Almonte Viaduct. Detailed Design

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Abstract

Given the scale involved, construction of this bridge necessitated more comprehensive engineering and detailing for some of its components. These tasks were performed by the builder’s staff to ensure coordination as full as possible between the design and the construction teams, as described in this paper.

Keywords: Concrete arch bridge, world record railway arch bridge, temporary cable stayed construction, self-consolidating concrete, high-strength concrete.

1 Introduction

The River Almonte Viaduct is located on the high speed rail line running from Madrid to Extremadura in southwestern Spain. At some future time, this railway will be extended to provide high speed transport between Spain and Portugal and more specifically between Madrid and Lisbon. The stretch of line near Cáceres runs across an area of great environmental value where the Rivers Tagus and Almonte flow into the Alcántara Reservoir.

An especially long span was required to cross the River Almonte, which widens at its mouth. The main section of the viaduct was consequently designed as a 384 m concrete arch that straddles the river from bank to bank with no intermediate piers (Figure 1). At the time of completion, the arch held the record for being the longest span on a steel and concrete railway bridge in the world and was among the longest on all types of arch bridges.

Construction on the viaduct began in August 2011 and on the arch in April 2012. The arch was completed in August 2015 and at this writing completion of the bridge as a whole is scheduled for May 2016.

Figure 1. Overview of bridge

The rail line is owned by ADIF, Spain’s railway infrastructure management company. ADIF commissioned the design of this section of the line from a Spanish consortium whose members are...