



## Post-Tensioning Auchtertyre Viaduct, Scotland

Client  
Railtrack  
Consultant  
White Young Green  
Contractor  
Edmund Nuttall  
Post-tensioning Specialist  
Freyssinet  
Contract Duration  
3 Months  
Work Completed  
September 2001  
Contract Value  
£150,000

**External post-tensioning using tendons and bars to strengthen an old steel truss multi-span railway viaduct.**

**An assessment carried out by White Young Green revealed that the five-span Auchtertyre Viaduct, which carries a single track rail line over a deep river valley 50 miles north of Glasgow, required strengthening.**

White Young Green's concern was that the top and bottom flanges of the steel trusses were significantly overstressed. Whilst the lower chord would be relatively simple to strengthen by augmenting the section with additional steel plate, it would have been more difficult to perform a similar operation on the top flange due to the lack of good access and the presence of track and support members.

Freyssinet worked closely with White Young Green to develop a stressing scheme tailored to fit in with the existing attributes of the structure. The solution used deflected tendons and inclined high tensile bars fixed below the bottom flange level to relieve the stress in both upper and lower chords. The sub-contract package also included strain monitoring of the existing truss to ensure that the applied forces were transmitted as predicted.

At the four shorter 50 foot side spans, stainless steel high tensile bars were used. These bars were stressed and anchored into steel brackets at the ends of each span and into a steel block supported by a triangular bracket at the mid-span positions.

At the longer 100 foot central span the amount of stress relief required was much higher so the Freyssinet C-Range post-tensioning system was chosen. The 7C15 tendons comprise sheathed strand inside an HDPE duct with the annulus cement grouted prior to stressing. This system gives excellent corrosion protection, with the individual strands fully re-stressable or replaceable.

The contract is an interesting and cost effective application of Freyssinet designed post-tensioning technology to rehabilitate an old and complex structure in an inaccessible location.



- 1 The viaduct is in a beautiful and isolated part of Scotland
- 2 HT bars meet at a triangular bracket at mid-span position

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