

The Role of Bridges in the Creation of Roads in Islamic Kurdistan

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ABSTRACT

One of the most important cases which were related to human being is road and its relation. Relationships and ways were widely developed after Islam and homogeneousness of many areas under Islam.

Various factors were taken into consideration in the process including selecting the nearest road and road safety. Natural disasters were always obstacles in easy achieving and creating near roads. One of these obstacles was valleys and rivers which made obstacle in the way construction. Human being always overcame various obstacles and thought of a solution using the power of mind. In order to cross the rivers and creating near roads, he tried to make bridges on these roads in different eras and passed this natural obstacle.

Kurdistan always faced this problem in its ways according to its climate and permanent rivers. Therefore, the existence of bridges and their architectural type were effective in creating roads especially in Islamic era in Kurdistan relational roads.

KEYWORDS: road construction, Islamic era, rivers, bridges, architecture, Kurdistan

1. INTRODUCTION

Kurdistan has a special place in the West due to geographic location and environmental diversity. This environmental diversity and the existence of wide plains, high mountains with permanent rivers and full of water and available food sources resulted in creating various settlements in this region in different historical periods. Over time, communicated paths became widespread and diversified in different places and many areas placed many areas under its control. Impressive development has been seen in communicated paths in Islamic era according to widespread relationships among governments and societies that this case highlighted itself with creating caravanserais, castles and bridges along the communicated paths.

Human being has struggled with natural obstacles and problems during his life. One of them was crossing stream and long rivers which itself was an obstacle in creating trade and economical relations. Therefore, although using the body of trees for crossing small rivers was a somewhat simple thought, it was a solution to big and mainly problems of human as well as an introduction to create long and huge bridges and also it related different lands and created various ways in different areas.

The necessity of creating bridges was inescapable due to the existence of permanent rivers in the researched area and the probability of their existence on communicated paths. Bridge creation increased communication, shortened ways and increased performance power in selecting closer and easier ways.

The significant of the study and state of the problem

The present study aims at determining bridges historical era and communicated paths place in identified era, the effect of rivers as natural obstacles in creating and constructing bridges and roads based on introducing Kurdistan bridges as well as specifying their architectural style and pattern.

Historical geography of Kurdistan

Identifying and becoming familiar with the considered area is one of the important factors in every study. Different definitions have been said in relation to historical geography. One of the definition which are said about historical geography and is accepted by the most geographers is this "historical geography is a science which investigates the relationship between human and environment in the past, therefore, human situational relations in the past time frame is proposed in order to make more understandable today's geographical issues of human. In other words, it can be said that historical geography is the same past human geography" (Beik Mohammadi, 1999, p. 15).

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From historical Geography, Kurdistan contains many different areas based on various texts and sources but what is mentioned in most texts as Kurdistan included Western and Northwestern parts of Iran, North and East of Iraq, and South and South-East Turkey.

One of the most important historical texts which can be introduced as first local history that describes geography and Kurdistan history is Sharafnama written by Amir Sharaf al-Din Bitlisi. In this book, history and geography of Kurdistan are examined in detail and mentioned the limitation of this land from one side to the Persian Gulf and Fars and from the other side to Armenia and Mousel and intact land and also from the other side to Ajam Iraq and Azerbaijan (Bitlisi, 1985, p. 23). The book "Historical Geography" written by Brtold has pointed to Kurdistan and its Kurdish area in two parts. The part which includes the main limitation of this study introduced these areas as "Mountain" quoted by Arab geographers and the province of Kermanshah and Azerbaijan includes one part of this area which is known as Ardalan and its important city is Senne (Bartold, 2007, p. 215). Mustawfi used the term Kurdistan for the first time in describing administrative divisions and geography of Seljuk in the book Nozhat ol-Gholub. Mustawfi knew Kurdistan as a state of Jebal province and Bahar as the central part and 16 as its provinces. Some parts of Kurdistan, Kermanshah, Hamedan, Lorestan, and some areas of Iraq Kurdistan were in Kurdistan according to Mustawfi classification and also today's measure (Mustawfi, 2010, p. 120).

Also, Kurdistan has been referred as different names in other geographical sources like "Historical Geography of Eastern Caliphate" written by Guy Lestrangle.

Location of Kurdistan

Current Kurdistan is in the West of Iran and near Eastern part of Iraq. This province which is in widespread hill sides and plains of central Zagros Mountains limited to Western Azerbaijan and Zanzan from North, Hamedan and zanzan from East, Kermanshah from south and Iraq from West (Zarei, ????????). According to the country divisions, Kurdistan includes Sanandaj, Saggez, Bane, Qorveh, Marivan, Hassan Abad or Sokand, Diwandareh, Kamyaran, Dehgalan, Serish Abad and Sarv Abad (Koosha, ????????????)



Figure 1. Source: Cultural Heritage Organization of Kurdistan Site

Introducing Kurdistan Rivers

Kurdistan has an important and a special place from climatic situation and its place in central Zagros especially from water sources in Iran. According to the fact that permanent and seasonal rivers were always natural obstacles in creating roads and one of the main factors in creating and constructing roads, important rivers of Kurdistan are introduced in this part.

The rivers of this area include three catchments:

- 1- Sefid Rud catchment where its water flows into Caspian Sea.
- 2- Zarine Rud where its water flows into Urmia Lake.
- 3- Sirwan Catchment and small Zab where its water flows into Iraq and then into the Persian Gulf (Najafi, 1990, p. 44).

Table 1. Kurdistan Rivers

Important Rivers of Kurdistan				
Movement Path	River Length	River Type	Catchment	River Name
South-West to North-East	175 Km	Permanent	Caspian Sea	Telvar
South-West to North-East	666 Km	Permanent	Caspian Sea	Ghezel Ozen
North-East to South-West	95 Km	Permanent	The Persian Gulf	Sirwan
North-East to South-West	98 Km	Permanent	The Persian Gulf	Gheshlagh
North-East to South-West	13 Km	Permanent	The Persian Gulf	Garan
South to North	284 Km	Permanent	Urmia Lake	Zarine Rud (Cheghatochay)

According to this that some of the presented rivers move their directions in their moving path, their presented path is only in Kurdistan in this table. Inserted information in Table 1 has been extracted from one of the cultural geographical books of the Country Rivers.

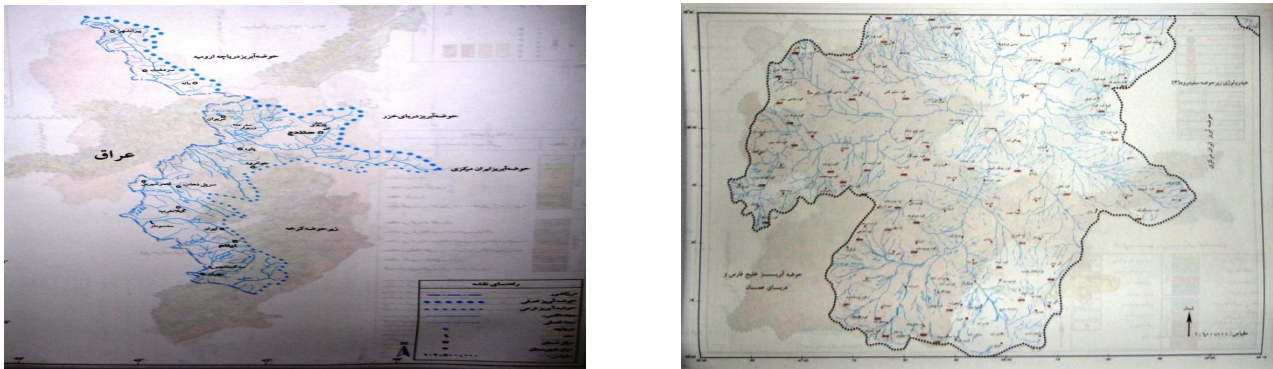


Figure 2. Caspian Sea and the Persian Gulf Catchments in Kurdistan
(Source: Geographical Culture of Kurdistan Rivers)

The importance and place of bridges in road construction and communication:

Road has always played an important and undeniable role in human life. Human always needed road in his life and used it in different cases and it had a lot of applications. Road has been used in various cases from the ancient times to the present.

Road was the first and the most naturalist relation among human being. There is no possible way to turn the social wheels without roads as blood flow is impossible without the existence of arteries in human body and therefore, country imagination without roads is far from reality according to this measure. Road is the means of moving wealth in economical terms, because agricultural and industrial products can be moved by road from where they are produced to where they are consumed. Road is power transmission means in military term, because it is used for moving soldiers, weapons, and military equipment. Road is a means of providing national unity in governmental term which a government can deploy the government power to the country (Road organization, 1971, p. 12).

According to above definitions, roads have had different applications including roads which had trade and business exchanges or military roads which were used for campaigns. Roads were suitable ways in transmitting cultures, civilization, art and prosperity which were very important from this point. However, there were different obstacles in creating roads especially natural obstacles including mountains, rivers, deep valleys and hot and barren deserts which were natural obstacles in constructing roads and human always had problems with these obstacles in creating roads and thought of many solutions for passing them. One of the characteristics of roads and their construction is quick and easy destinations. It was necessary to pass natural obstacles in order to create them. One of these obstacles is rivers full of water and deep valleys for which human being thought of constructing bridges and on these obstacles in order to pass them and create quick and easy roads. Actually, it can be said that bridge construction has been started from the time that human being could use the most basic way, trees body, in crossing streams and small rivers (Mokhlesi, 2000, p. 25).

However, human being could use new ways and increased bridges strength and safety with increase in his ability and experiences in bridge construction and crossing rivers according to the fact that he was always moving in developing and progressing path. Until now, no bridge constructional work which dates back to before Sasanian era was not found in Iran except a dam which did the work of a bridge and have been recently found on Kor river of Fars in Doroud Zan and it is attributed to Sasanian. It is because bridges are constructions which are susceptible to damage and destruction more than any other construction and have been destroyed earlier than any other buildings and their existence were of life's necessities. In other eras, new bridges have been built in their places and it is probable that remained bridges of past eras have been more ancient (Pirnia and afsar, 1991, p. 162). Also, the investigated area of the present study includes these areas and bridge has an important role in road construction of this area according to the existence of many rivers. They will be introduced in the next part.

Bridge applications

Bridges have special features according to climatic situations in Iran's different areas and they also had different applications. Bridges and dams which were constructed in Iran had basic and different applications:

1- The most important application of bridge was to connect related road of two coasts of rivers in order to cross for various goals.

2- In some areas, bridges were designed as dams by architects according to climatic situations and for irrigation of agricultural lands and to some extent for controlling floods. In addition, some bridges have had the role of giving power and providing the necessary energy for turning long wheels of water mill (Mokhlesi, 2000, p. 83).

3- In order to cross deep ditches which were constructed around the cities and to access entrance gates, small bridges were constructed in front of them which were movable.

4- Some bridges which were called river bridges, it delivering or water delivering, in order to deliver water from one coast to the other.

5- In some rare cases, bridges were used for promenades first sample of which is probably in Safavid era and one of their famous is Si-o-se Pol in Isfahan.

Bridge architecture (bridge components)

Different cases have been considered in constructing and creating a bridge and some changes have been made in developing bridges and some cases have been added according to developments and experiences which have been gained. Components of a bridge include: 1- foundation or footing planning: In this part, engineers select the kind of foundation based on the river situation.

A) With construction of diverse rivers in cases which the water of rivers has been lessening, the water path has been changed and their foundations have been made.

B) In some cases, it was tried to select a part of the river which was the river bed and stony or rocky and its opening was tight that be affordable in both economical and time point of view.

C) Breakwater or foreshore: In most bridge bases, triangular or semi-circular projection was made even against water flow and agrees with it which is called water broken. They lessen water pressure of rivers in addition to basic strength of bridge bases.

4- Arch and opening: different arches were used for opening in bridge construction. These arches have changed in different eras. In this case that high arches and also zigzag arcades were used in Sassanid era and they were used in Islamic era and were in bayes arches or Holouchin. Sharp or zigzag arches were selected in the early of Islam and they were constructed until 10th century. In Safavid era, the form of bridge arch openings tend to have less wave were as general or medium five or seven which were known as the name of Shah Abbas or Abbasi Arch. Bridges were made with semicircular, flat or hanging arches in Ghajar era and the current century in which architecture and engineering counting were developed and modern architecture was placed instead traditional architecture (Mokhlesi, 2000, p. 96).

5- Kaneh or Kano: They are said to sinking which are at the back side of arches or between arches of bridges openings. They are needed in order to simplify the construction and also the cross of river overflow from these openings that put less pressure on arches as well as to tabulate the bridge surface.

6- Room construction, direct tendency and bars can be mentioned as other cases which exist in some bridges and are constructed in addition to beauty and variety in bridge architecture, they have also strength application and were used in propulsion neutralization.

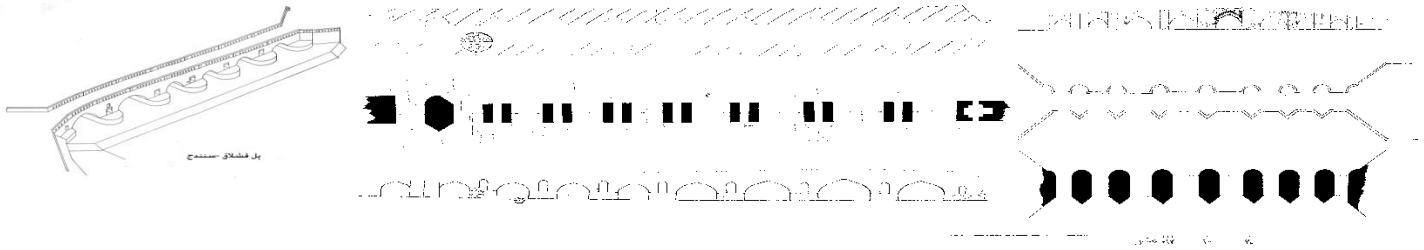
7- Turret: Small walls with maximal height of 1.5 in two sides of bridge pathway were used in order to avoid people fall and caravans into water which are called turret.

8- Inscription: Some inscriptions were written and placed on bridge body which included the construction date, its sponsor, maker, and reconstruction men in some rare samples of bridges unlike other architectural works of Islamic era like Dokhtar bridge of Meyaneh,

Panj bridge of Maku and Kshkan bridge.

Table 2. Bridges of Kurdistan Islamic era

Bridges of Kurdistan Islamic Era										
On River	Body Materials	Foundation and Base Materials	Breakwater	Base	Arch Type	Opening Number	Reconstructed	Antiquity	Path	Bridge Name
Baytmer	Brick with plaster	Stone and material	Circular and triangular	Circular	Zigzag	7	Yes	Safavid	Gharveh-Bijar	Farhad Abad
Gheshlagh	Brick with plaster	Stone and material	Semicircular	Circular	Zigzag	6	Yes	Safavid	Sanandaj Entrance	Gheshlagh
Gheshlagh	Brick with plaster	Stone and material	Circular and triangular	Rectangle	Zigzag-Semicircular	5	Yes	Safavid	East of Sanandaj	Sheikh Bridge
Tereval	Brick with and soil plaster	Stonemason	Circular and triangular	Square	Zigzag	9	Yes	Safavid	Bijar-Takab	Salavat Abad
Ghezel Ozen	Brick with and soil plaster	Stone and material	5-sided and circular	Rectangle	Zigzag	4	Yes	Ghajar	Bijar-Zanjan	Ghojoor
Garan	Brick with and soil plaster	Stone and material	Triangular	Square	Zigzag	3	Yes	Safavid	Marivan-Sanandaj	Garan



Bridges plans of Farhad Abad, Gheshlagh, Salavat Abad (Source: Kurdistan Cultural Heritage)



Salavat Abad Bridge (Bijar)

Gheshlagh Bridge (Sanadaj)

Garan Bridge after Reconstruction (Marivan)

Figure 3. Salavat Abad, Garan and Gheshlagh Bridges (Source: Kurdistan Cultural Heritage)

Conclusion

Most bridges of Kurdistan belong to the Safavid Era according to the conducted study which represents prosperity and road construction in this era of Islamic eras and in this area and also thriving economy and business of this area in the Safavid era. These bridges were mostly constructed on important rivers of this area and this fact represents the important access to water as well as direction of movement in river paths.

A consistent pattern was used in materials and architectural design especially in plan and created arches types on bridges of this area.

These bridges were important in making communications beyond the city area with other areas according to the following map which shows the bridge locations. Moreover, it can be revealed that roads of the Ghajar era were extender of the Safavid era according to this fact that most bridges have been reconstructed in Ghajar era and this fact represent the importance of these roads in this area.

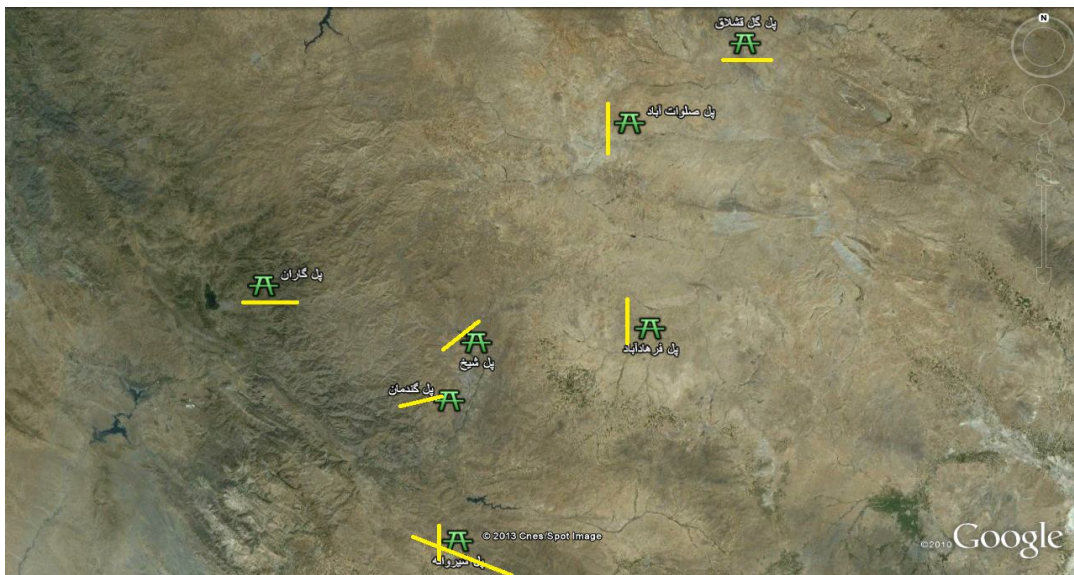


Figure 4. Location of Kurdistan Bridges (Source: www.GoogleEarth.com)

The conducted study represents almost an identical pattern of architecture and materials of Kurdistan bridges and also the importance and place of bridge in road construction and prosperity in eras in which bridges were constructed, widespread pattern of bridges, the role of natural obstacles in making bridges.

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