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## Herstal Viaducts: complete program of refurbishment, strengthening and upgrading of existing structures

**Pascal Thonon**

*Besix - Design Manager, BE*

**Arnaud Salmon**

*Greisch - Project Director, BE*

**Abdurrahman Aydogdu**

*SPW – Director, Road Dir. of Liège, BE*

**Patrice Toussaint**

*SPW – Director, Expertise/inspections, BE*

**Contact:** pthonon@besix.com

### Abstract

Since the 60's, the structures of Herstal Viaducts have suffered from a dysfunction of expansion joints, drainage system and been exposed to a high level of corrosion. On top, existing road layout, without shoulders and insertion/deceleration lanes at connection to existing junctions, lead to an unsatisfactory level of safety. During 2012, Belgian road directorate (S.P.W.) has developed and implemented an extensive inspection plan and design program to assess the existing structures. An important public works contract has been awarded early 2014 to refurbish, strengthen and upgrade the existing viaducts.

**Keywords:** Structural strengthening, refurbishment, widening, mobility

### 1 Introduction

The project deals with the strengthening and widening of three successive viaducts located on the A3 motorway linking Brussels (Belgium) to Aachen (Germany). On the territory of the municipality of Herstal, in the province of Liège, this motorway crosses the Albert Canal, the industrial site "Arcelor-Mittal" and the Meuse river. This strategic section located on 3 European routes, is the most heavily loaded axis of Wallonia with more than 100,000 vehicles a day in both directions of traffic.

Two structures (OA 26 and OA 27) span waterways (the Albert Canal and the Meuse) with main spans of 85 m and 110 m where steel beams with variable inertia act compositely with a reinforced concrete deck that is heavily posttensioned longitudinally and transversely. The site being subject to risks of mining subsidence, half-joints were installed to make the existing structures statically determinate.

The third flyover (OA26bis) is a structure of 8 simply supported spans of 25m length made of prestressed precast beams with transversely posttensioned concrete deck.

The bridges having been subjected to little maintenance work.

The Walloon region has a road and motorway network of nearly 5,000 structures whose periodic inspections (every 3 or 6 years) lead to a prioritization of rehabilitation works.

Thus, during the first 50 years of their life, these three structures commissioned in 1964 were only subjected to the maintenance work essential for their proper functioning.

The last inspections revealed degradations that led to the decision to rehabilitate these 3 viaducts:

- Decay of numerous expansion joints; systematically deficient sealing/waterproofing leading to