

## **Ottoman Masonry Bridges in Anatolia and the Balkans**

Orhan BAYKAN<sup>1</sup>, Ahmet ALKAN<sup>2</sup>, Yalçın ÖZDEMİR<sup>3</sup>,  
Nesrin BAYKAN<sup>4</sup>, Ünal ÖZİŞ<sup>5</sup>

<sup>1</sup> Dept. of CE, Pamukkale University, Denizli, Türkiye, obaykan@pau.edu.tr

<sup>2</sup> Dept of CE, Dokuz Eylül University, İzmir, Türkiye, ahmet.alkan@deu.edu.tr

<sup>3</sup> Dept of CE, Dokuz Eylül University, İzmir, Türkiye, yalcin.ozdemir@deu.edu.tr

<sup>4</sup> Dept of CE, Pamukkale University, Denizli, Türkiye, nbaykan@pau.edu.tr

<sup>5</sup> Prof. Dr. Em., Dokuz Eylül University, İzmir, Türkiye

### **ABSTRACT**

Remains of the historical masonry bridges in Anatolia and the Balkans are dated back to the Roman (first half of the I. Millenium AD), to the Seldjukide (early centuries of the II. Millenium AD; basically in Anatolia), and to the Ottoman periods (13<sup>th</sup> to 19<sup>th</sup> centuries). Besides serving to transportation, bridges crossing watercourses have to be considered as important hydraulic structures. Built for military as well as economic purposes, more than one hundred Ottoman bridges (roughly two thirds in Anatolia and one third in the Balkans) served for several centuries; some of them being still in operation. They are silent witnesses of the hydraulic knowledge and solid construction technology of their times.

In this inventory study, only Ottoman's masonry bridges in Anatolia and Balkans have been presented. Some of the Ottoman's masonry bridges had sunken in the reservoir of modern dams, some of them demolished during the construction of the new highways, and some of them are still in service.

**Keywords:** Masonry Bridge, Ottoman, Balkan, Anatolia.

### **1. INTRODUCTION**

Anatolia that had been along the history an intersection point of many civilizations as well as a bridge between Asia and Europe in point of either geography or history, had owned hundreds of bridges during the last four millenia. A great part of those bridges does exist in their original places, and an important portion is still in use after some repairs less or more.

The aim of this study is to present the existence of masonry bridges of Ottoman Empire in Anatolia (Modern Turkish Republic) and Balkans [Kientz 1963; İşmen 1972; Çulpan 1975; Tunç 1978; F. İlder 1978; İ. İlder 1995; Öziş at al. 2007].

Masonry bridges had been constructed in three types as (a) with continuous arches of similar or almost similar shapes; (b) with the arches of odd number, in ascending and descending order (the highest arches in the middle); (c) with even number, in ascending and descending order (the highest pier in the middle) as shown in Fig. 1.

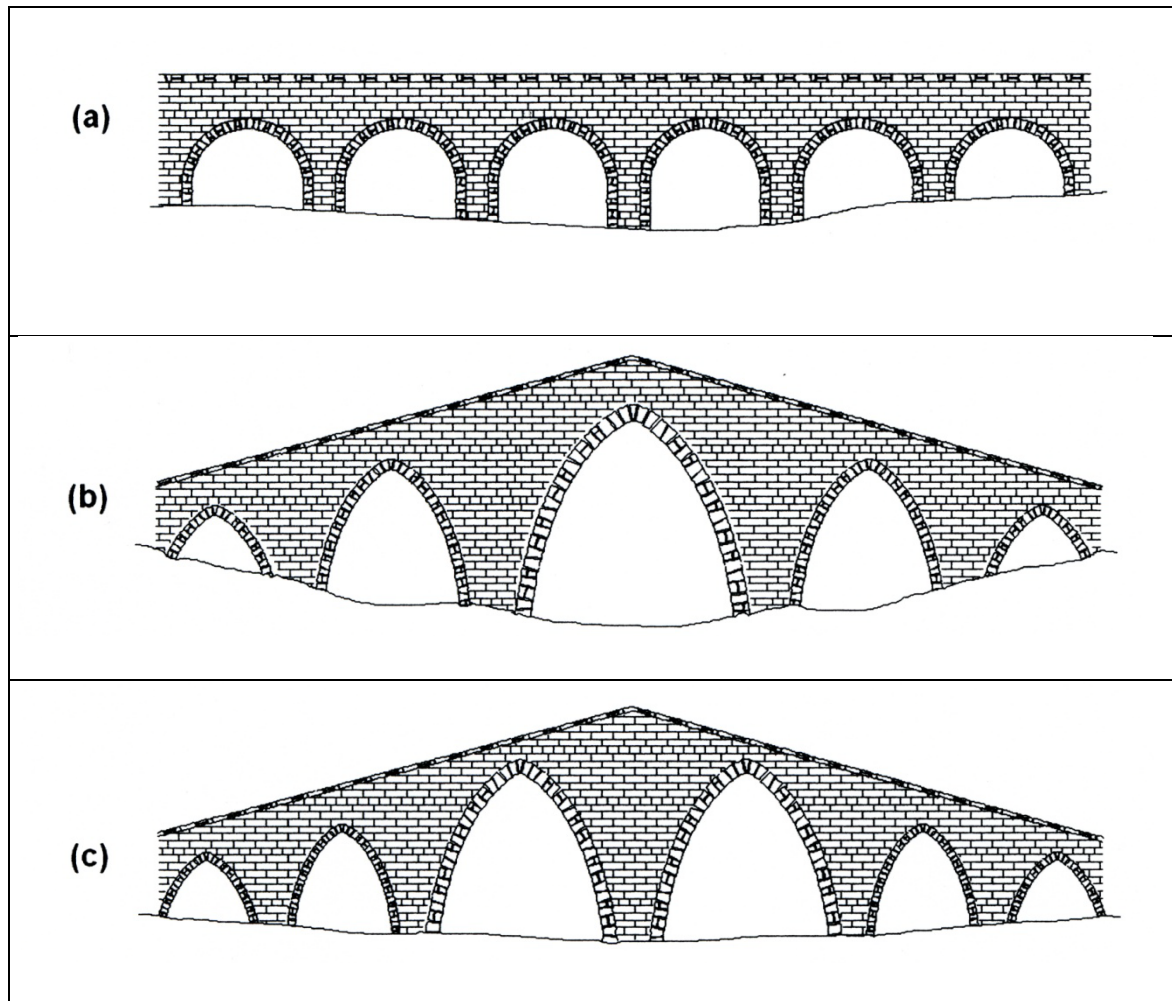


Figure 1 Types of bridges: (a), regular circular arches; (b), 1 greater sharp arch in the middle;  
(c), 2 greater sharp arches in the middle

## 2. BRIDGES OF EARLY OTTOMAN PERIOD

### 2.1. Masonry Bridges in Anatolia

There are several literature about the Ottoman's bridges that they are handling the bridges all together, studying separately one or some, concentrated on only Mimar Sinan's (Sinan the Architect) bridges of 16<sup>th</sup> century [Anhegger 1952; Bozkurt 1952; Kientz 1963; Eyice 1964; Akmandor 1968; Canbil 1969; İşmen 1972; Çulpan 1975; Tunç 1978; Arıoğlu & Anadol 1979; Aksoy 1986; Çeçen 1988a,b; Demir 1988; Radic 1988; Ülgen 1989; Karaesmen v.diğ. 1991; Öziş at al. 2000, 2003, 2007;]

It has been given certain attention to land-transportation, bridge and highway construction, and path-watcher organization (special name: derbent) during Ottoman period. [Çeçen 1999]. In early Ottoman period, in 14<sup>th</sup>-15<sup>th</sup> centuries, the construction of bridges had given interesting samples. 14<sup>th</sup> century, Taşköprü on Gökırmak near to the city Kastamonu, Nilüfer Hatun Bridge on Nilüfer river, Behramkale Bridge on Gemere river, Koyunköprü on Bergama river are the first bridges of Ottoman period in Anatolia. The examples relevant to this period are given in Table 1.

**Table 1 Historical Bridges of Ottoman Period in Anatolia**

Name	River	Type	Date of constr. (century/year)	Number of arches	Max. Span (m)	Length (m)
Nilüfer	Nilüfer	b	XIV	4	10,0	50
Behramkale	Gemere	b	XIV	4	14,5	-
Gazimihal	Tunca	a	XIV	16	8,5	184
Taşköprü	Gökırmak	c	1367	5	9,8	101
Koyun	Bergama	b	1383	2	11,9	-
Uzun	Ergene	a	1443	174	14,0	1360
Saraçhane	Tunca	c	1451	12	11,0	120
Koyunbaba	Kızılırmak	b	1490	15	16,5	250
Geyve	Sakarya	b	1495	15	12,5	196
Kırkgöz	Tohma	-	XV	22	6,5	222
Nasrullah	Karaçomak	b	1501	5	12,0	40

Uzunköprü constructed in 15<sup>th</sup> century on Ergene river with a length of 1360 m is the longest masonry bridge in Anatolia while Koyunbaba with 250 m of length on Kızılırmak near Osmanlık, Kırkgöz of 220 m on Tohma near the province Malatya, Saraçhane of 120 m on Tunca river, respectively, are the famous bridges of that century.

## **2.2. Bridges in Balkan Countries**

Construction of bridges has shown interesting examples in Balkan countries during early Ottoman period. Those examples are listed in Table 2.

## **3. MASONRY BRIDGES OF MİMAR (ARCHITECT) SİNAN PERIOD**

### **3.1. Masonry Bridges in Anatolia**

In 16<sup>th</sup> century that is the brightest period of the Ottoman empire, the construction of bridges were having the signature of the great engineer and architect Sinan. The bridges of this period had been concentrated in Thrace in order to cross the rivers and keep safe the military as well as the civil transportation movements towards east and west from the capital Istanbul.

Among the bridges constructed by Sinan, Alpullu on Ergene has a main arch of 20 m and the length of Sultan Süleyman bridge composed of four broken lines on the lake Büyük Çekmece is 635 m. The Büyük Çekmece bridge is one of the six respected works of Sinan who's number of works are reached close to 500. Sinan's bridges are listed in Table 3.

### **3.2. Masonry Bridges in Balkans**

The masonry bridges constructed in this period are listed in Table 4. The bridge over Drina in Vişegrad, constructed for Sokullu Mehmed Paşa, became famous by the novel of Nobel-prize-winner Ivo Andric in 1960's. The Aslanağa Bridge was relocated to downstream Trebinje in 1970's because of the construction of the Grancarevo Dam. The Mostar Bridge over Neretva, constructed by the Architect Hayrettin, displays with 29 meter the largest arch span in Europe; ruined by the civil war in 1990's, it has been restored by 2005 like the original one.

Table 2 Historical Bridges of Early Ottoman Period in Balkans

Country	Name	River	Type	Date of constr. (century/year)	Number of arches	Max span (m)	Length (m)
Bulgaria	Sultan Murad Hüdavendigâr	Tunca		XIV	7		
Macedonia	Vardar Paşa (Timurtaş Paşa)	Vardar					
Greece	Söğütlüdere (Yıldırım Bayazid)	Söğütlüdere					
Albania	Vezir	Şkumbin		XV			
Albania	Davut Paşa	Boyana		XV			
Albania	Vezir	Orin	b+b	XV ?			
Bulgaria	Gazi Firuz Bey.	Jantra	a	XV			
Bulgaria	Koca İshak Paşa	Struma	b	1469/70	3	21,7	90
Bulgaria	Karlova Bridges		a	XV	Debağhane 1 Sığıryeri 2		
Macedonia	Vardar	Vardar	a	XV.	11		178
Bosnia& Herzegovina	Hünkar (Çareva Cuprija)	Mlačka	a	XV	4		
Greece	Faik Paşa	Narda	b	XV	13		142
Greece	Tempe Valley	Peneios	b	XV	3		

Table 3 Masonry Bridges of Mimar Sinan Period in Anatolia

Name	River	Type	Date of construction	Number of arches	Max span (m)	Length (m)
Odabaşı	Sazlı	a	1529	8	-	39
Gebze	Dil	b	before 1550	3	9,7	65
Kırkgöz	Akarçay	a	before 1550	22	-	175
Kalburcu	Porsuk	a	before 1550	16	-	264
Saray	Tunca	c	1553	4	10,0	60
Kapuağası	Harami	b	before 1563	5	8,8	75
Çorlu	Çorlu	b/c	before 1564	6	-	58
Yalnızgöz	Tunca	b	1567	1	6,6	-
B. Çekmece I	See-Lake	b	1567	7	7,0	157
" II	"	b	"	7	9,0	135
" III	"	b	"	5	7,0	101
" IV	"	b	"	9	11,8	184
Silivri	Silivri	a	before 1568	32	7,8	333
Lüleburgaz	Lüleburgaz	c	before 1570	4	8,7	93
Alpullu	Ergene	b	before 1572	5	20.0	124
Payas	Yakacık	c	1574	4	-	40

#### 4. LATE OTTOMAN PERIOD

From 17<sup>th</sup> to the begin of 20<sup>th</sup> century, during the Late Ottoman Period, the construction of bridges had become relatively less in amount and smaller in dimension because of the decreasing of important locations for bridge-construction as well as financial weakness of the empire. The relatively important bridges of this period are given in Table 5 and 6 in Anatolia and Balkans, respectively. Two selected pictures are given in Figure 2 and 3 below.

Table 4 Masonry Bridges of 15<sup>th</sup> century in Balkans

Country	Name	River	Type	Date of constr. (century/year)	Number of arches	Max. span (m)	Length (m)
Bulgaria	Mustafa Paşa	Meriç	c	1528/29	20		295
Bulgaria	Uzuncadere	Uzunca (Ulu)	-	1590			
Bulgaria	Bistriça	Bistriça	a	XVI			
Bosnia& Herzegovina	Keçi	Miljacka	b	XVI	1	18,0	43
Bosnia& Herzegovina	Karagöz Mehmet Bey	Neretva	c	XVI	6	13,5	80
Serbia	Mostar	Neretva	b	1557/1566	1	29,0	
Serbia	Sokullu Mehmet Paşa (Drina)	Drina	a	1577/78	11	14,8	180
Bosnia& Herzegovina	Arslanağa	Trebişnica	c	1573/74	4	18,6	92
Bosnia& Herzegovina	Rüstem Paşa	Zeljetniça	-	XVI	15		
Bosnia& Herzegovina	Sokollu Ferhat Paşa	Vrbas	-	XVI			
Montenegro	Vezir	Moraça	-	XVI			
Greece	Gazi Hasan Bey	Köstem	a	XVI	10		114
Greece	Sinan Bey			1585/86	1		
Kosovo	Akköprü	Bistriça		XVI			

Table 5 Masonry Bridges of Late Ottoman Period in Anatolia

Name	River	Type	Date of cons. (century/year)	Number of arches	Max. Span (m)	Length (m)
Ekmekçizade	Tunca	c	1615	10	15,0	136
Babaeski	Şeytan	c	1633	6	7,3	72
Devegeçidi	Devegeçidi	b-c	17 <sup>th</sup> century	7	13,7	119
Valide	Yalak	b	17 <sup>th</sup> century	3	12,4	64
Yusuf Ziya Paşa	Togar	b	1807	1	16,0	55
Çarpık	Murat	b-c	1817	12	15,0	156
Yeni	Meriç	c	1847	12	15,5	222
Nilüfer	Nilüfer	b	1886	1	23,8	

## 5. CONCLUSION

The ancient/historical bridges should be rehabilitated, renewed and reconstructed for delivering of our cultural heritages to the next generation, and they may be used at the same time as passenger bridges as well. These bridges which may be counted as semi-hydraulic structures, may help give some idea about correction of our modern span-determination techniques of bridges as well as to create new methods. It can be also tested the strength of materials, the durability of design and sustainability of those bridges.

Table 6 Masonry Bridges of Late Ottoman Period in Balkans

Country	Name	River	Type	Date of construction	Number of arches	Max. span (m)	Length (m)
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				(century/year)			
Macedonia	Kaçanikli Mehmet Paşa	Radika	-	XVII	3		
Benaluka	Gazi Ferhad Paşazade Hüseyin Bey		-	1614			
Serbia	Mehmet Paşa	Nişava	-	1618			
Serbia	Mehmet Paşa		-	1627	5		
Bosnia& Herzegovina	Hacı Hüseyin	Miljacka	-	1619			
Bosnia& Herzegovina	Danyal Paşa	Buna	-	XVII (exist)	14	7,6	102
Greece	Kösem Valide Sultan	Sperchios	-	XVII	7		
Albania	Kurt Ahmet Paşa	Osum	b	1784/85	7		
Kosovo	Terziler (Terziski)	Djakoviça		1796			
Bosnia& Herzegovina	Briga Al-Hâc Abdullah			1798			
Bosnia& Herzegovina	Latin		a	XVIII	4		
Greece	Vardar	Vardar		XVIII			
Albania	Mehmet Paşa Buşati	Drin		XIX			
Albania	Bahçelik	Drin ?		1889			144
Bulgaria	Yantra	Yantra	a	1870	14	11	270
Bulgaria	Selvi	Rosika	b	1872 R125			99
Serbenia	Ak Köprü Ayşe Hanım	Gradska Reka	b	1844			
Serbenia	Hacı Hüseyin	Gradska Reka		1848/49			
Bosnia& Herzegovina	Vezir Davud Paşa	Miljacka		.1834			
Bosnia& Herzegovina	İskender Paşa	Miljacka		1861			
Greece	Gazi Süleyman Paşa	Yelkenci	a	1887	4		
Greece	Hasan Nazif Dede Efendi	Köstem (Pinios)		XIX			

**Acknowledgement:** The authors are thankful to Ret. General Cevdet Çulpan, Gülgün Tunç ve Fügen İter for their quite comprehensive and pilot studies performed in 1970's; to Ayhan Atalay for his always close contribution especially for Mimar Sinan's bridges; to Turkish Highway Authority and some other institutions; to Spur Verlag and its manager to late Dr. Turgut Vogt, for the excellent publication of their recent book.



Figure 2 Büyükçekmece bridge on the pier of the lake in İstanbul/Türkiye (Photo: Ü. Öziş)

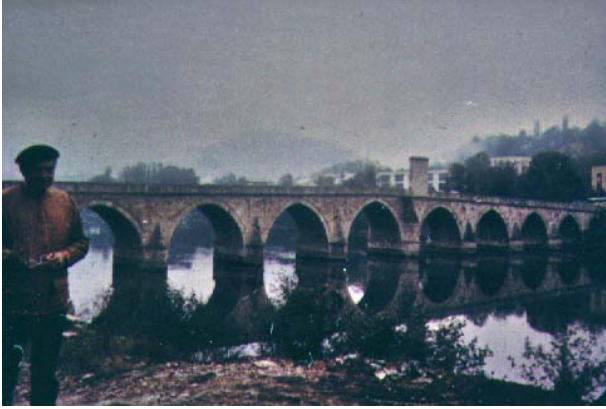


Figure 3 Sokollu Mehmet Paşa bridge on Drina creek in Visegrad/Hungary  
(Photo: M. Soner)

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