



## Forth Bridge Restoration



### Project

Forth Bridge Restoration

### Client

Transport Scotland

### Location

Queensferry, Scotland, UK

### Start Date

2002

### End Date

2011

### Duration

120 months

### Contract Value

£140m

### Services Provided

Structures (bridges, tunnels and earthworks), programme management, risk-based maintenance

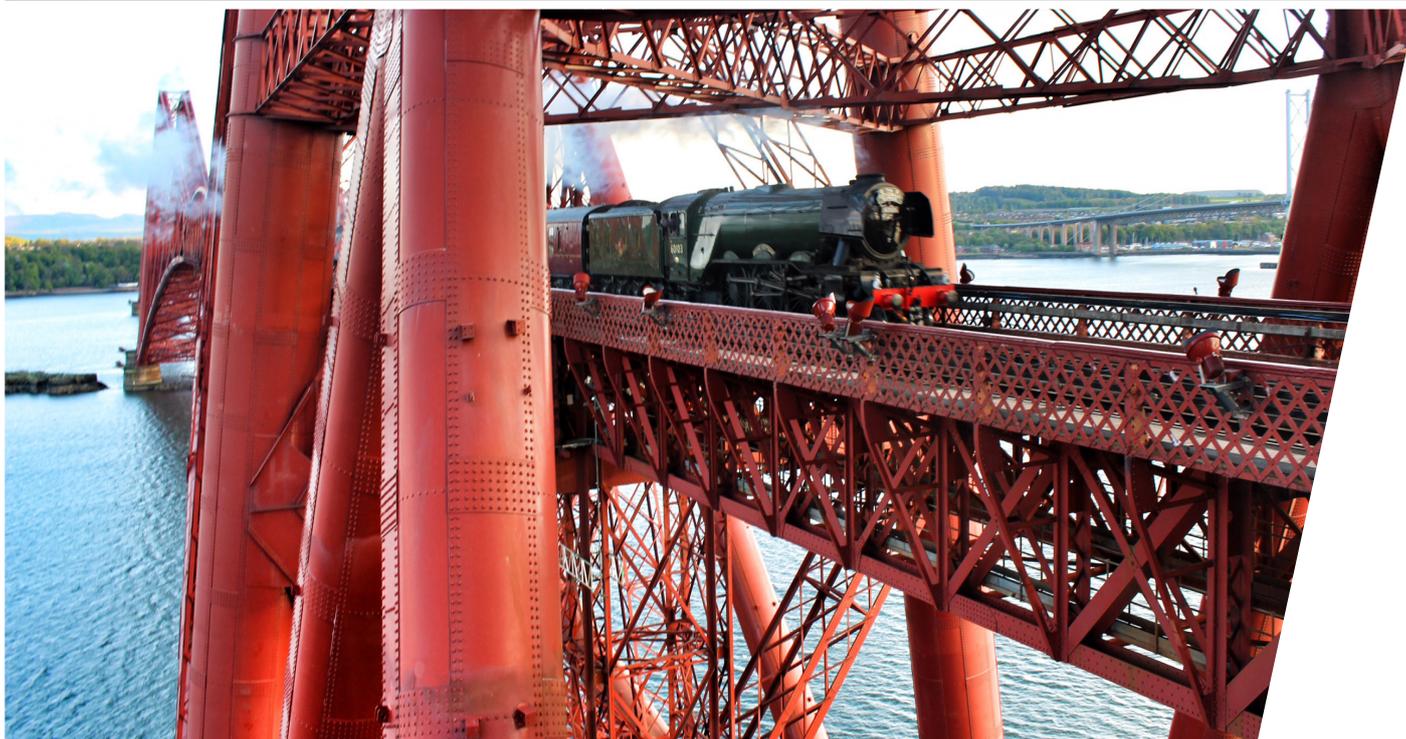
### Background

The Forth Bridge is a masterpiece of Victorian engineering, a Grade A listed world heritage site and one of Scotland's most recognisable landmarks. It carries the East Coast Mainline Railway north from Edinburgh over the Forth Estuary by way of a 2.5km long balanced cantilever structure between South and North Queensferry.

This unique structure has been in constant operation since opening on 4th March 1890 and has always required constant maintenance.

Painting was historically undertaken on a continuous basis, ceasing in 1974 with the publication of the Health and Safety at Work Act where 'historical practices' were outlawed. Subsequently, only maintenance on a smaller scale in easily accessed areas was completed, resulting in serious corrosion of the paint system in some areas, visible to the public by the early 1990s.

Network Rail carried out a full structural survey of the bridge; established the best coating system to apply to the structure to ensure long term value and embarked on a ten year partnership with Balfour Beatty to complete the restoration. Works commenced in 2002 and were completed in late 2011.



## Scope of Works

The £140m project was successfully delivered on time and within budget.

The constituent parts of this project were:

- ▶ in excess of 255,000m<sup>2</sup> of the steel structure has been grit blasted, to remove all remnants of the existing paint
  - ▶ 240,000 litres of paint applied
  - ▶ over 6.5million rivets painted by hand
  - ▶ all these activities were carried out at heights of up to 110m above the waters of the Forth Estuary
- ▶ at its peak, the workforce peak reached 400, with over 1,500 passing through site over the ten years
  - ▶ over 4.5million work-hours were required to complete the project.

All this has proceeded without impacting normal operations, with over 200 train services a day using the structure.

## Key Project Outputs

The main objectives of the project were to:

- ▶ to halt the corrosion of steelwork and maintain the integrity of the structure

- ▶ apply a coating system which would lessen the need for repeated applications and general maintenance.

Now the restoration is complete, the Forth Bridge is unlikely to need painting for up to 25 years – potentially even longer. Day-to-day maintenance and regular inspections will be undertaken by a small on-site crew.

This project had achieved a number of benefits, namely:

- ▶ major gains in asset reliability, availability and life
- ▶ lower whole-life maintenance costs
- ▶ safer and less intensive maintenance.