

Historical Arched Stone Bridges and Their Long Lasting History in Turkey and Balkans

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Abstract

It is one of the primary tasks of the General Directorate of Highways to repair and maintain the historical bridges which are of great importance in view of our cultural history in accordance with the projects to be developed or caused to be developed, apart from the recently constructed roads and bridges. In this paper, the restoration works carried out on the stone bridges with arches which are proven to be durable against the factors such as earthquakes, dams, variable water flows and heavy traffic over the centuries as a consequence of the analysis made specifically for the original construction techniques and the interaction between soil, foundation and river, shall be discussed.

Keywords: Stone Arched Bridges, Restoration, and Earthquake.

1 Introduction

Anatolia which has witnessed the development of various civilizations for centuries was covered with road network to meet the communicational, militaristic and commercial requirements of the societies. Within this process, as part of the transportation system the bridges have turned out to be the supplementary elements of the cultural history as beneficial structures serving for commercial, economic, militaristic, social and cultural purposes. Pursuant to the inventory records, it has been observed that there exists a total of 1948 each bridges in our country the majority of which is located on 1st degree seismic zone, dating back to Hittite Period(1), Urartian(1), Roman(142), East Roman(26), Seljuk(160), Ottoman (1509) and Early Republican(105) Periods with 316 bridges dating back to Ottoman Period, abroad the majority of which is located in Bosnia and Herzegovina as of December 2016.

1948 ea bridges are classified in accordance with their construction technique as follows: Stone(1834), Wooden(38), Iron (34), Reinforced Concrete (42), [1], [2]. The arched stone bridges which have proven to be durable against dynamic forces such as earthquake, water, and wind for centuries as mentioned within the scope of this study are considered to serve for a long time in case a relationship between the original construction techniques and soil-foundation-river is maintained while the original construction techniques and the relationship to be established with the environment should be well defined in the first priority.

2 Construction Technique for the Stone Arched Bridges

Construction of the structures which support the construction item commences with the bearing elements in the first place. For the stone bridges,