

Signalling & Safeworking History Bluff's Interlocking Machines

During 2008 while exploring near the site of the former Fraser's Siding at Bluff, the remains of a previously unknown signalling installation were discovered. The size of the remains suggests a small signal cabin, but where did it come from as there was never a signal cabin at Bluff? Often these installations appear either in QR's Weekly Notice (when commissioned or decommissioned) or in the Working Timetable to aid operational staff. There is no record of a signal cabin in either of these documents throughout the period up to the commissioning of CTC at Bluff.

Firstly I'll show how I determined the size and possible shape of the structure and determined that it is a small signal cabin structure.

The first piece of evidence discovered was the large piece of the concrete foundation as shown in Photo 1. It had been dug out of the ground and pushed away from the railway corridor a short distance, and is now outside the railway corridor on the southern side of the line. The concrete foundation is 7 feet 10 inches wide and about the same length however the top edge is broken off at an angle. Running lengthwise along the foundation are two raised ridges of concrete spaced 4 feet 4 inches apart. Near the unbroken corners of the foundation are bolts which have been cut off and a third cut off bolt exists along the side of the foundation near the broken edge.



Photo 1: The large piece of the concrete foundation showing the two ridges of concrete running lengthwise.

The second piece of evidence discovered was the smaller triangular piece of the concrete foundation as shown in Photo 2. It also measures 7 feet 10 inches wide and about 5 feet long on the straight unbroken sides. Studying both pieces revealed that the smaller piece was indeed the corner which was broken off the larger piece during removal. Adding the measurements of both pieces reveals that the concrete foundation measured about 7 feet 10 inches by 12 feet 10 inches.



Photo 2: The smaller piece of the foundation, broken from the larger piece.

The key thing to note, as shown in detail in Photo 3, is the 16 cut off bolts placed in a very unique layout, near the middle of the long broken edge on the smaller piece of concrete. The layout of these bolts confirmed that these remains were part of a railway signalling structure. These 16 bolts would have secured the Accommodation cranks in position with each crank requiring 4 bolts. The Accommodation cranks are where the point rodding, exiting a signal cabin perpendicular to the track, turns through 90 degrees to run parallel to the track towards the points operated from the cabin. This evidence shows that at least 4 point rods, hence 4 levers, could have been provided.

By picturing the two pieces of concrete foundation together a general picture of the foundation can be drawn. The 16 cut off bolts show where the Accommodation cranks were placed and also indicate which way the point rodding ran after leaving the signal cabin. The raised ridges of concrete on the large part of the foundation indicate where the lever frame was positioned. The spacing of 4 feet 4 inches makes it possible that up to 12 levers at 4 inch centres or 10 levers at 5 inch centres were provided. The bolts around the edge of the foundation indicate where an operating platform would have been secured around the lever frame.

Many QR signal cabins and lever frames had levers spaced at 5 inch centres however a smaller number of lever frames used a spacing of 4 inches. The Accommodation cranks are 90 degree cranks and have arms which are 10 inches in length. By measuring the horizontal distance between the Accommodation crank centres it can be determined that the levers they connected to were spaced at 5 inch centres in this case.

The distance from the edge of the slab to the centre of the first Accommodation crank is 3 feet 4 inches or 40 inches, and the distance from the same concrete edge to the raised frame support is 1 foot 9 inches or 21 inches. By drawing this to scale on the attached diagram the position of the 10 inch cranks, point rods and ends of the lever frame can be clearly seen.



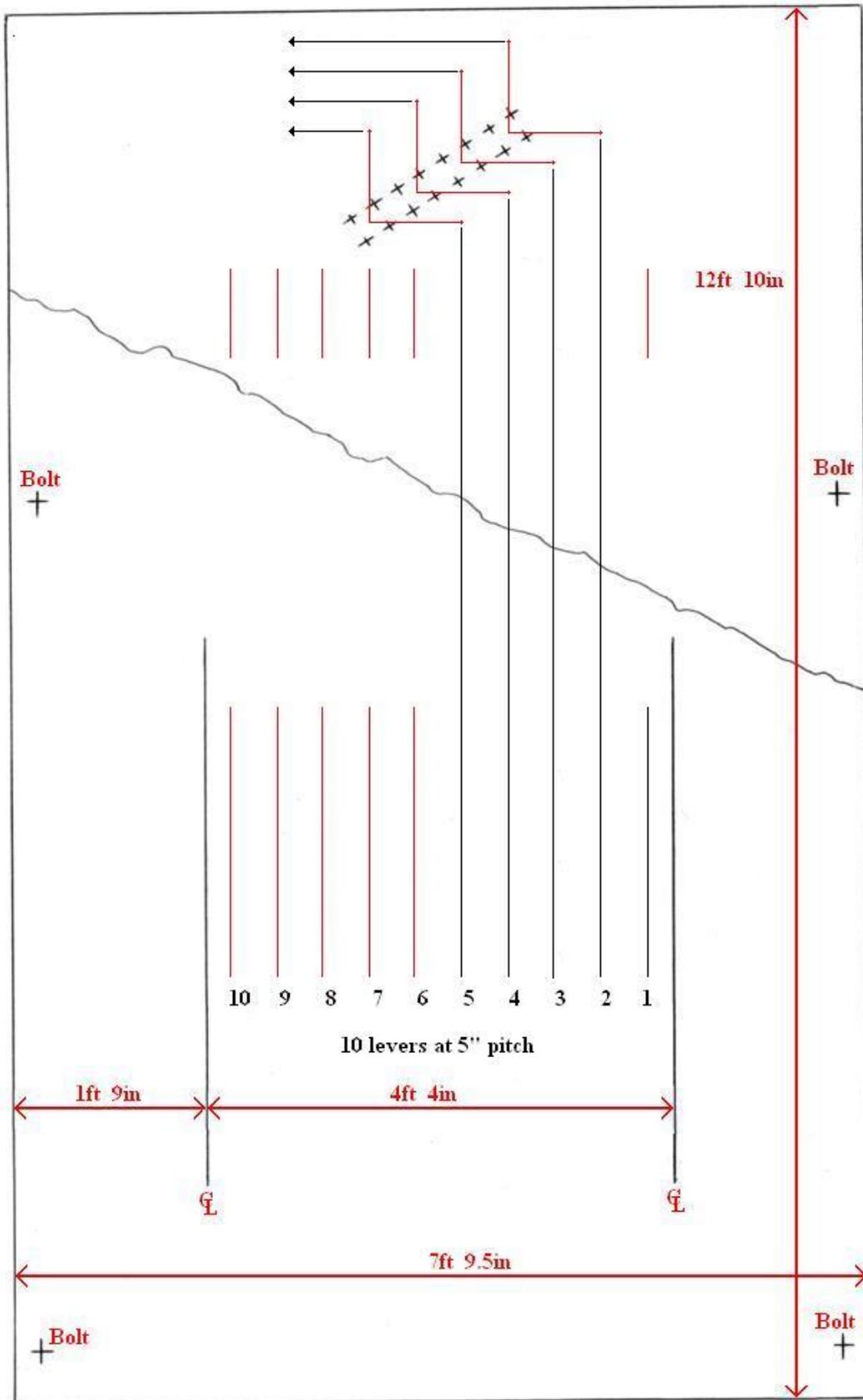
Photo 3: The 16 cut of bolts where the 4 accommodation cranks were bolted.

By continuing this 5 inch spacing it can be seen that five more rods are possible to the left, and one more rod is possible to the right. In total 10 levers at 5 inch pitch can be neatly spaced between the ends of the lever frame.

The next question is are these levers 6-9 with the signalman facing the track, or levers 2-5 with the signalman facing away from the track. Similar lever frames at Warwick, Kaili, Pring, Callemondah and Mackay all have the signalman facing away from the track. It is also unlikely that levers 1-5 were signals so it is presumed that the signalman faced away from the track and that the point rodding was connected to levers 2 to 5. Lever 1 was quite possibly a Release lever but this is impossible to determine from the remains. Likewise it is also impossible to determine what levers 6-10 were used for or indeed if they were even installed. Warwick B frame had a capacity for 10 levers but not all the levers were installed with empty spaces left where they could be added if required later.

The only questions remaining are was this signal cabin from Bluff and if so what was it used for? Considering that the Accommodation cranks can accommodate 4 levers it can not be assumed that only 4 levers were used. The Accommodation cranks would typically have point rodding connected but it is also possible to connect signal wires to them by using a different shape crank. There is no evidence to indicate that pulleys were provided to operate typical semaphore signals through signal wires. It is possible however that any signals existing may have been colour light signals and in that case no evidence can be seen in the minimal remains. A number of stations on the Central Line had colour light signals before the installation of CTC signalling.

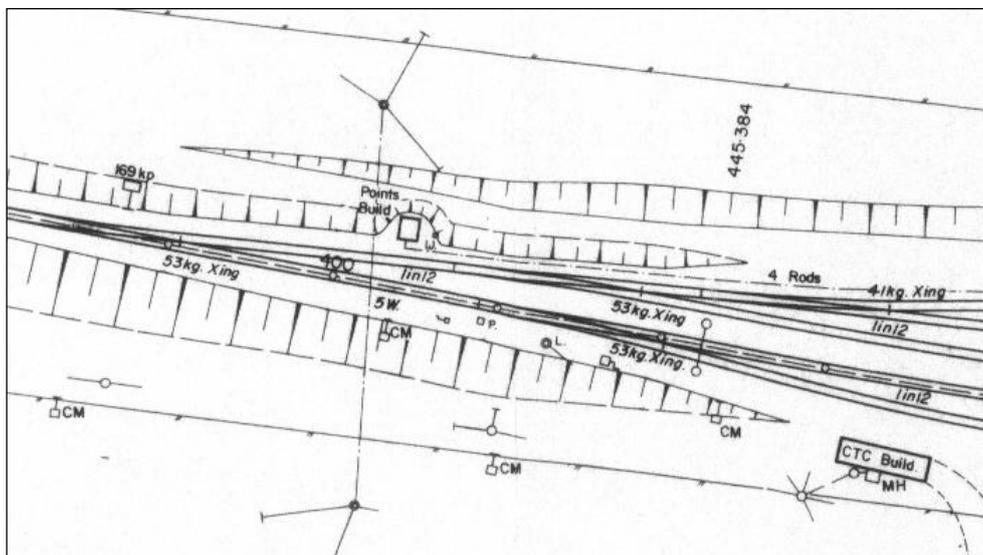
The existing general track layout at Bluff consists of a main line, passing loop, third road, and two additional roads called the 4th and 5th roads. Whilst the 4th and 5th roads can be used for through trains they also have catch points fitted and can be used for longer term storage of wagons or trains. If the points from the 3rd road to the 4th and 5th roads were operated from the Bluff cabin then 4 point rods would be required, two for the point blades and two for the plungers. This scenario matches the remains that had been located at Bluff.



Drawing 1: A scale drawing showing the layout of the foundation and the positions of key elements.

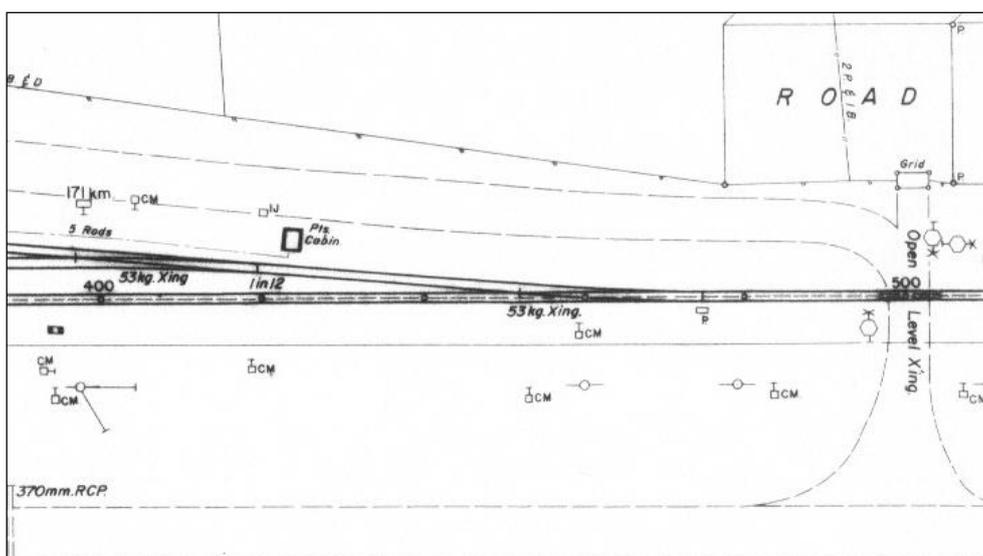
At this point I made a visit to The Workshops Museum at Ipswich and asked for any station yard plans for Bluff. I have looked at these previously and did not remember any mention of such a

signalling structure existing. A few plans did exist but they did not help solve the problem of identifying this lever frame. Another station yard plan had recently been donated to The Workshops Museum and it showed the track layout at Bluff after the implementation of CTC signalling. The plan is numbered C3232 and is dated 14-5-1985.



Part of Plan C3232 showing the location of Bluff east lever frame.

While these plans typically deal with track layout and buildings they sometimes show some details of signals and signalling equipment. This was indeed the case with this plan as it shows a lever frame at both the eastern end and western end of Bluff yard allowing access to the 4th and 5th roads as I deduced above. Further, the plan shows the route taken by the point rodding and states at the eastern end that “4 rods” run beside the track, fully supporting my theory. The location of the structure is marked as “Points Build” meaning points building. Interestingly the western end of the station yard plan states “Pts Cabin” and “5 rods” beside the track and the reason is that an additional small loop siding existed at the western end of Bluff yard, behind the 5th road, and was also operated from the west cabin.



Part of Plan C3232 showing the location of Bluff west lever frame.

This information supported and confirmed that the remains of this signalling structure was indeed from Bluff, but from a later period than initially thought, after CTC signalling had been implemented.

Technically the structure would be classed as a ground frame, and operated by station staff or train crew as required when electrically released by the Train Controller. In 2008 there are approximately 256 electrically released ground frames in use within Queensland. Of these about 85 are QR1 pattern ground frames which are bolted to a small block of concrete adjacent the track with the operator usually standing on a separate concrete culvert. About 169 are the more modern QR2 pattern fabricated ground frames which are bolted to a slightly larger concrete block adjacent to the track with a small steel platform for the operator to stand on. There are two other ground frames however which use large lever frames identical to the interlocking machines found in signal cabins like Ascot and Charters Towers. These ground frames (Callemondah yard and Mackay yard) are mounted on substantial concrete foundations like what was found at Bluff, have a steel framework supporting an operating platform and a roof for protection from the weather. Photo 4 shows the structure at Callemondah with 5 levers which is very similar to what existed at each end of Bluff yard. This type of structure being utilized as a ground frame is quite rare in Queensland.



Photo 4: A similar structure to what existed at Bluff, but with a capacity of 5 levers

Further study of the Working Timetables of the period indicated that these lever frames existed at Bluff approximately from the implementation of CTC until at least 20-4-1986. The next timetable available, dated 11-9-1988, shows that the lever frames had been removed and electric points and colour light signalling had been installed.

The last question was to find out what happened to the similar concrete foundation which must have supported the lever frame at the Western end of the yard. Several walks around the area failed to find any remains and it was suspected that the concrete may have been left in the ground and buried under ballast when the track was duplicated westwards towards Boonal. Finally another walk around a different part of the eastern end of Bluff yard yielded a large piece of concrete sitting vertical against

a tree and surrounded in very tall grass. A quick observation of the concrete slab revealed that it was the foundation for the Bluff west lever frame which had been removed and dumped at the opposite end of the yard. The concrete foundation for the Bluff west lever frame had 20 cut off bolts also proving that 5 Accommodation cranks, hence 5 point rods were provided.

Any further information or a photograph of either of these signalling structures at Bluff would be most welcome. If any readers know of other similar signalling structures they would like examined or investigated please email me or the editor.

Amazing what a keen eye can discover from a piece of concrete..!