

Bridge Installation for Working parties (2020 Edition)

1 Outline (Only gives a general idea. Detailed instructions below)

- (a) Open the 2 boardwalk fence gates. Install rope for persons to haul themselves from moat
- (b) Install ropeway across moat and the hand line for waderpersons
- (c) Install the mainland abutment board (somebody brought it!) on the mainland abutment
- (d) Aim the mainland abutment board at the island one and fasten with 1 x 60mm posidrive screw
- (e) Align the three beams on the abutment boards and fit the two gauge control end boxes, then the deck units in correct order
- (f) Check correct alignment of screw holes with probes (they will be provided)
- (g) Insert the coach screws **ONLY in the holes marked with a large X** and tighten fully, but do not overdo it. **The screw heads should NOT bite into the deck wood (easily done if you use a power drill to tighten screws, so set the torque release accordingly)**
- (h) Test the structure with static and dynamic loading (details below)
- (i) When work is finished return most things to secure storage on island

2 How to Open the Boardwalk Gates

General

This job has become much easier since the installation of the splendid new boardwalk in 2017

Tools

You will need 1 x 17mm AF open ended spanner or a ring spanner of the same size. **Sockets are unsuitable for this job!**

You will also need a metal drift 9mm diameter (or thereabouts!) and a rubber or wooden mallet. **AND the three keys to the two fence gates.** The left hand gate is held by a hasp and staple and secured with a single padlock. The right hand gate is held by 2 coachbolts each secured with a padlock.

The Gates

- (a) Unlock the padlock which secures the left hand gate, open the gate and hold it open with the hook provided. Store the padlock in the plastic container. provided
- (b) For the RH gate, unlock the two padlocks which secure the two coachbolts and remove them, noting the colour coding. Store these padlocks with the LH gate padlock.
- (c) Undo the nuts with the 17mm A/F spanner and remove both nuts and washers, storing them in the container

- (d) Use the mallet to drive the coach bolt flush with the gate, then continue with the drift to drive the bolts clear of the gate. Store the bolts in the container, then put the container and its contents in a safe place.
- (e) Fasten the gate in the open position with the hook provided

Replacement When Job Finished

- (a) Close both gates
- (b) Padlock the LH gate
- (c) Insert the coachbolts in the RH gate, ensuring that the square sections under their heads locate correctly in the holes, and the washers and nuts are in place
- (d) Tighten the nuts firmly (but not excessively) with the spanner
- (e) Secure with the padlocks, observing the colour coding

3 Ropeway and handline installation (needs at least 1 waderperson)

For those unfamiliar with knots and hitches, try "**Animated knots by Grog**" on the internet.

The ropes needed will be packed in a plain, stout, plastic bag. Start by unpacking the carrier rope (a BRAIDED MULTICOLOURED rope with melted ends). It will be used to transfer components of the bridge from the island to the mainland.

It will be chained - a source of total bafflement to many (try "**Grog Chain sinnet**" for help). To unchain it, find the end at which the chaining finished. It will be a plain loop, secured by a half hitch. Untie the hitch and pull. The whole chain should come apart to reveal a doubled rope with loop tied at one end by a bowline .

One end should have a simple butterfly stopper knot tied on it. This is the mainland end. Tie it to the mainland post by any simple knot; a round turn and two half hitches will be fine.

Packed with the carrier rope will be a plain blue rope. It will also be chained; unchain it like the carrier rope and tie one end to the mainland post next to the carrier rope with a round turn & 2 half hitches (RT & 2 HHs). This will be a handline for those crossing to the island before and after the bridge is in place

Now put all the free carrier rope and the other shorter ropes in some sort of shoulder bag. A waderperson then needs to carry this bag and the free end of the blue handline (hitched to their belt or a bandolier loop) across to the island

On the island side, pass the blue handline rope around one of the sycamore stems by the ascent slope and double it loosely round . Take the carrier rope up to the free standing post. Use the bowline loop to form a cow hitch and drop it over the post and then pull tight with the hitch about 2ft (600mm - **GUESS IT!**) above ground level.

Take the free end of the blue handline from the sycamore and take it and the bag back to the mainland. Once there pull the handline as tight as possible and tie it to the mainland post with an RT & 2HHs

Close to the mainland end of the carrier rope tie a **Marlinspike** hitch. Rig the yellow 4:1 hoist with one hook end secured to a fence post by a rope loop and the other located in the Marlinspike hitch. Untie the carrier rope from the post and pull as hard as possible on the hoist. While the tension is full on, take the carrier rope round the post again and secure with an RT & 2HHs. The carrier rope is now set up for transferring bridge parts from the island to the mainland

4 Pulleys

The new pulleys can be set on to the carrier rope **after** it is in place and tensioned. For each pulley in turn remove the red-painted **knurled** (*it means specially roughened for a good grip for fingers*) rod and threaded sleeve and take off the bent wire closure.

Drop the pulley over the rope so that the pulley wheel rests on the rope and replace the wire closure. Secure it with the knurled rod and nut again.

Karabiner a short rope to each of the two wire closures (one rope for each pulley). Now the waderperson can rapidly walk the pulleys back to the island. This should be easy if the waderperson uses the ropes and pulleys as an aid to balance

5 Beam Operations

On the island, release the padlocks (**put them safely somewhere so that they will not be lost**) so that the beams, deck units and gauge boxes can be removed from the storage stack, but do not remove any until their turn comes. Use the cargo ropes (mentioned in 3 above) to secure load items to the pulleys. **If you use log tongs to handle the beams NEVER leave them to lie on the ground. Always hang them in a convenient bush so that they remain visible**

Take beams from secure storage one by one and send, in correct orientation (**L, C & R - AS SEEN FROM THE ISLAND**) to the mainland shore. Send L first then C, then R. **The order is important !**

When all three beams are in place on the abutments in the correct orientation ensure that the beam ends on the mainland reach right to the mainland end of the abutment board.

Now fit end gauge boxes GB1 and GB3 (formerly named "endboxes"), ensuring that beams are in contact with the inner guides and the end board of GB1 (**this is vital!**). Check alignment of screw holes with a probe. then secure GB 1(at the island end) with coach screws through the pre-drilled holes. Place GB3 (on the mainland end) **but do not fit the screws. (Code: DU - deck unit, GB - gauge box. ENI means "End Nearer Island")**

Now fit deck units and the inter-gauge box, starting with DU 1, then IGB, then DU2 and DU3. Make sure that ALL the ENI ends **are nearer to the island and everything butts up tightly.**

Check alignment of screw holes with probes, (**important: only the holes marked with a large X are to hold screws!**) then insert coach screws and tighten. Push GB3 up to DU3, insert coach screws and tighten, **but do not overdo it. The screw heads should NOT bite into the deck wood (easily done if you use a power drill to tighten screws, so set the torque release to disconnect the drive as soon as the screwhead touches the deck unit).**

Fit the two underties 2m from each end and secure with a pair of deck unit coach screws in the pre-drilled 6mm holes in the sides of the deck units

Fit an anchor rod through the steel loop on the end of the centre beam and push it well into the soil

Fit the step-off in position at right angles to the mainland abutment board. and secure with the hooks into the screw eyes on the adjacent bridge beam. Tighten the butterfly nuts to hold the step-off securely

The bridge structure is now completely assembled

5 Testing the Structure

With the structure assembled and in place over the moat, two reasonably heavy persons to stand on the centre line. Observe deflection

Two people to walk from one end to the other, keeping in step. Observe any oscillations and make notes.

If all is well (no excessive deflections nor oscillations), the bridge is fit for use

6 Dismantling when work is over

Withdraw and store all deck unit screws **except** those holding the three gauge boxes

Disconnect the step-off from the bridge beam and store the hooks. **They do not go back to the island! They both need to be stored at home by whoever is in charge of bridge installation.**

Withdraw any anchor rods fitted and carry them back to the island

Remove the underties and re-insert their securing screws to stay in place in the sides of the deck units.

Leave the chain plates in place on the beams

Remove DU3 and draw it back to the island store.

Remove inter-gauge box and send back to the island store

Remove DU2 and DU1 and send back to island storage

Remove the screws which secure GB1 and GB3, remove the gaugeboxes, send them to the island and store them on the deck units.

Ropeway the beams to storage in their place by the deck units. Remember that the beams must stand on their narrow edge, leaning over to shed water

Remove the mainland abutment board, step-off and its hooks, but do not send any of these to the island. Arrange for their storage at home.

8 Finishing

Secure the deck units and gauge boxes with chains and padlocks

Unhitch the Ropeway system from the post on the island to which it is secured

Mainland crew can now haul the Ropeway system back onto the mainland.

Island crew wade back across the moat using blue hand line if they wish

When everybody is back on the mainland, untie the single handline from the mainland post and haul it all back on to the mainland.

Chain and bag it

Remove the pulleys then chain and bag the carrier rope and put the pulleys in the same bag

Pack up all tools and check for missing items.

Leave the site

Lock the boardwalk gates behind you!

Job finished!

Lessons learned from previous installations

- 1 Essential to have at least 1 waderperson ready on the island from the start.
- 2 **Log tongs can be useful for handling beams on the island - bring your own if you have them**
- 3 **Ropeway to be fastened about 600mm (24 ins GUESS IT!) above ground level and kept tight**
- 4 **Hitch beams in transit close to mainland end of the beams and also close to island end before attempting movement**
- 5 **Fasten gauge boxes 1 and 3 before deck units and gauge box 2**
- 6 **Test hole of GB 1 and GB 3 alignments with probes first, then insert coach screws in all 12 holes**
- 7 **When fastening deck units, only insert coach screws in holes marked with a large X**