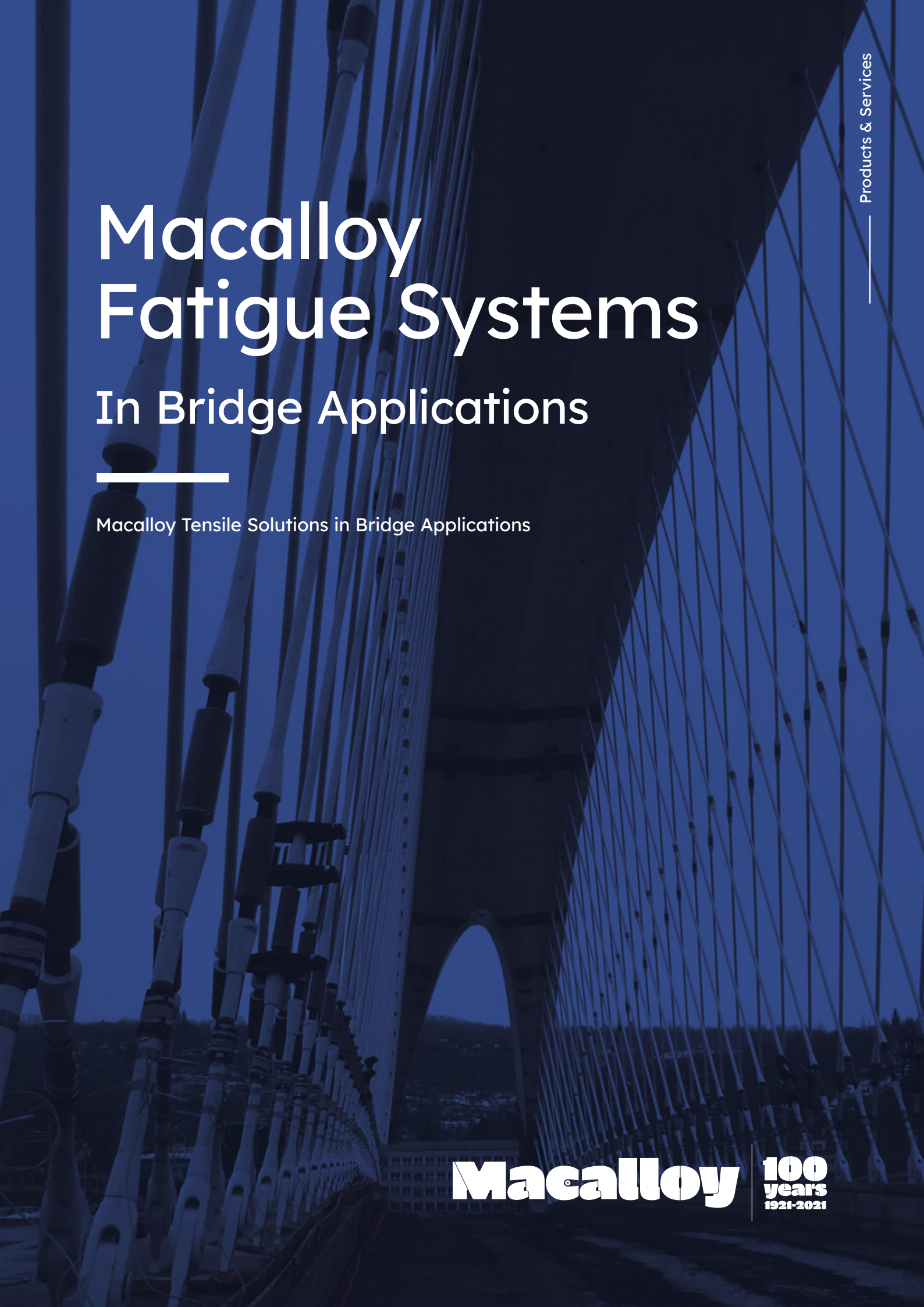

Products & Services

Macalloy Fatigue Systems

In Bridge Applications

Macalloy Tensile Solutions in Bridge Applications

Macalloy 100 years 1921-2021

Over the years Macalloy Tensile Solutions have been at the forefront of architectural design and in particular the design of modern (supported/stay/bowstring) bridges.

Macalloy has continually supported engineers in providing custom solutions to suit static, quasi static or fatigue loaded bridges.

In circumstances where fatigue requirements are essential, Macalloy provides a comprehensive selection of *New Fatigue Tension Bar systems that are specifically designed to endure the demanding cyclic loading typical of such bridge structures.

Macalloy Tensile Products can deal with the demanding work life of the new generation of multi-purpose bridges, applications vary from lightweight footbridges to multi-purpose tram and multi-lane road bridges.

Macalloy is committed to buying 'green steel' in order to help our environment and reduce carbon emissions, our manufacturing process is based on recycled steel scrap and a Nordic fossil-free electricity mix. As a result, the carbon footprint of our steel bar is a full 80 percent lower than the global average.

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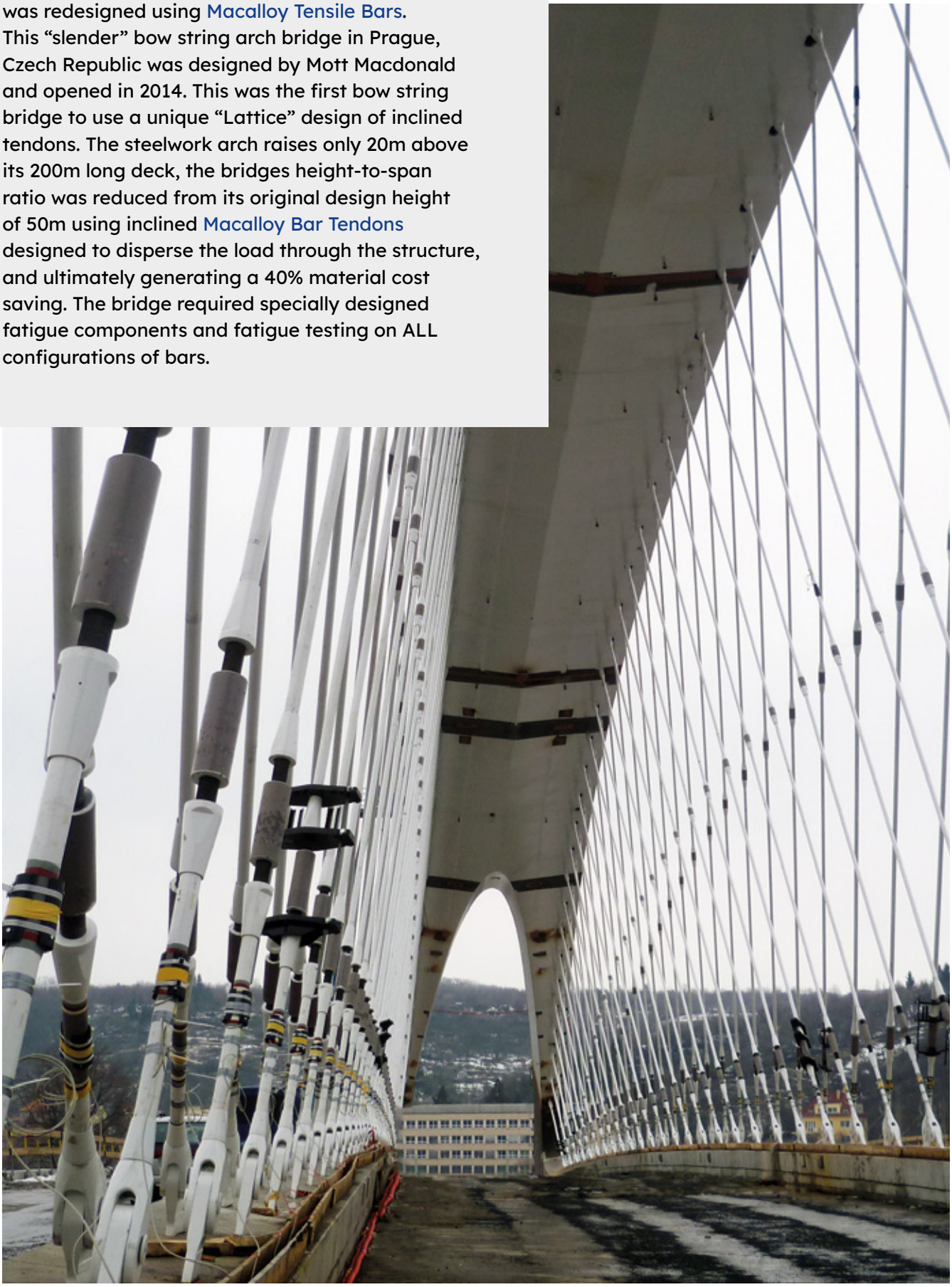
New Macalloy Fatigue Systems in Bridge Applications:

- Fatigue plays a crucial role in the design of bridges that experience cyclic loading. To tackle these challenges, Macalloy provide specialised fatigue tension bar systems with fatigue-resistant rolled threads in diameters of up to 140mm, which have been designed and tested in compliance with BS EN 1993-1-9 EUROCODE 3.
- The Macalloy Fatigue Systems are offered in three different grades of tension bar – 460N/mm², 520N/mm², and 550N/mm², and all feature an innovative Macalloy Fatigue Fork designed using a lost foam technique, which enhances surface finish and ensures Level 1 integrity in the most crucial areas. These fatigue tension bar systems have been tested, and approved, to the following Detail Categories.
- Detail Category 84 The systems rated at 460N/mm², 520N/mm² and 550N/mm² have undergone successful testing, demonstrating their capability to withstand a stress range of 105N/mm² for over 2 million cycles, with a peak load of 45% of their ultimate tensile strength.
- Detail Category 105 The 460N/mm² and 520N/mm² systems have undergone successful testing at a stress range of 131.25N/mm² for over 2 million cycles, achieving a maximum load of 45% of their ultimate tensile strength. The Macalloy Detail Category 105 tension bar systems are in accordance with the testing parameters for pre-stressing tension bars as per EN 1993-1-11.

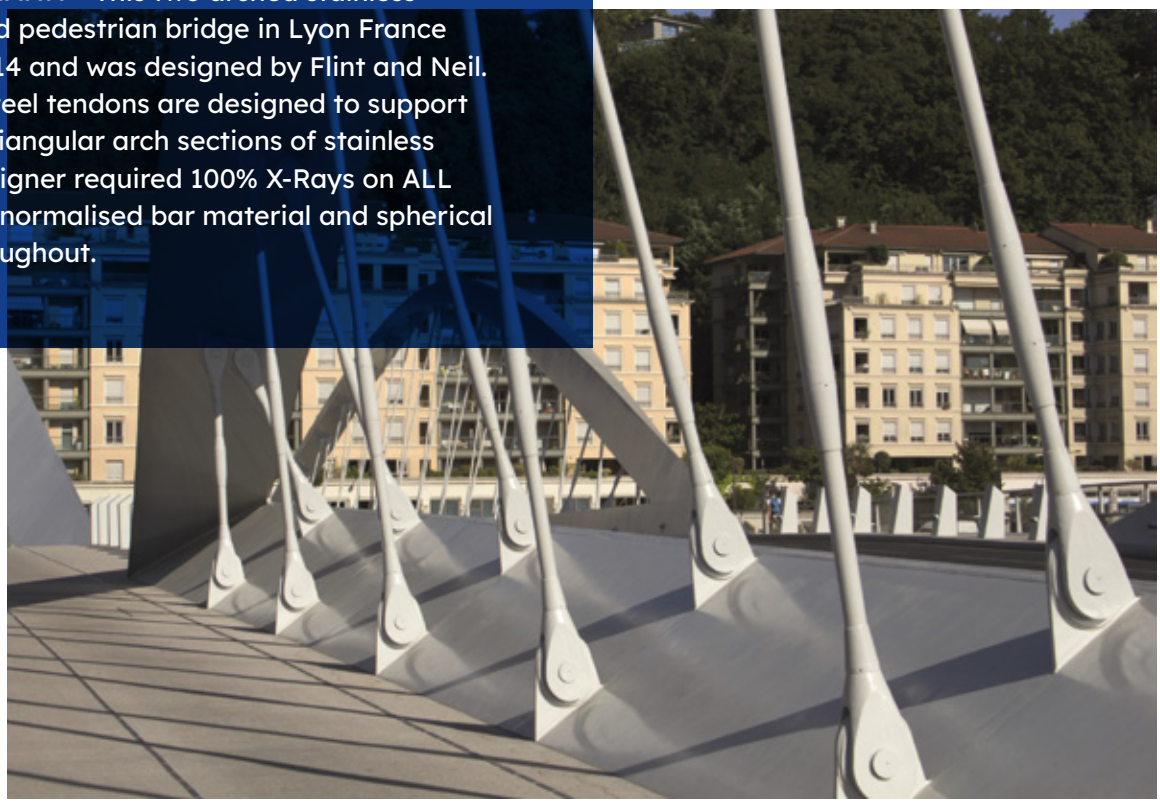
Benefits of the Macalloy Tensile Solutions in Bridge Applications:

- Macalloy have developed a “trademark” architectural aesthetic carbon and stainless fork connector.
- Due to the ease of installation of the Macalloy Tensile Bar system and the avoidance of any pre-stretching requirements, Macalloy Tie Rods provide an extremely cost-effective solution compared to cable alternatives, especially in arch bridges and lightweight stayed bridges. Similarly Tensile Bars offer a more rigid solution than cable ensuring reduced deformation of the bridge deck and ease of installation.
- The Macalloy Technotensioner solution for “in line” tensioning pretensions loads in TENSILE BARS as well as load monitoring post installation. Macalloy has an extensive fleet of jacking equipment designed to meet most requirements and can design bespoke equipment for specialist applications.
- Macalloy Site Services team can offer stressing support, training, advice and supervision.
- Macalloy can also offer alternative load monitoring devices such as strain gauges and “Harmonics” to monitor the loads post installation.
- Macalloy has designed a range of spherical bearing products which eliminate “bending” moments and the risk of misalignment of tendons. Macalloy’s spherical bearing solutions can accommodate misalignments of up to 5.9 degrees.
- Corrosion protection is available on Macalloy Tie Rods. Macalloy can offer protection through a variety of different coatings for various environments from Hot dipped galvanising through to C2/C5 paint, powder coating and stainless steel in a range of finishes.

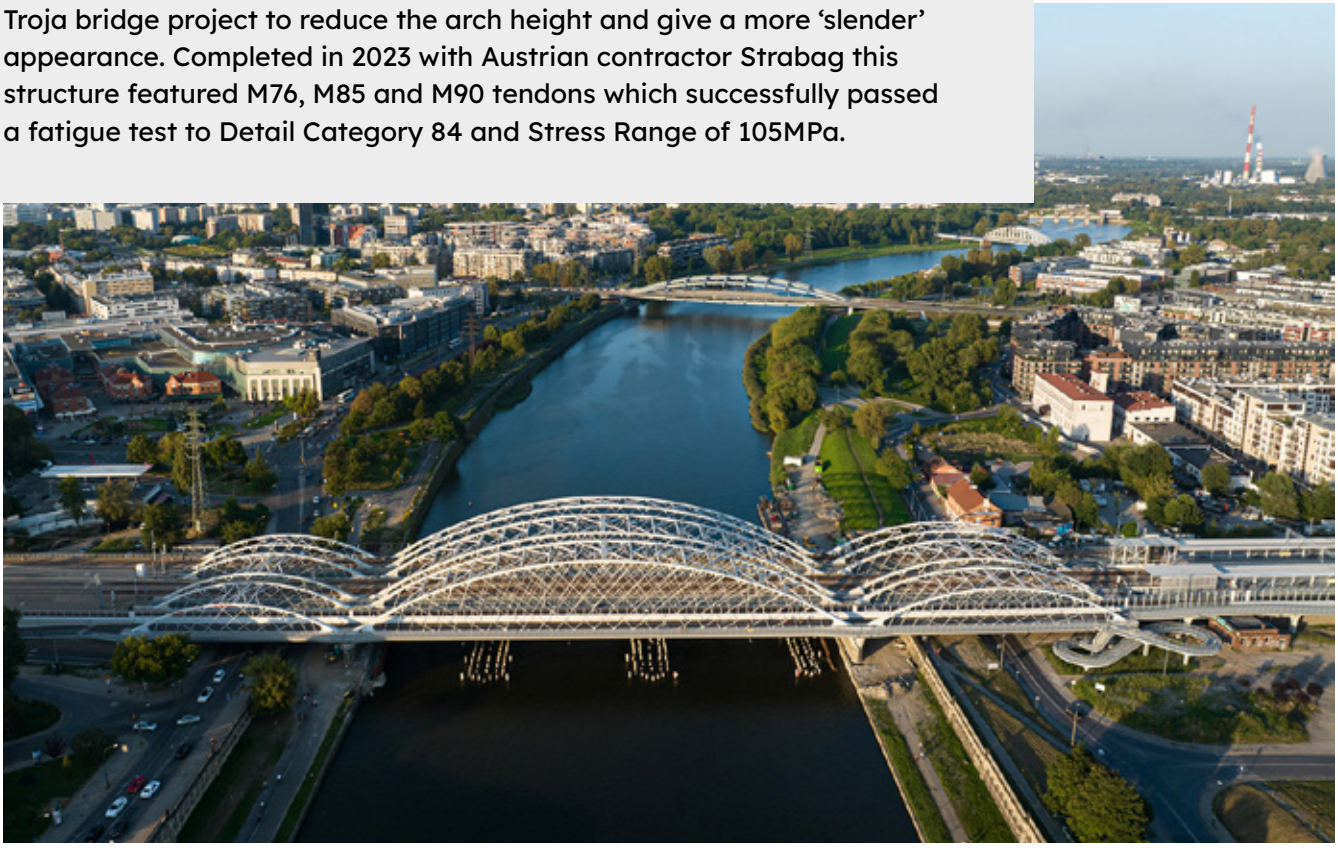
TROJA BRIDGE. Originally a cable stay bridge was redesigned using Macalloy Tensile Bars. This “slender” bow string arch bridge in Prague, Czech Republic was designed by Mott Macdonald and opened in 2014. This was the first bow string bridge to use a unique “Lattice” design of inclined tendons. The steelwork arch raises only 20m above its 200m long deck, the bridges height-to-span ratio was reduced from its original design height of 50m using inclined Macalloy Bar Tendons designed to disperse the load through the structure, and ultimately generating a 40% material cost saving. The bridge required specially designed fatigue components and fatigue testing on ALL configurations of bars.



PONT SCHUMANN – This two arched stainless steel road and pedestrian bridge in Lyon France opened in 2014 and was designed by Flint and Neil. The carbon steel tendons are designed to support the feature triangular arch sections of stainless steel. The designer required 100% X-Rays on ALL components, normalised bar material and spherical bearings throughout.



KRAKOW BRIDGE – The new railway, pedestrian and bicycle pathway bridge over the Vistula River in Krakow in Poland. Comprising of 9 arches the bridge utilises the unique ‘lattice’ design first introduced in the Troja bridge project to reduce the arch height and give a more ‘slender’ appearance. Completed in 2023 with Austrian contractor Strabag this structure featured M76, M85 and M90 tendons which successfully passed a fatigue test to Detail Category 84 and Stress Range of 105MPa.



GOLDEN JUBILEE BRIDGES – this award winning BAR STAY bridge probably the most iconic bridge over the Thames was designed by Lifshultz Davidson and Sandilands and engineers WSP and completed in 2002 and renamed to commemorate the Queens 50th golden jubilee. This bridge consists of two pedestrian walkways suspended by Macalloy Bar tendons either side of the railway bridge. The two bridge decks are anchored to the various bridge abutments requiring a large number of engineered bespoke components including trunnion joints incorporating spherical seating to allow for a single design for different tendon inclinations.

ETA DANMARK

ETA - 21/0053 Tension Rod Systems
BSEN ISO 9001: 2015

MADE IN SHEFFIELD

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