



Simon Rudman

Technical Services Design Manager for Northumberland County Council

Simon has been involved in the repair, design and construction of bridges and other structures for over 35 years. His career began with G Maunsell & Partners with involvement in the extensive repairs to the M6 elevated interchange otherwise known as “Spaghetti Junction” before coming involved in the repair and refurbishment of a number of other significant bridges including historic cast iron structures alongside more modern structures such as the A19 Tees Viaduct. Simon’s experience wasn’t limited to the UK; he was responsible for the design of the Burj Al Arab bridge in Dubai and a member

of the site team for the design and construction of the Kap Shui Mun Bridge in Hong Kong, the world’s longest combined road and rail cable-stayed bridge.

On his return to the UK Simon relocated to Northumberland and began working on the repair and refurbishment of many of the County’s historic structures as well as being responsible for the design of modern replacements such as the iconic Lesbury Bridge. The commencement of the refurbishment of the Union Chain Bridge marks the culmination of over 15 years of effort in securing the future of this unique structure.

4. Union Bridge Restoration and Progress to date

Simon Rudman



Simon Rudman (right) with (left) Cllr Glen Sanderson of Northumberland County Council on the occasion of a visit to the Bridge by HRH The Duke of Gloucester (centre) in September 2019.

The aims of the Restoration Project

- To conserve and raise awareness of the internationally significant Union Bridge and to celebrate its historical and engineering importance as a Grade 1/Grade A listed structure in England and Scotland respectively; the world's oldest suspension bridge still carrying vehicular traffic with the world's oldest standing road suspension bridge masonry pylon (on the Scottish side); the longest span suspension bridge in the world from 1820 to 1826; the first suspension bridge in Europe to carry wheeled traffic and the earliest remaining example of Capt Sir Samuel Brown's patented eye-bar wrought iron chains; an important local transport link and much-loved landmark; a part of the Sustrans National Cycle Network and of the industrial heritage of the Borderland.
- To provide impactful and sustainable STEM (scientific, technical, engineering and mathematics) opportunities for young people inspired by the innovative engineering of the Bridge.

Delayed Contract Start

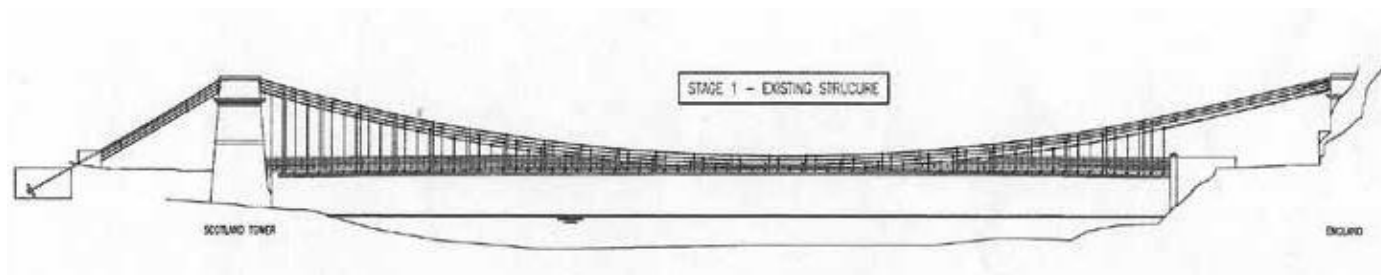
On the 1st July 2020, the Spencer Group of Hull, East Yorkshire, were awarded the £7.1m contract for the Bridge's refurbishment, with a start on site in mid-August and an expected completion date of November 2021. Spencer Group have an outstanding record in building, maintaining and refurbishing bridges. Recent repair and refurbishment contracts undertaken by the company have included the Forth Road, Kessock and Erskine Bridges in Scotland and the Humber Bridge in England. In 1999 C. Spencer Ltd. Hull, (The Spencer Group) restored Sir John Rennie's (son of John Rennie) historic Horkstow Suspension Bridge, erected in 1834-5 over the River Ancholme in Lincolnshire. At that time Prof Paxton was the chairman of the ICE Historic Bridge and Infrastructure Awards Panel who were sufficiently impressed by the project and its execution to award it a Commendation.

The 10-stage Restoration Process

It is anticipated that the restoration of the Bridge will follow a 10-stage sequence, involving its complete dismantling, repair and restoration off-site and reassembly. The final details of the construction methodology may be subject to change as the preferred contractor evaluates the most appropriate working methods. The onset of the Covid-19 pandemic required the postponement of the contract start date in February 2020 and the ongoing restrictions may necessitate a change to the contract programme.

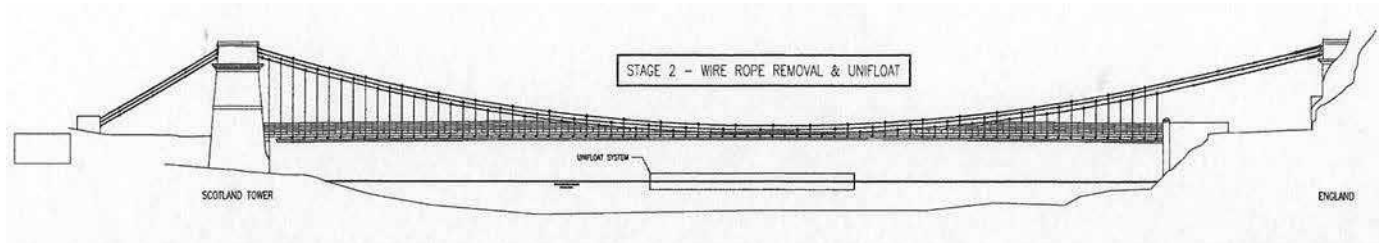
Stage 1 – Site establishment

Site compounds will be established on both sides of the river; vegetation and tree clearance has already been undertaken; and enabling works will be carried out.



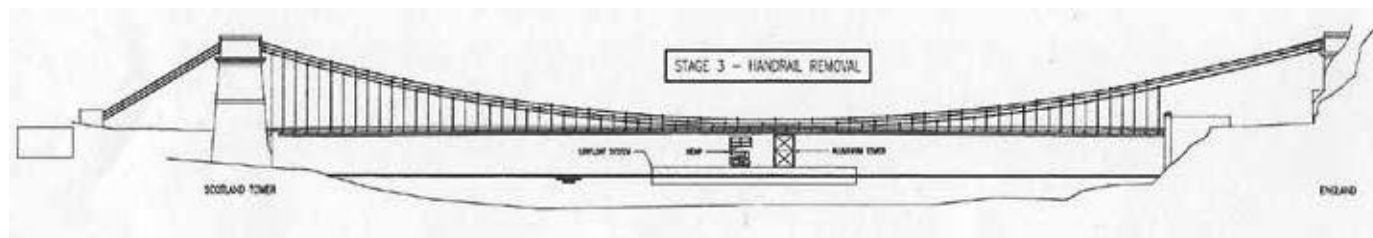
Stage 2- Removal of Wire Rope added in 1902/03

Winches will be connected to the Wire Rope. The selfweight of the chain will be taken and the rope will be cut, lowered on to the timber deck and cut into manageable pieces. An aerial platform system and sky hook will be installed.



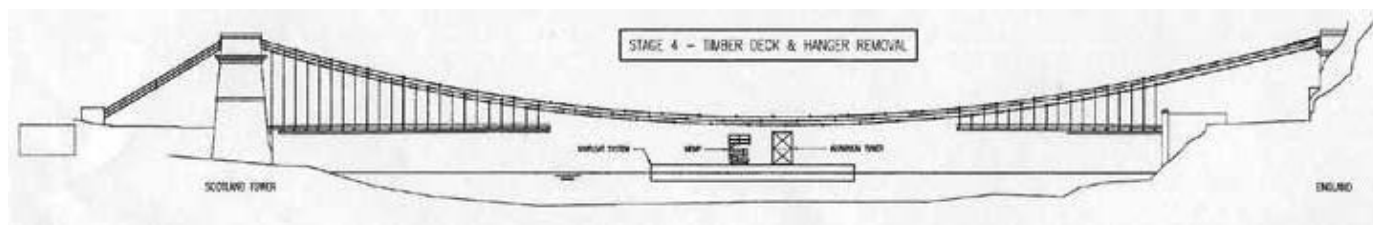
Stage 3 – Removal of Handrails

All elements of the handrails will be surveyed and recorded and tagged as they are removed. They will be blasted, cleaned, repaired and painted and held for reinstallation during the reconstruction stage.



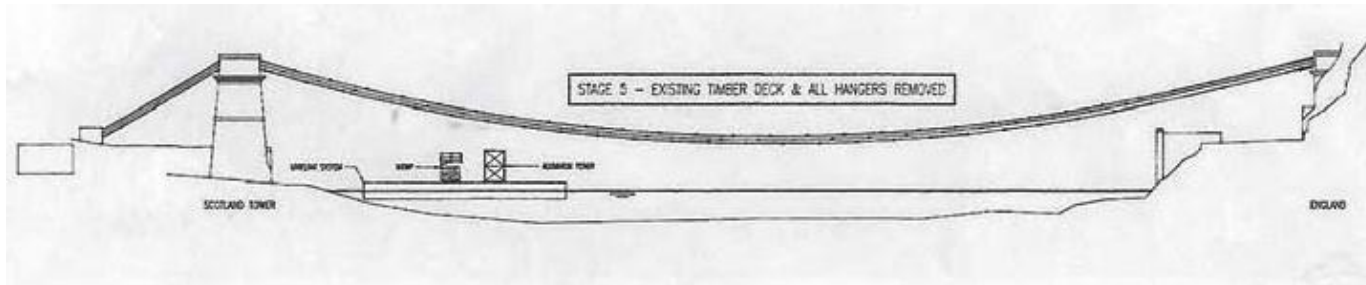
Stage 4 – Removal of Timber Deck and Hanger

The underside of the timber deck will be accessed by means of a suspended platform independent of the Bridge structure; after removal of fixings, the timber deck sections will themselves be removed to each side of the Bridge.



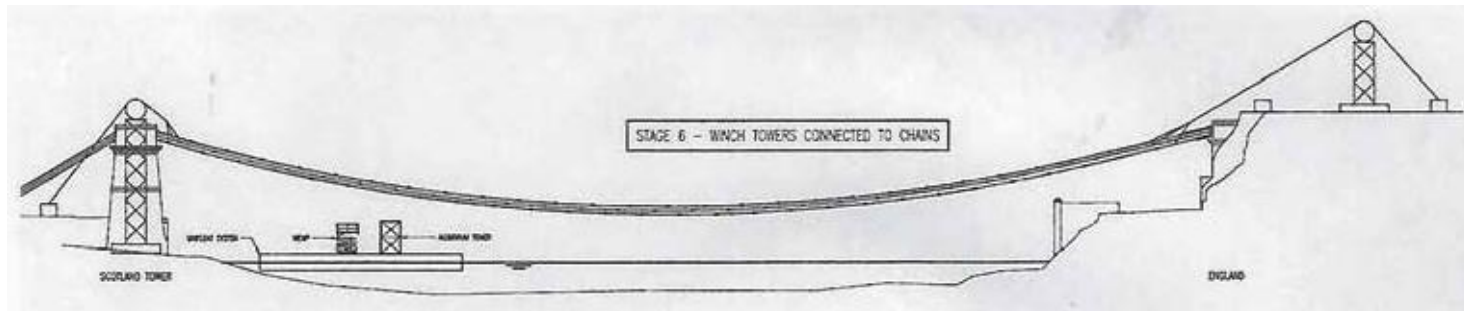
Stage 5 – Removal of Entire Deck

The entire deck is removed and only the chains remain.



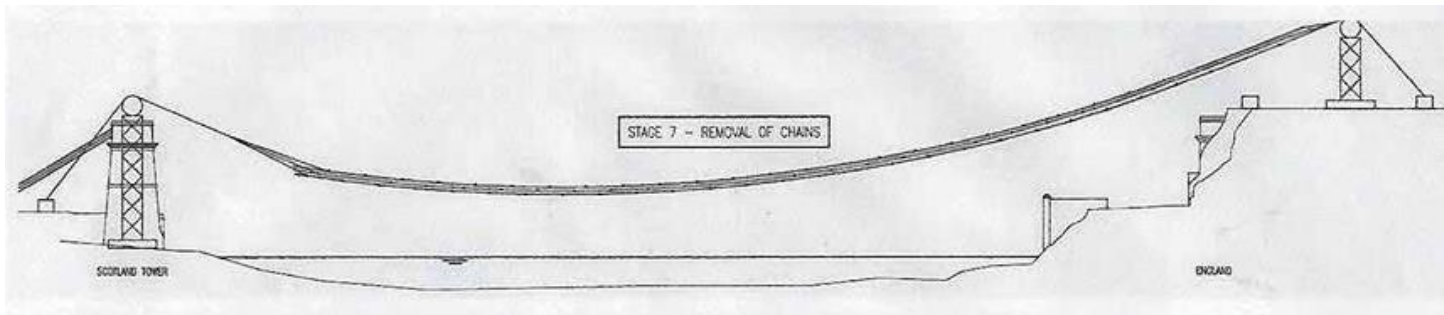
Stage 6 – Construction of Winch Towers

Following removal of the timber deck, the chain removal process starts. Winch towers are built near the English and Scottish towers, the chain is disconnected and winched towards the English bank. Every section is tagged and recorded as it is removed.



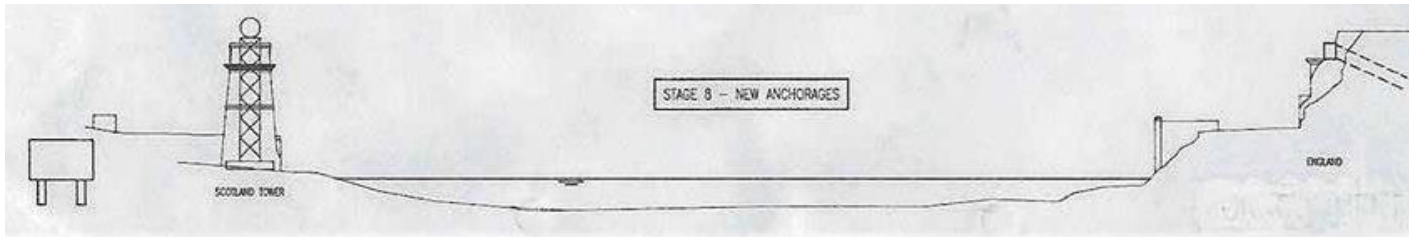
Stage 7 – Removal of Chains

The chains are incrementally winched across the river to the English bank. It is essential that stability is maintained throughout the operation.



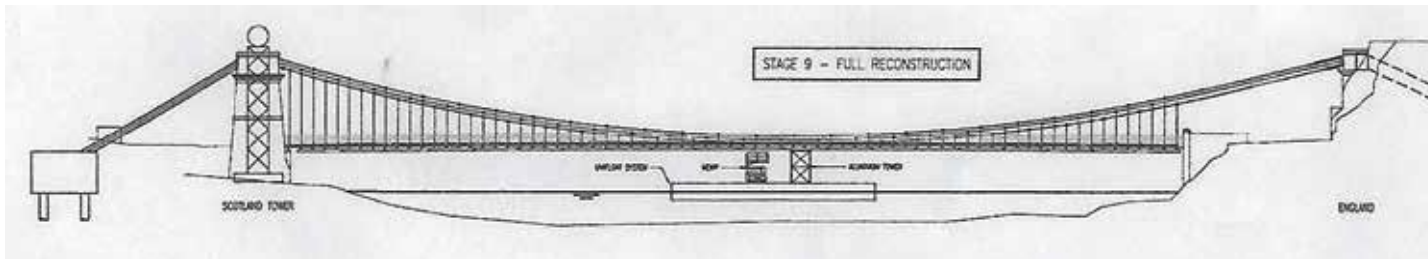
Stage 8 – Construction of New Anchorages

The English and Scottish abutments are excavated. Ground anchors are installed on the English abutment; pile caps and piles on the Scottish abutment. Tensile rods allowing re-tensioning and connection installed. Tower masonry restoration is completed.



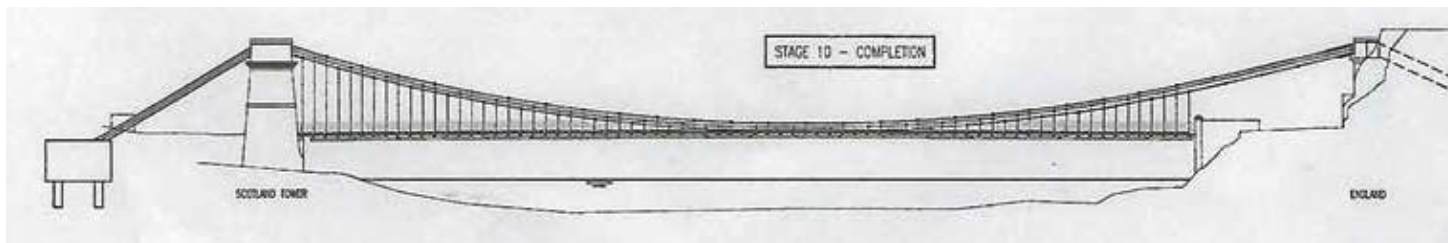
Stage 9 – A Full Reconstruction

Stages 8 to 2 reversed; the restored chains are winched back; the decking, hangers and railings are replaced.



Stage 10 – Completion of the Restoration Work

The structure is complete; with new anchorages, new section of handrail and new timber deck and hangers



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*Socially distanced celebration:
Members of the Project Board convened on the Union Bridge on 29th June 2020 to mark the award of the £7.1m contract for the refurbishment of the Union Bridge.
Left to right: Carol Whinnom, Museums Northumberland; Cllr Glen Sanderson, Northumberland County Council; Cllr Gordon Edgar, Scottish Borders Council,
Glen Smithson, Spencer Group; and Robert Hunter, The Friends of the Union Chain Bridge.*