

**North Yorkshire County Council**  
**Scarborough & Whitby Constituency Committee – 3 December 2021**  
**Whitby Swing Bridge - update**

**1.0 Purpose of the Report**

- 1.1 To update members on maintenance issues regarding Whitby Swing Bridge.

**2.0 History of the Bridge Maintenance**

- 2.1 The Swing Bridge was built in 1909 mechanised in 1983 and from that time the revenue costs of maintenance and operation were shared between Scarborough Borough Council (SBC) and North Yorkshire County Council (NYCC) until the 1 February 2012.
- 2.2 An agreement between NYCC and SBC in 2012 placed the responsibility for the bridge maintenance with NYCC and responsibility for the staffing and operating of the bridge was with SBC. It was agreed that the daily maintenance of oiling, greasing and cleaning would be the responsibility of SBC.
- 2.3 NYCC at the time of signing the agreement invested £82,752 bringing the bridge operating system to a maintainable state and contracted with Fairfield Engineering to manage the maintenance and repair of the Bridge Systems and Hydraulics on an annual basis. Within the first three years of the new agreement the County Council had invested a total of £515,230 on improvements to the bridge.

**3.0 Our Long Term Plan for the Bridge**

- 3.1 Since NYCC became responsible for the maintenance of the bridge we have up rated the systems that operate the bridge and introduced remote monitoring of the systems that drive the bridge. Regular training has been provided for the SBC operators of the bridge to ensure the correct operation of the bridge and we have introduced regular servicing of the drive systems on the bridge, an annual service and an interim six monthly service which checks the various important service items.
- 3.2 We have improved the location of the sensors which operate the bridge over the past ten years and lifted those we could above the normal flood levels which has improved resilience and has coped with everything but an extreme tide which needed several sensors changing. In order to minimise delays for parts replacement we have a stock of items stored on the quay side so that spares are available for the engineers to fit. The bridge is still affected by extremely hot weather which we are currently investigating with a possible solution which avoids cutting off the ends of the bridge it give greater room of expansion of the two bridge leafs (the deck) which in extreme heat conditions bear on the road on to the bridge and prevent it operating.
- 3.3 Failures of the bridge operation have been reduced from twenty plus per year to approximately four per year since the arrangements set out in section 2.2 came into effect in 2012. However, it is likely that some of these closures have involved extremely high temperatures which prevented the bridge opening as described earlier.

- 3.4 The County Council is responsible for four mechanical bridges, including the bridge at Whitby. The Whitby Swing Bridge operates every day on two tides which is significantly more than any of the other three mechanical bridges we also maintain. In July the Bridge Manager attended a breakdown which was due to the failure of a limit switch on the East leaf of the bridge which indicated falsely that the leaf was closed and when the West leaf was closed it jammed at the centre of the bridge which left an open gap. After consulting the contractor, Fairfield we unjammed the bridge and manually closed the East leaf and that allowed the West leaf to close then the engineer arrived on site and replaced the faulty limit switch and bridge was tested and put back into use. The bridge was operational and checked within an hour of the arrival of the engineer. There was unfortunately disruption for the users for three hours while we unblocked the bridge leaves which had jammed. Fairfield's are currently looking into additional measures to ensure there is a secondary sensor or another way to ensure the bridge cannot be operated in this circumstance. There are numerous options and they are being evaluated before being implemented.
- 3.5 Failures of this type cannot be predicted as the limit switches are checked during the services which are carried out twice a year. The electronic sensors that we have introduced on the bridge can be remotely checked and if they are not operating correctly they can be swapped easily for a new one.
- 3.6 It should be remembered that this bridge operates in a very harsh environment and is open to the elements and the tidal river which is why we instigated the new maintenance regime of the annual service which covers the whole of the bridge and the six monthly service which checks the operating systems and fluid levels.

#### **4.0 longer term issues**

- 4.1 The bridge will need painting in ten years' time and the motors that drive the bridge leaves and the hydraulics will need overhauling in the next twenty years. Various sensors will have to be upgraded as they will become obsolete and unavailable but the market will have moved on and suitable replacements will be available.
- 4.2 The bridge structure with the current weight restriction will need work in the future to repair areas of corrosion in non-structural locations on the bridge but the main structure should be good for another 75 years. The current bridge is positioned in the best location for the shortest span across the river and it was built on the site of a fixed span footbridge on the downstream side of the current bridge. A new bridge in the current location would require a footbridge to be provided which was capable of opening to river traffic otherwise the removal of the existing bridge would lock the port and marina upstream of the swing bridge for a number of months. A new bridge for traffic in another location would be of a longer span and be more expensive.
- 4.3 On the morning of the 1 October 2021 an inspection by Fairfield's engineers and the Bridge Manager from NYCC into the operation of the East Leaf was carried out and it was found to be working properly in all respects and no repairs were necessary. Since carrying out this inspection we have called Fairfield's Engineers back to the site and they have checked the bridge staying in Whitby over night to carry out more test swings the next morning and the bridge performed correctly.
- 4.4 Appendix A details the call outs for issues which prevented the bridge operating for the last two years.

## **5.0 In Conclusion**

- 5.1 The strategic importance of the swing bridge to Whitby is clear and this paper sets out the work that has been done to improve the resilience of the structure and to minimise the number of breakdowns and the length of time that there is disruption when it does unfortunately breakdown. However, like any complex mechanical system this bridge can fail in service and we have put arrangements in place that allows us to identify the failure quickly and resolve the matter as efficiently as possible. The bridge has many years of life left in it and the maintenance regime we have put in place ensures that the performance of the bridge is in our opinion good for a bridge operating in a difficult location open to a highly corrosive atmosphere and flooding and is in fact better than that of some of our other mechanical bridges which do not operate with the same intensity as this bridge does because of its importance to the economy of Whitby and the Port.

## **6.0 Recommendation**

- 6.1 The contents of the report are noted.

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Schedule of maintenance as below since August last year.

Completion Date	Title
20/10/2021	Investigation into bridge getting stuck
18/10/2021	Investigation
26/08/2021	3 month service
10/08/2021	Steel walkway repairs
16/07/2021	Breakdown
07/05/2021	6 month service
08/03/2021	Redecking due to hanger failure
26/02/2021	3 month service
24/12/2020	West side - handrail repair
26/11/2020	6 month maintenance
28/08/2020	3 month service












































































	Electrical & Mechanical Service	Revision: A01
	Whitby Swing Bridge Service Visit	26/08/2021
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ITEM	LOCATION	DETAIL	WKG	FTY	COMMENTS		
East Leaf – Hydraulic Inspections	Under Bridge	HPU	Oil Level (top up if required)	OK			
			Oil Temp (min 10DegC)	OK			
		Pressure Line Filters	Secure	OK			
			Clean (change if necessary)	OK			
			Pressure Level	OK			
			Replace Filter (12m only)	N/A			
		Return Line Filters	Secure	OK			
			Clean (change if necessary)	OK			
			Pressure Level	OK			
			Replace Filters (12m only)	N/A			
		Vibrations	Non excessive	OK			
		Noise Levels	Non excessive	OK			
		Solid Pipe Works	Secure	OK			
			Tight	OK			
			No Leaks	OK			
		Flexible Hoses	Secure	OK			
			Tight	OK			
			No Leaks	OK			
			Functional	OK			
		Oil Sample	Oil Sample Required (12m only)	N/A			<b>Max Dirt ISO DIS 4406 18/14 Water Content: -0.01%max</b>

#### INSPECTION NOTES & RECOMMENDATIONS

Mechanical inspections conducted by Francis Corner Engineering and Harker Hydraulic