

PONT FAEN, CHIRK BRIDGE STRENGTHENING

METHOD STATEMENT

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1. **Timing**

It is proposed to start the work August/September 2010

2. **Duration**

The duration of the work is anticipated to be 8 to 10 weeks

3. **Methods**

- 3.1 All materials/equipment will be stored in the site compound which will be located on the existing carriageway between the bridge and the bell mouth to the B4500.
- 3.2 No materials will be stored adjacent to the river as per PPG5.
- 3.3 The bridge strengthening work will involve a method called arch centring. An example of this is shown in Figure 2 below. This will involve constructing scaffolding under the arch of the stone bridge.
- 3.4 Scaffolding equipment will be delivered to site and lowered onto the river bank via the adjacent carriageway and man-handled to its position.
- 3.5 Scaffolding will be erected by hand under the stone arch. There will be no requirement to divert the watercourse.
- 3.6 A temporary support for the arch centering will be positioned adjacent to the south abutment. This typically will be formed by a row of temporary gabion baskets within the watercourse. This will involve the workforce entering the river and filling the baskets by hand. There will be no pollution concerns with this method of construction.
- 3.7 There will be at least a 1m gap under the scaffolding between the water and scaffolding.
- 3.8 Horizontal netting will be installed under the scaffolding in order to prevent materials dropping into the water during the strengthening work. This will comprise a fine gauge netting, or geotextile membrane that will prevent any debris entering the watercourse.
- 3.9 A temporary footbridge will be erected 6m downstream of the bridge. The footbridge will be constructed from scaffolding. This will be in public usage prior to the commencement of the strengthening work.

4. **Site Monitoring**

- 4.1 An Ecological Clerk of Works (ECoW) will be employed in order to supervise and monitor the site work.

- 4.2 The ECoW will liaise with the project co-ordinator/site engineer so that the contractor is made aware of the conditions/restrictions of site working.
- 4.3 Immediately prior to the start of the work the site ecologist/ ECoW will undertake a further walkover of the site, including a nesting bird survey.
- 4.4 All plant and equipment will be restricted to the immediate area of the bridge on the carriageway.
- 4.5 It is anticipated that all works under the bridge, i.e. re-pointing will be done manually by men operating from the scaffold platform.
- 4.6 The ECoW and site engineer will agree all access and egress routes to minimise disturbance to any adjacent habitats.
- 4.7 Environment Agency guidelines will be followed for working in proximity to water, PPG5.
- 4.8 No re-fuelling of vehicles or machinery will be undertaken within 10m of river.
- 4.9 The risk of run-off is very unlikely owing to the nature of the work, however measures to prevent run-off will be provided where and if necessary. These will include the use of sand bags and/or straw bales and tarpaulins.
- 4.10 No vegetation or tree clearance is proposed as a result of the proposed work.
- 4.11 Flight lines under the bridge for commuting bats will be maintained at all times by leaving gaps in the netting on both sides of the bridge. The ECoW will ensure that the netting is fitted in an appropriate manner.
- 4.12 No bats were recorded using the bridge at the time of the bat emergence survey in May 2010. As bats may move into a structure after a survey has been carried out, all construction personnel will be briefed on the signs/ecology of bats/site specific issues and what to do if they locate a potential roost (- stop all works and contact a licensed bat worker for further advice).
- 4.13 The drainage tunnel identified as a potential roost site in the bat report will be retained in its current state.
- 4.14 As crevices within the stonework will be pointed during the strengthening work, three Schwegler 2FR bat tubes will be fitted to the south eastern upstream abutment offering long-term alternative roosting locations to bats in the area.
- 4.15 Otters are known to travel along the river corridor to access other parts of their territory and to feed. The contractor will therefore ensure that the river corridor is not obstructed, or any equipment that may cause animals to become trapped or injured is left on site, or in such a place as to cause harm to otters.
- 4.16 The riparian corridor will be maintained at all times so that otters may travel through the area freely. The site ecologist/ECoW will be consulted regarding methods to maintain the continuity of the habitat.

- 4.17 Should work be undertaken during the nesting season (1st March to 30th September), then a nesting bird survey will be undertaken to check for the presence of nests prior to the start of the work.
- 4.18 Nest boxes will be provided as mitigation for any loss of nesting habitat, and as a positive conservation measure. It is recommended that two Schwegler dipper and pied wagtail nest boxes are fitted to the bridge under the guidance of the site ecologist on completion of the work.



Site Location

Careful consideration should be given to matching the colour of the existing brickwork or stonework. It may be that its attractiveness lies in the colour and texture which age and weathering have produced. It may also be the case that the weathered and darkened surface conceals a multitude of old repairs which would be unsightly if visible. In such instances, cleaning would be a mistake. Some masonry however was clearly designed to achieve a particular architectural effect which weathering and dirt may have diminished. Here, cleaning could be used to restore the original appearance, and new masonry needs to be chosen to match the cleaned masonry. Cleaning of masonry is beyond the scope of this document; advice will be found in BS 6270 (BSI, 1982).

Bricks may be made to practically any shape to avoid the need to cut them to fit. BS 4729 (BSI, 1990) lists those most commonly sought: they are referred to as "standard" special shapes and they are more readily available than "special" special shapes.

Difficulties may occur because standard size bricks which are now 215mmx65mmx102.5mm may be of a different size to the existing bricks.

It is possible to replace a complete ring of bricks and is most likely to give a visually satisfactory result. It would be important to ensure the mortar joint between the new and existing ring is well packed. It may be desirable to tie the new ring into the existing rings to ensure that it acts structurally.

Clay bricks expand after placing due to absorption of moisture. This may have the advantage of introducing some dead load stresses into the new brickwork.

Stone is likely to have come from a local quarry except perhaps in the case of major bridges. It is likely that the quarry will no longer be open, so it will be necessary to obtain a similar stone from elsewhere. Even if the quarry is still operating, the stone being quarried now may be significantly different to that used in the bridge. Artificial stone is now available and may be specified to match both the strength and colour of the existing stone.

Design method

Repointing is used for routine maintenance of bridges not assessed as weak, and to strengthen bridges assessed as weak due to inadequate ring thickness because of missing mortar where weathering has eroded the joints. A MEXE analysis is sufficient.

Observed defects

Spalling and cracking of mortar was noted, possibly due to incorrect preparation of the joints, frost, incorrect application of mortar, shrinkage of mortar, water seepage, or growth of vegetation. Colour mismatch was also noted. On some structures, notably of sandstone, the stonework had eroded leaving the pointing standing proud.

6.2 SADDLING

Saddling involves removal of the fill and casting an in-situ concrete arch, which may be reinforced, on top of the existing arch. Its advantage is that the work is invisible once completed but it requires a major construction operation which will disrupt traffic flow to install. It may be necessary to support the arch ring with centring (figure 13) while the work is in progress which may rule out its use. It may be

Arch Centring details.

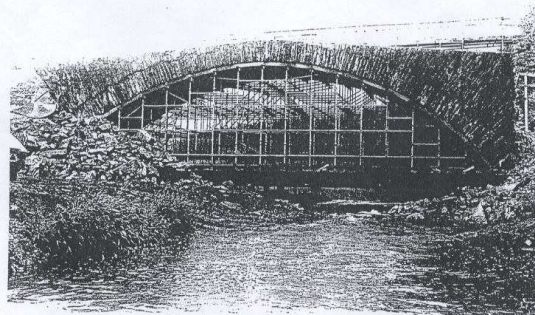


Fig.13 Temporary centring for saddling

Example of Arch Centring Method