

TECHNICAL STATEMENT

Swing Bridge Rebalancing Methodology:

Offset Bearing Timber Swing Bridge

1. Purpose

This document outlines the practical method used to rebalance the restored timber swing bridge following removal and replacement of structural components and ballast.

Due to the bridge rotating on an offset bearing, correct counterbalancing is essential to ensure smooth operation and to avoid unnecessary loading on the pivot bearing and structure.

2. Background

During restoration works, the following changes were made:

- Removal of approximately **9.5 tonnes of existing ballast**
- Removal of deteriorated timber, steel plates, and handrails (estimated **12.5 tonnes**)
- Installation of new timber and handrails (estimated **10 tonnes**)

As many of these values are estimates, and because timber weight varies with moisture content and seasonal drying, precise theoretical balance calculations would not provide reliable accuracy.

For this reason, a controlled practical balancing method was adopted.

3. Baseline Reference Position

Before removing ballast, the bridge was:

- Raised and securely blocked
- Recorded in its previously balanced position

This provided a known historical balance reference point which could be returned to during reinstallation of ballast.

4. Adjustable Ballast System

To allow accurate balancing:

- Ballast chamber: new construction to allow removable access.
- Additional framing was installed to allow:
 - Incremental addition or removal of ballast
 - Fine adjustment at both ends of the bridge
 - Future seasonal adjustments if required

This ensures the bridge can be precisely tuned rather than relying on fixed calculated weights.

5. Rebalancing Procedure

The rebalancing process is being carried out as follows:

1. Install an initial estimated ballast weight.
2. Gradually remove temporary supports.
3. Observe the bridge behaviour:
 - Tendency to rotate in either direction
 - Bearing loading behaviour
 - Manual effort required to swing
4. Add or remove ballast in controlled increments.
5. Repeat adjustments until the bridge:
 - Remains stable without self-rotation
 - Swings freely with minimal effort
 - Shows no uplift at either end
 - Sits evenly on the bearing

Fine adjustments are made using smaller ballast increments to achieve neutral balance.

6. Timber Weight Considerations

As the new timber naturally dries and seasons:

- Some reduction in weight is expected over time.
- Minor seasonal variation may occur.

For this reason, the ballast system has been designed to remain adjustable, allowing future fine tuning if required.

7. Ongoing Monitoring

It is recommended that balance be checked:

- After the first summer drying period
- At 6–12 months following completion
- Periodically thereafter as part of routine maintenance

Any adjustments required can be made via the accessible ballast system.

8. Conclusion

Due to variable material weights and the offset pivot configuration, a controlled staged balancing process has been adopted in place of fixed theoretical calculations.

This method:

- Reflects actual installed conditions
- Protects the pivot bearing from unnecessary stress
- Allows for seasonal timber movement
- Provides long-term adjustability

The bridge will be set to neutral operational balance under dead load conditions and can be fine tuned in the future if required.