Recording of a lift gate adjacent to Bridge 106, Gilwern, Monmouth and Brecon Canal

Description

General

The lift gate lay in the western forebay of a bridge hole (Bridge 106 - Ffynnon-Eirin Bridge; Fig 1) on the side of the valley of the river Usk. In the eastern forebay was a swing gate, pivoted on the offside of the canal (Fig 4).

The timbers

The lift gate originally comprised a rectangular timber frame (Figs 2 and 5). Of the frame timbers, only the timber forming the pivot at the base of the gate could be satisfactorily measured. This was 0.25 to 0.3m square. It is thought that, in order to obtain a satisfactory joint with this timber, the side timbers must have been of comparable scantling. The top frame timber was missing. The planks were set into a channel cut in the length of the basal timber and it is clear from the remains of a joint (Fig 7) that they were set into a comparable channel in the top timber also. The planks were about 25mm thick and varied in width but, on the whole, were about 0.3m wide. The planks were caulked with a fibrous substance thought to be horsehair.

The species of timber used in the construction of the gate is unknown but, typically, the frame would have been of oak and the planking of elm.

A rectangular timber immediately to the west of the lift gate timbers and abutting the concrete apron under the bridge is a later addition relating to the insertion of a stop plank arrangement.

The ironwork

Two hinges were positioned near either end of the basal timber. A small recess had been cut in the timber cill against which the gate would have closed to accommodate the hinges (Figs 2 and 6). Each hinge was secured with two bolts, or possibly screws, with square heads. A metal strap, approximately 0.3m long, was placed over the join between the side timber and the top timber (Figs 2 and 7).

The apron

Little of this was visible but it is believed that this was formed of stone and was flat. It may have sloped down towards the basal timber.

Current condition of gate

The gate has lost one of its side and one of its longitudinal frame timbers (the upper timber) and is therefore in a fragile condition with its planks being secured only in a single slot in the basal timber. Its apron appears to have subsided in a couple of places, allowing the timbers to collapse into the hollows thus formed.

Interpretation

Comparative assessment

A lift gate was recorded at Winsley Hill on the Kennet and Avon Canal (K&A) in 2000 by the author (Coxah and Gardner 2000; Fig 3). The recorded gate formed one of a back-to-back pair and lay within its own narrows. It seems that the idea was that a breach on either side of the gate would result in the gate on the upstream side rising and preventing too great a loss of water. A cast iron pulley box was provided on the towpath side. This could have enabled the emergency gates to be used for planned maintenance also: either of the gates could be raised by hitching a horse, with a chain and/or rope, through the pulley box to the gate, and pulling it up. This process would have been made easier for the horse by opening a paddle built into the gate, which would have been closed before de-watering the downstream section of the canal. To subsequently re-water the de-watered section, the paddle would again have been raised until the water level had equalised on both sides of the gate. The gate could then be lowered and the re-watering completed.

The gate at Gilwern was similar in many respects to the example on the Kennet and Avon Canal (Fig 3). There were, however, a number of significant differences. The example on the K&A had a longitudinal mid brace, terminating adjacent to a paddle mechanism. Then example at Gilwern had neither. On the K&A the boards were secured to the face of the frame timbers; at Gilwern they were set into a longitudinal channel cut in the top and bottom timbers. On the K&A the gate lay on stone bearing blocks, themselves set onto a concave brick apron. This would have facilitated the automatic lifting of the gate when water flowed over it at a sufficient

velocity, so long as the space under the gate was kept free of silt. At Gilwern the gate appears to have lain on a flat stone apron which may have sloped down to the basal timber. It may have been thought that this slope was sufficient to facilitate the lifting of the gate as it would have been, effectively, already part way up. Another possibility is that it was thought that this design eliminated the need to keep an under-gate space clear of silt, thus reducing maintenance costs.

On the K&A the recorded gate was one of a pair, positioned back to back, in its own narrows. At Gilwern there may have been a companion lift gate in the position now occupied by a much more common swing gate (Fig 4). There is no evidence one way or the other. The Gilwern gate also occupies the fore bay of a bridge hole, rather than having its own narrows. It is unknown if the Gilwern gate had a pulley box similar to the example on the K&A although such pulleys are known elsewhere on the Monmouth and Brecon Canal.

A visit was paid to the Waterways Trust archive at Gloucester for any documentary evidence relating to lift gates on the Monmouth and Brecon Canal. No direct mention was found of lift gates. Stop gates were referred to (BW 92/8) but it is believed that these references relate to vertically hinged swing gates such as the one seen adjacent to the lift gate recorded by this project (Fig 4). The lack of references implies that lift gates were an early, presumably original feature. The last time that the lift gate was seen was probably subsequent to an engineering survey carried out in 1963 (BW 133/054 Comprehensive Engineering Survey Report; Flyndneron (*sic*) Bridge 106). This identified that the wing walls of the bridge hole needed rebuilding. This work was probably undertaken and resulted in a quantity of concrete being placed beneath and in front of the wing walls. This may be seen overlying one of the side timbers (Figs 2 and 5).

Commentary

The Kennett and Avon Canal was built between 1794 and 1810 and the Brecon and Abergavenny Canal (later to become part of the Monmouth and Brecon Canal) between 1793 and 1812. They are therefore precisely contemporary. With only two known recorded lift gates, one from each canal, it is impossible to draw any conclusions regarding development of flood or water control technology from the two available examples. It may be that this design of gate was employed in situations where the engineers had had difficulty with the stability of their earthworks and were taking precautions against a catastrophic failure. It may be significant that the current breach on the Monmouth and Brecon Canal occurred a short distance below the lift gate in a situation which, had the gate been operational, it would have been in a position to ameliorate. Reasons for gates of this design falling out of favour are not difficult to find. Once *in situ*, they would have been impossible to inspect or maintain without first draining the canal. Their effectiveness is also unknown although the simple fact that they were used on at least two different canals by different engineers suggests that they were not without their virtues.

Significance

Given their situation in the base of the canal, and in the case of the Monmouth and Brecon, clearly associated with an original feature (Bridge 106) it is highly likely, although, as yet, not possible to prove conclusively, that these gates are contemporary with the construction of the canals. Their original rarity is difficult to assess, although it is likely that they were never common. However, it seems fairly certain that few now survive. When they were built it is likely that they were experimental and untried technology, even by the standards of late 18th century canal construction. They may be considered to be the forerunners of late 20th century protective barriers such as the Thames Barrage.

Recommendations

There is a presumption against removal of archaeological deposits or historic fabric. This has to be weighed against the following circumstances:

- that its value *in situ* is greater than its value as an historical artefact, separated from its context
- that, if retained *in situ*, the deposits or fabric will have a better chance of survival than if they were removed
- that if retained *in situ* they will survive in a form that will enable them to be investigated or better preserved at some future date

- better techniques or resources for their investigation and/or preservation will be available at some future date

- is the (usually greater) cost of retaining the deposits or fabric reasonable compared with the costs of removing and (usually) conserving them?

It is generally always the case than historical artefacts are more meaningful if kept in their context than if they are removed. This applies in the case of the lift gate. In this case, the fabric of the gate is more akin to archaeological deposits than a structure in so far as it will be buried and will not be on display.

Preservation *in situ* is the only realistic way that the lift gate can be preserved. It is possible to preserve water-logged timbers once they have been removed from their original environment but it is a time-consuming and very expensive process. Therefore, preservation *in situ* provides the best chance for the physical survival of the lift gate.

The surviving timbers are robust and, in their current position, are unlikely to be subject to significant erosion by passing boats, particularly if they are covered. Such covering must be capable of recreating the *status quo ante*, (presumably wet and anaerobic conditions), that contributed to their preservation in the first place.

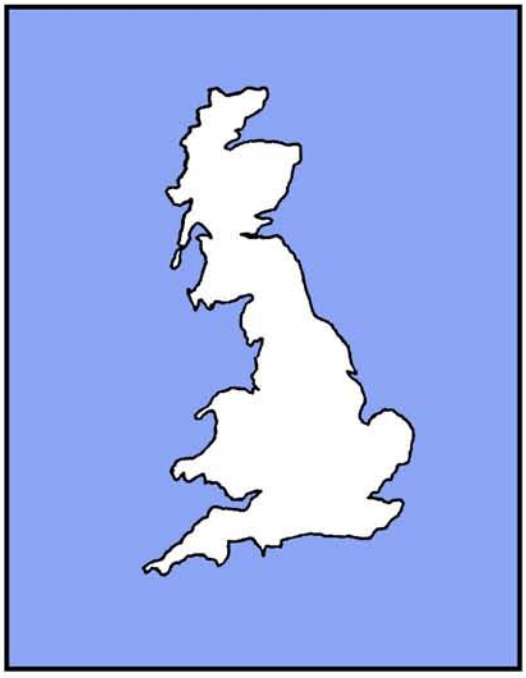
Again, it is nearly always the case that techniques and methods improve over time. It may also be the case that future financial circumstances will be better than currently pertain.

The removal of the gate would be relatively inexpensive. However, at the present time the focus of the repair project is to return the Monmouth and Brecon Canal to navigation at the earliest opportunity for the minimum cost. This situation is unlikely to be compatible with the careful removal and conservation of the timbers of the lift gate.

On balance it is believed that, so long as the cost of modifying the various construction details in the vicinity of the lift gate is modest, preservation *in situ* is the best solution. If funds can be found it is recommended that an interpretation panel featuring a reconstruction of the gate should be mounted in the vicinity of the site. An illustrator, who in the author's experience has unrivalled experience in the preparation of such panels, including the supply of suitable lecterns on which to mount them, is given in Appendix 1.

Bibliography

Coxah, M, and Gardner, L, 2000 *Report on the archaeological survey and watching brief on the Kennet and Avon Canal, Bath Valley section relining project*



Ordnance Survey map
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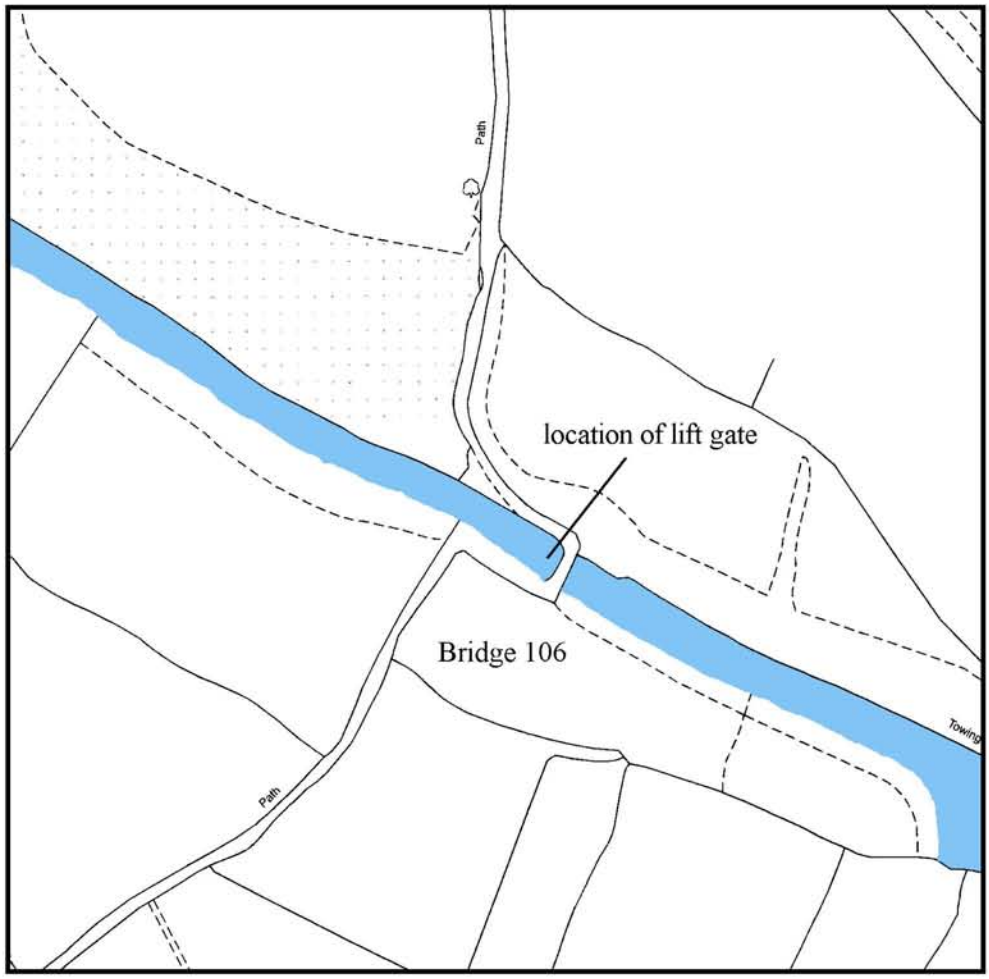

Fig 1: Location of site

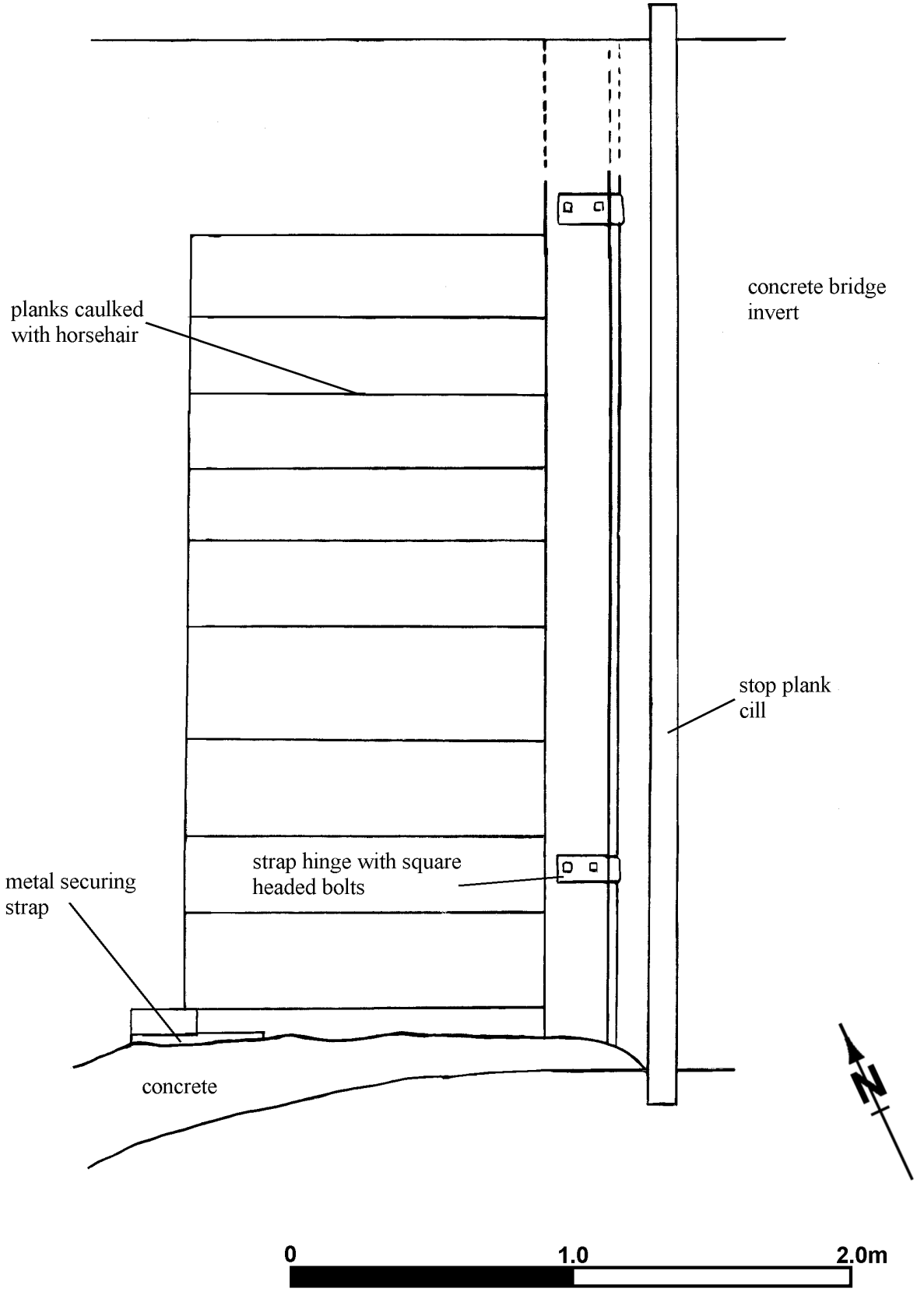

Fig 2: Plan of lift gate at Gilwern

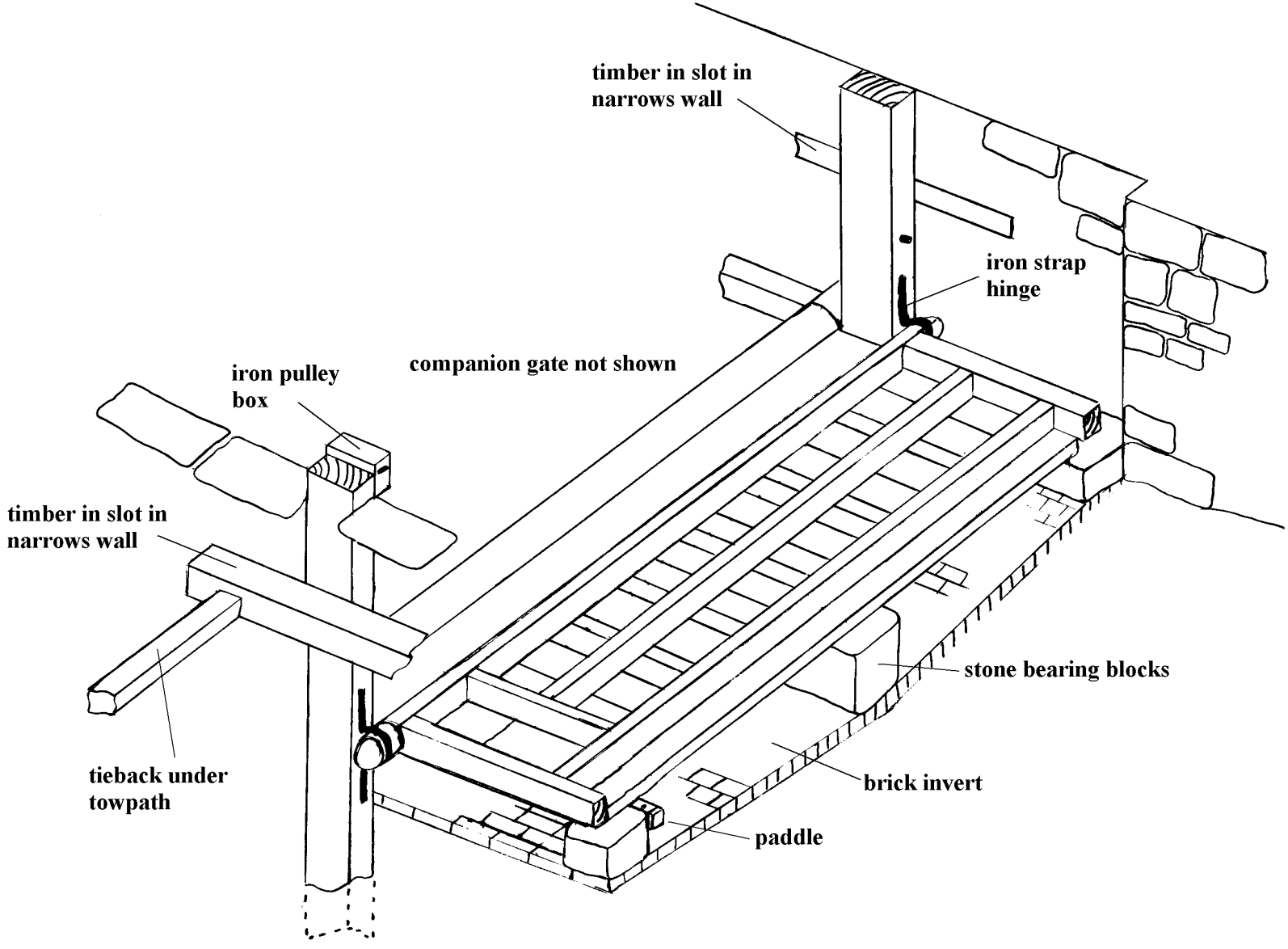

Fig 3: Lift gate at Winsley Hill, Kennet and Avon Canal

Fig 4: Swing gate in eastern forebay

Fig 5: Lift gate in western forebay

Fig 6: Detail of hinge

Fig 7: Detail of metal strap

Appendix 1:

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