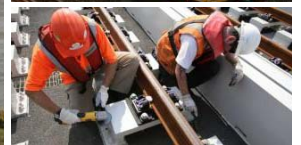


Reconstruction of Leven Viaduct, Morcambe Bay, Cumbria



Client

Network Rail and Carillion

Project Description

Leven Viaduct is a 49-span double track structure estuarial crossing which was to be replaced using multiple simply supported single track spans with independent walkway units and longitudinal track timbers. Cass Hayward's pre-contract value engineering review delivered the following improvements:

- Modular steel deck units fully welded and painted in the factory
- Exaggerated camber for run-off of rainfall and waves.
- Weld detailing simplified and reduced in length by 40%
- Direct fixings of the rail to the deck and no longitudinal timbers

During the main contract the design was further modularised and walkway units redesigned to accommodate the details and loading of demolition and erection gantries which were utilised to avoid marine operations and speed up construction.

Cass Hayward Role(s)

- Value engineering review of Form A design for Network Rail
- Design for tender
- Detailed design (Form B) for construction
- Temporary works design
- Construction stage advice
- Form A designer and independent checker of design for 51 span adjacent structure – Arnside Viaduct

Project Statistics

- Completed July 2006 after 16 week long blockade
- Project value £14m
- 3500 tonnes of steelwork in 96 new deck units modularised to just 16 types
- 1100m of new track laid

Special Features

- Track/Bridge Interaction Analysis – advanced non-linear analysis to verify limiting rail stresses and movements in service
- Design for fatigue endurance on this all-welded steel structure demanded an advanced analytical approach
- Critical control of construction tolerances to avoid raising of the track. Practicable details and adjustment facilities were incorporated into the slender design

- Novel method for integrated demolition and installation using purpose-made gantries
- Project approach replicated for Arnside Viaduct – the adjacent “sister structure”

Awards

- National Rail Award 2007 - Civil Engineering Achievement of the Year.
- ICE North West Region Merit Award.

