



Single span strengthening of a Listed masonry arch railway viaduct

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Abstract

Due for completion in December 2017, the Ordsall Chord connects Manchester's Piccadilly and Victoria railway stations for the first time, improving rail connectivity, reducing rail service congestion, allowing new railway services to be introduced, and creating over £1bn of economic benefit.

The Chord comprises a new elevated viaduct, with substantial alterations and widening to existing brick railway viaducts. The Castlefield viaduct is an existing Grade II listed 1845 masonry arch viaduct affected by the widening of the Chord. The longest span, COL120A, was in very poor condition and required strengthening to accommodate the new railway arrangement without any long-term maintenance liability.

The design was developed in a strongly collaborative approach, whose benefits are discussed throughout the narrative, to successfully deliver this challenging structure in time for the 2016 Christmas blockade, a heavily constrained period due to other simultaneous major works to be carried out to the Chord.

Keywords: Collaboration; brick viaduct; skewed arch; strengthening; railway bridge; Listed Building; pre-cast concrete; under-ringing.

1 Introduction

A new arch under-ringing solution has been built beneath the long skew span COL120A of the Castlefield Viaduct, a Grade II Listed brick viaduct which has supported a railway since 1845. Construction of the strengthening was completed in December 2016 – see Figure 1.

The strengthening works were initiated by Network Rail as a constituent of the wider Ordsall Chord development, which comprised the provision of a new elevated viaduct alongside substantial alteration and widening to existing brick viaducts at their intersections with the Chord. The Castlefield Viaduct is one of two widened viaducts, being at the southern end of the new Chord. These alterations alongside an

already poor condition triggered the strengthening of the COL 120A span.



Figure 1. COL120A under-ringing, prior to grouting of the arch extrados