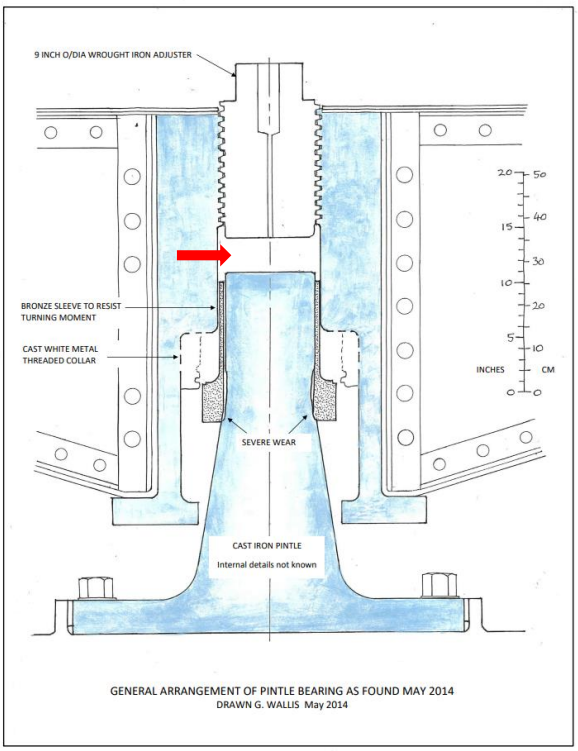
BRUNEL's OTHER BRIDGE NEWS

January 2025

BRUNEL GOT IT RIGHT ! ….. WELL, MOSTLY



GENERAL ARRANGEMENT OF PINTLE BEARING AS FOUND MAY 2014
DRAWN G. WALLIS May 2014

Brunel intended that a large part of the weight of the rotating deck should be carried by a central bronze pad sitting on a pointed casting called a 'pintle'. This literally means 'little pin' although it is, in fact, a heavy casting nearly a metre high.

A large adjuster was screwed down onto the pintle, but when we investigated the bearing we found that its bronze thrust-pad is missing. The space is arrowed on the sketch.

This essential part is shown on the original drawings, so what happened to it?

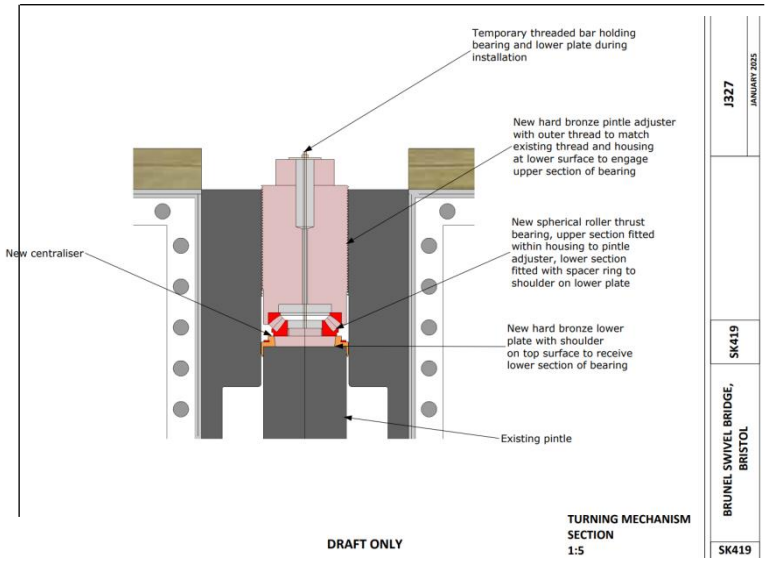
We think the story started early in the life of the Bridge. The adjuster is a giant close-fitting threaded bolt which we have tried hard to remove with a giant spanner pulled round by chain-hoists as shown below.

The left photo shows the late Maggie Shapland wrestling with our heavy spanner.

Despite repeated pulling, heating and hammering the adjuster resolutely refused to move, and we believe it siezed soon after originally installed. Thus, when the Bridge was relocated to its present position in 1873, it would be natural to leave out the pad, relying instead on the four turntable wheels to carry the load.

Recent structural analysis by specialist consultants Eaton Dynamics has shown that support by the pintle, as well as the four wheels, is essential to the structural performance of the Bridge. Reassuringly, they also demonstrated that Brunel's design for the side-girders is still quite capable of carrying pedestrian loads after 175 years, even in its rusted condition.

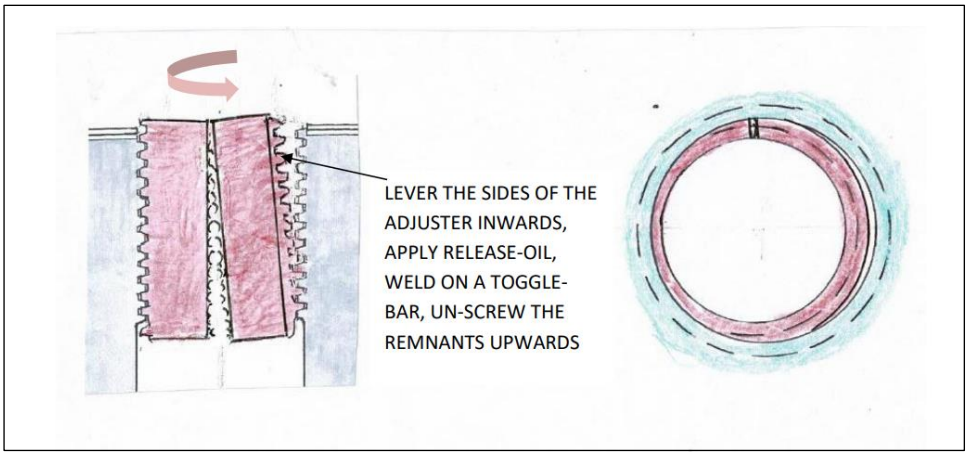
So, Brunel's Swivel Bridge structural designs were spot on, but his design for the central pintle-adjuster was less successful.



It will be vital to renew the central thrust bearing, using a modern roller-bearing, as illustrated by our volunteer Bob Watkins in red on his drawing, see left.

This will greatly reduce the torque required to rotate the deck, and may make it feasible to reinstate a (modern) drive from the original location on a walkway hung alongside the southern side beam. The original hand-cranking is not being considered as an option!

Mechanical engineering volunteer Geoff Wallis has devised a way of removing the siezed central adjuster, although doing so will not be easy. See below for an extract from the six-stage procedure. The old adjuster will be displayed near the Bridge for visitors to admire.



STRUCTURAL ENGINEERING CONSULTANCY

In November 2023 structural engineers Mann Williams of Bath were appointed to design the repairs to the wrought iron deck. Their first-draft report was circulated to the Design Review Team just over a year later, around Christmas 2024. The Review Team comprises representatives from Historic England, Bristol City Council, The Swivel Bridge Group and the consultants.

When eventually complete, the draft report should prove that the structure will be capable of serving as a Swivel Bridge for pedestrians and dismounted cyclists, setting out in detail what repairs are needed. At present further work is awaited to complete the contract Brief, which was developed by ourselves in conjunction with Historic England's Structural Engineer.

Mann Williams have employed sub-consultants Cass Hayward of Chepstow who have identified nearly 400 localised defects and specified repairs of 19 different types. Inevitably the design of repairs is a compromise between reversibility, durability, appearance and cost. Cass Hayward have adopted a bolted-plate approach, although in many places this results in a sandwich with five layers plates which would be costly and risks trapping water in the long term. At the outset of the project we suggested a welded solution (with new rivets where necessary) and provided video evidence of this being undertaken on another Listed structure.

A number of other technical matters await resolution, so watch this space!

MASTER-PLANNING

Thank you to our supporters who provided feed-back to Bristol City's Master-planning consultants Lifschutz Davidson Sandilands. Several of our volunteers contributed to the consultation. At the end of last year LDS kindly met with our representative and were receptive to our ideas for regeneration of the Tongue. The review period is now finished, and a draft report is due to be published within a few weeks, followed by further consultation on the plans.

2025 VOLUNTEER WORKDAYS

Our workdays on site take place on the third Saturday of each month, although this does sometimes change. Please check the website.

This year we plan to meet at 9.30am on:

February	15th	March	15th	April	12th
May	17th	June	21st	July	19th
August	16th	September	20th	October	18th

Risk assessments and method statements have been submitted to the Principal Dock Engineer, and will be available on site for everyone to read.

Please report to one of the Work-Day supervisors on arrival and we'll introduce you to our safe methods of working. The entrance to the site is off Brunel Lock Road just under the south abutment of the Plimsoll Bridge. Cross Brunel Lock via the Replica Bridge. Parking on site is very limited, but reasonablt-priced parking is available in Brunel Lock Road.

SKILLS & HELP NEEDED PLEASE

Can you help us with these tasks? If so please email Geoff on jandgwallis@gmail.com

- People to engage passing visitors in conversation and explain the area's history
- Painters for the Swivel Bridge and for over-painting graffiti generally.
- Gardeners to control weeds and shrubs growing near and in masonry.
- Maker of 6 inch long forged steel spikes (nails) to secure timber strakes to the capstan.
- A woodworker to shape simple oak strakes and fit them to the Brunel Lock capstan.
- A carpenter to make a glazed notice-board for community and work-day notices.
- Help to heat and jack the twisted gland on one hydraulic-jigger to realign it with its ram.
- …and your particular skills! Come along and help, however you are able.

A BIG THANK YOU TO OUR VOLUNTEERS FOR YOUR ONGOING SUPPORT

PLEASE NOTE: There is a report of each workday on www.brunelsotherbridge.org.uk and on Facebook. Do check it out, share, comment & support us on social media.

www.brunelsotherbridge.org.uk
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