as porches on the first floor and terrace on the second floor with stone columns and is symmetrical to the compositional center of the facade. In the compositional center of the

façade, a volume, with a semi circular base, is protruding and is located on the symmetrical axis of the façade. In the exterior façade of Timcheh, the entrance axis is on the symmetrical axis and overlaps the compositional center of the façade. All the elements of façade are symmetrical to the longitudinal axis of the building and the skyline reaches maximum height in the compositional center of the facade. In the interior of Timcheh, the façade has a frame-like structure with proportion of 1 to1. on the 1st floor and in the center of each module, one big wooden door and on the 2nd floor a two-pane door are enclosed into the frame. The facades and floor are connected through a platform creating a bond between the body and floor. In the facades of Timcheh, repetition of brick columns between the modules has caused a consistency between the lateral facades, and in the corner of the central hall, connection has been created using cornering techniques. There is no consistent structure between facades and roof.

**c. Sara of Akbarian**

The building has interior facades overlooking the yard and Timcheh and it doesn't have exterior facade. Outline of facades is repetition of a module with 4 meters width and in number of 5 modules in all facades. In every module, components of façade are symmetrical compared to central axis of module and entire façade is symmetrical compared to transverse and longitudinal axes. All facades have the compositional centers which are on geometrical center of facades. The entrance axis is on the symmetrical axis and overlaps the compositional center of the façade. In the compositional centers of facades and at the ends of axes, facades are index.(hierarchy) .Structure of Timcheh facades is based on a modular network with 4meters width in number of 7 module in every view. In Timcheh, the compositional center of façade and entrance are located on symmetrical axis of façade. Proportion of façade frames in every module is 1 to 1. The facades and floor are connected through platforms creating a bond between the body and floor. Repetition of brick columns between the modules has caused a consistency between the lateral facades, and in the corner of the central hall, connection has been created using cornering techniques and 45 degree angle alteration. The connection between facades and roof has been done by brick arches. In the façade of Sara, connection between facades on the first floor is created by stone columns of colonnade. In the facade on the second floor, repetition of a three-part module with constant rhythm has been caused association between side facades.

**d. Sara of Kashani**

The building has interior facades overlooking the yard and Timcheh and it doesn't have exterior facade. Outline of facades is repetition of a module with 4 meters width and in number of 7 modules in eastern and western facades and 6 modules in northern and southern facades. In every module, components of façade are symmetrical compared to central axis of module and in western and eastern façades are symmetrical compared to symmetrical axes. Eastern and western facades have the compositional centers which are on geometrical center of façade. Southern and northern facades don't have compositional center. The entrance axis is on the symmetrical axis and overlaps the compositional center of the façade. In the compositional centers of facades and at the ends of axes, facades are index. (Hierarchy) .Structure of Timcheh facades is based on a modular network with 4meters width in number of 9 modules in every view. In Timcheh, the compositional center of façade and entrance are located on symmetrical axis of façade. Proportion of façade frames in every module is 1 to 1. The facades and floor are connected through platforms creating a bond between the body and floor. Repetition of brick columns between the modules has caused a consistency between the lateral facades, and in the corner of the central hall, connection has been created using cornering techniques and 45 degree angle alteration. The connection between facades and roof has been done by brick arches. In the façade of Sara, connection between facades on the first floor is created by stone columns of colonnade. In the facade on the second floor, repetition of a two-part module with constant rhythm has been caused association between side facades.

**e. Sara of Nozari**

The building has interior facades overlooking the yard and it doesn't have exterior facade. Outline of Sara facades is repetition of a module with 4 meters width and in number of 7 modules in all facades. In every module, components of façade are symmetrical compared to central axis of module and all façades are symmetrical compared to symmetrical axes and the compositional centers of facades. The entrance axis is not on the symmetrical axis and doesn't overlap on the compositional center of the façade. In the compositional centers of facades and at the ends of axes, facades are index. (Hierarchy) .Structure of western Timcheh facades is based on a modular network with 4meters width in number of 9 modules in every view. Proportion of façade frames in every module is 1 to 1. There is a terrace on the second floor of the southern Timcheh which has been caused Coherence in facades. The terrace continues across the facade and has led to a link between the façade components. The facades and floor are connected

through platforms creating a bond between the body and floor. Repetition of brick columns between the modules has caused a consistency between the lateral facades, and in the corner of the central hall, connection has been created using cornering techniques and 45 degree angle alteration. The connection between facades and roof has been done by brick arches .In the façade of Sara, connection between facades on the first floor is created by stone columns of colonnade and on the second floor by brick columns. The columns have 135 degrees angle at the junction between the two lateral facades and are raised at the distance between floors. In the colonnade, has been emphasized on vertical lines.

**C. Residential buildings**

This group of buildings is located in the depth of quarters and their entrances are connected with semi public and semi private passages. All axes of the house are parallel to the around passages. The residential buildings in Arak old fabric is classified into three types based on the combination of open and closed spaces compared to each other. Since for conducting of the analysis process, the sample of any type should be comprehensive and contain all the properties related to the type, so from any type, the building have been chosen that their Structure and details have changed less over the time and have greater diversity. Based on these criteria, the samples have been selected for the type 1, 2, 3 are houses of Khakbaz, Hassanpur and Hajagha Mohsen Araki respectively.

**a. House of Khakbaz**

The building has four exterior facades overlooking the yard. Outline of facades is combination of non equal level pages that are ahead in the axes compared to the adjacent surfaces. Each page is composed of two windows on the first and second floors. Windows are symmetrical compared to the middle axis of the page and the vertical lines of windows are the same direction. There is no dividing line between floors in the views and windows horizontal lines are along the same direction. Northern and southern facades are symmetrical compared to the axis passing through the entrance. All facades have the compositional centers which are located on the axes. The entrance axes are on the symmetrical axes of the façades and overlap the compositional centers of the façades. In the compositional centers of facades and at the ends of axes, facades are index. (Hierarchy) The facades and floor are connected through stone platforms creating a bond between the body and floor. Repetition of brick columns between the pages has caused a consistency between the lateral facades .In addition, Repetition of a decorative brick motif on the upper line of facade has led to a link between the lateral facades. In the corner of views, facades are connected by polygon surfaces and decoration in the form of stepped pages. The Connection between the facades and roof has been created by curved surfaces.

**b. House of Hassanpur**

The building has interior facades overlooking the yard and an exterior façade in the entrance side. Outline of facades is repetition of a module with 2 meters width and in number of 9 modules in eastern and western facades and 6 modules in the northern facade. In every module, components of façade are symmetrical compared to central axis of module and western and eastern façades are symmetrical compared to symmetrical axis. The northern facade has the compositional center which is on geometrical center of façade and other facades don't have the compositional centers. The entrance axis is on the symmetrical axis of the northern façade and overlaps the compositional center of the façade. In the compositional centers of facades and at the ends of axes, facades are index.(Hierarchy) Proportion of façade frames in every module is 1 to 2. The facades and floor are connected through brick platforms creating a bond between the body and floor. Repetition of brick columns between the modules has caused a consistency between the lateral facades .In addition, Repetition of two and three part modules with fixed rhythm has caused a connection between lateral facades. The connection in the corner of facades has been done by level difference between the levels. The Connection between the facades and roof has been created by curved surfaces.

**c. House of Hajagha Mohsen Araki**

The building has interior facades overlooking the courtyards and doesn't have exterior façade. Outline of facades is repetition of a module with 1 meters width that are repeated in the form of three-door, five-door, seven-door and nine-door in facades. In every module, components of façade are symmetrical compared to central axis of module and the building axes. The northern facade has three compositional centers which are located in the place of five-door, nine-door rooms and porch that all of them are along the axes. The eastern facade has a compositional center which is located in the place of three-door room that it is along the longitudinal axis. The other facades don't have compositional center. Exterior facades overlooking the passage are a combination of brick and thatch and have no decorations. The main entrance axis is not on the symmetrical axes and the compositional centers of the façades. In the compositional centers of facades and at the ends of axes, facades are index.(Hierarchy) Proportion of façade frames in every module is 1 to 2. The facades and floor are connected through brick and stone steps creating a bond between the body and floor.

Repetition of brick columns between the modules has caused a consistency between the lateral facades .In addition, Repetition of three ,five ,seven and nine parts modules with fixed rhythm has caused a connection between lateral facades. The connection in the corner of facades has been done by level difference between the levels, Diagonal lines with angle of 45 degrees. The Connection between the facades and roof has been created by curved surfaces.

**D. Communal buildings**

The communal buildings in Arak old fabric are of two types including single & multi complex that baths of Safai & Chaharfasl have been selected as representatives of types.

**a. Bath of Safai**

The building has no exterior façade. Outline of facades is repetition of a module in perimeter of octagonal and rectangular. In every module, components of façade are symmetrical compared to central axis of module and transverse and longitudinal axes. All facades have the compositional center which is on geometrical center of façade. The entrance axis is not on the symmetrical axis & the compositional center of the façade. Proportion of façade frames in every module is different. The facades and floor are connected through a row of stone. Repetition of similar forms in every module has caused a connection between lateral facades. The connection between facades and roof has been done by brick arches.

**b. Bath of Chaharfasl**

The building has interior facades and an exterior façade in the entrance side. Outline of facades is repetition of a module with 1.5 meters width in perimeter of an octagonal. In every module, components of façade are symmetrical compared to central axis of module and transverse and longitudinal axes. All facades have the compositional center which is on geometrical center of façade and along the symmetry axes. The entrance axes are not on the symmetrical axes and the compositional center of the façade and are symmetrical compared to longitudinal axis. In the compositional centers of facades and at the ends of axes, depth of the space is more and facades are index. (Hierarchy). Proportion of façade frames in every module is 1.5 to 1. The dominant material in facades is brick tiles with various colors and the design of each façade is unique. The facades and floor in dressing spaces are connected through stone platforms, in communication vestibules by a row of tiling and in hothouse by stone creating a bond between the body and floor. Repetition of similar forms in every module has caused a connection between lateral facades. The connection in the corner of facades has been done by Karbandi lines from different angles that have met each other in a circular page leading to continuity of lateral facades. Octagonal plans in ceiling are converted to circular form of dome by Karbandi creating a continuous shell between facades and roof.

**E. Memorial buildings**

The most memorial buildings have been destroyed due to lack of sponsorship. The only buildings which have remained are Hazrat Abolfazl Alabas, Mohammad Ebrahim & Molla Ghasem Saqakhaneh. These buildings are holy to people and are a symbol of Karbala battle.

**a. Saqakhaneh of Hazrat Abolfazl Alabas**

The facade of the saqakhaneh has a symmetry axis. The compositional center of the façade is located on symmetry axis and overlaps on the geometric center of the façade. Proportion of façade frames is 1 to 1. The facade and floor are connected through a stone platform. The connection between facade and bazaar ceiling has been done by a surface with a semicircular cross section.

**b. Saqakhaneh of Mohammad Ebrahim**

The facade of the saqakhaneh has a symmetry axis. The compositional center of the façade is located on symmetry axis and overlaps on the geometric center of the façade. Proportion of façade frames is 1.5 to 1. The facade and floor are connected through a stone platform. The connection between lateral facades has been done by brick columns with a semicircular cross section.

**c. Saqakhaneh of Molla Ghasem**

The facade of the saqakhaneh has a symmetry axis. The compositional center of the façade is located on symmetry axis and overlaps on the geometric center of the façade. Proportion of façade frames is 1.5 to 1. The facade and floor are connected through a tilling platform. The connection between lateral facades has been done by columns with a semicircular cross section. There is no connection between the facade and the roof of bazaar.

**F. Minor Architectural forms**

In Arak old fabric, Minor Architectural forms include symbolic pools which are often located on the middle of urban & architectural spaces.

**a. Pool of Charsuq**

The facades of the pool are symmetrical compared to center of volume from every direction. The compositional center of the façade overlaps on the geometric center of the façade. The facades and floor are connected through an indentation with depth of 5

cm. Symmetry of form compared to volume center has caused a consistency between the lateral facades.

**b. Pool of Garmkhaneh**

The facades of the pool are symmetrical compared to center of volume from every direction. The compositional center of the façade overlaps on the geometric center of the façade. The facades and floor are connected through an indentation with depth of 3 cm. Symmetry of form compared to volume center has caused a consistency between the lateral facades.

**c. Pool of Sarbineh**

The facades of the pool are symmetrical compared to center of volume from every direction. The compositional center of the façade overlaps on the geometric center of the façade. The facades and floor are connected through an indentation with depth of 5 cm. Symmetry of form compared to volume center has caused a consistency between the lateral facades.

**d. Pool of Nozari**

The facades of the pool are symmetrical compared to center of volume from every direction. The compositional center of the façade overlaps on the geometric center of the façade. The facades and floor are connected through an indentation with depth of 5 cm. Symmetry of form compared to volume center has caused a consistency between the lateral facades.

**e. Pool of Hassanpur**

The facades of the pool are symmetrical compared to center of volume from every direction. The compositional center of the façade overlaps on the geometric center of the façade. The facades and floor are connected through an indentation with depth of 5 cm. Symmetry of form compared to volume center has caused a consistency between the lateral facades.

**Conclusion**

Outline of facades is repetition of similar elements in a modular network. In every module, components of façade are symmetrical compared to central axis of module and all façades are symmetrical compared to 1-3 axes. In all facades, the compositional centers are on symmetrical axes and facades are index at the ends of plan axes and the compositional centers (Hierarchy). In all facades except the religious, communal buildings and residential buildings with multi courtyard composition, the entrance axes overlap on the symmetrical axes. It can be concluded that the introvert buildings which have limited access, the entrance axes are hidden and are not on symmetry axes of facade. In all buildings, the facades and floor are connected through brick & stone platforms and stairs, creating a bond between the body and floor. In the most buildings, connection between facades and roof has been done by brick arches and connection between lateral facades has been created by stone & brick columns.

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