FACT SHEET
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Australian Government

BUILDING OUR FUTURE

mainroads WESTERN AUSTRALIA

Fremantle Traffic Bridge

Preliminary findings regarding bridge condition

The 2021 routine inspection of the Fremantle Traffic Bridge, undertaken as part of Main Roads Asset Management Strategy for timber bridges, has confirmed the timber and steel elements of the bridge are continuing to deteriorate.

Since this temporary bridge was opened in 1939, Main Roads has undertaken extensive maintenance and repairs to keep the bridge operating. Since the early 1970s, many elements of the bridge have been repaired or replaced with steel – the bridge is no longer completely authentic or in its original state.

Future repairs would require significant replacement of key bridge structures. The inspection found steel elements in particular are corroded and the timber elements are rotting. Ongoing maintenance will not extend the life of the deteriorating timber.

We reassure all bridge users (motor vehicles, pedestrians, cyclists and river operators) that:

- the bridge is currently safe to use
- closures will be enacted as required for safety reasons
- Main Roads will continue to regularly inspect the bridge to ensure it remains safe to travel across.

While the bridge continues to deteriorate, the biggest risk to the traffic bridge is if it were to be hit by a vessel and was not able to sustain the force of such an impact.

Inspection

In July 2021, Main Roads commissioned a detailed inspection of the Fremantle Traffic Bridge as part of our routine inspection program for timber bridges - both above and below the waterline. This included traffic lane closures to enable the use of multiple truck mounted Under Bridge Inspection Units.

Timber bridges are generally checked for what load rating can be carried. Newer bridges generally have a higher rating than required. However, as inspections of bridges show deterioration, we consider what rating is applicable and make adjustments to the types of vehicles that can travel over the bridge safely.

A preliminary summary of findings report for the above waterline elements was prepared in October 2021. The report classifies all individual components as Excellent, Good, Fair and Poor.

The report's key findings are summarised overleaf.

Reinforced Concrete Overlay

We've had to close the bridge in recent years for emergency repairs to failed sections of the Reinforced Concrete Overlay (RCO). The RCO provides weather protection for the majority of the timber deck but does not protect the outside timber (stringers/bearers/ edge decking). In particular, the original detailing of the RCO is insufficient in width, allowing rain ready access to these edge components. Drainage from the bridge enters the wood which speeds up timber deterioration. The deck is thin and cracked due to movement of timber underneath where the timber work is not tightly held together. The concrete overlay had an estimated life of 15 years but is now 47 years old. The guard railing system is below expectations of current standards.

Sections of the road surface removed.

Edge of longitudinal deck plank deterioration and saturation.

Footpath

The footpath has extensive deterioration throughout, particularly external elements exposed to the weather with rotting to the timber resulting in capacity loss. Bolted connections on the footpath are heavily corroded and this has resulted in splitting of many timber components.

The balustrade (footpath handrail) height is 900mm. The recommended balustrade height for cyclists is 1400mm. It is not practical to upgrade the balustrading system; the repairs to post fixing, to achieve adequate capacity is anticipated to be problematic. The timber posts, particularly their fixings, are in 100% poor condition.

There is extensive corrosion to cable tray and pipes below the footpath.

Corrosion of bolted connections.

Footpath balustrade.

Tray below footpath.

Footpath condition.

Deterioration of bolt connections.

Pipes below footpath.

Timber Superstructure Components

Bridge bearers support the deck of the bridge. Some bearers (image below) are affected by rot, and sealing the exposed timber is not likely to be successful. 60% of external bearers are in fair or poor condition. This rot is mainly at the exposed edges; however, it is now progressing to within the bridge as the timber sucks in the moisture.

The stringers made of wandoo wood have lasted well, but further exposure to weather and water will cause ongoing deterioration. Stringers inspected showed 10% in excellent condition, with 65% good, 20% fair and 5% poor.

The bridge's bolted connections have reached the end of their useful life in many areas as the bolts have corroded, particularly those exposed to the weather (piers, outside stringers, corbels, and outside bearers). This is an issue throughout the bridge.

An outcome of the corroded bolts is splitting of the timber elements, which reduces the structural effectiveness. There is no effective repair for these components.

Span 3 LHS top of bearer 5.

Weathering of outisde stringer.

Weathered timber - split bearer and corbel.

Timber at the location of bolts securing the guardrail post to the deck.

Deck reinforcing and lack of shelter to outside stringers.

Weathered split timber from corroding bolts.

Steel Elements in Navigation Spans

Steel elements of the bridge have widespread paint coating failure. All surfaces show widespread spot corrosion. Additionally, and there are areas with local section loss in the main girders, supporting stringers and bracing. To repair surface corrosion on the steel, the only option is to blast clean the steel work and re-coat. The age of the coating suggests there will be a red lead undercoat which may create environmental concerns during repair. Due to the amount of crevice corrosion, a fully accessible recoating may be difficult to achieve.

The failure of the coating system has caused a large number of rivet heads to be in an advanced state of corrosion.

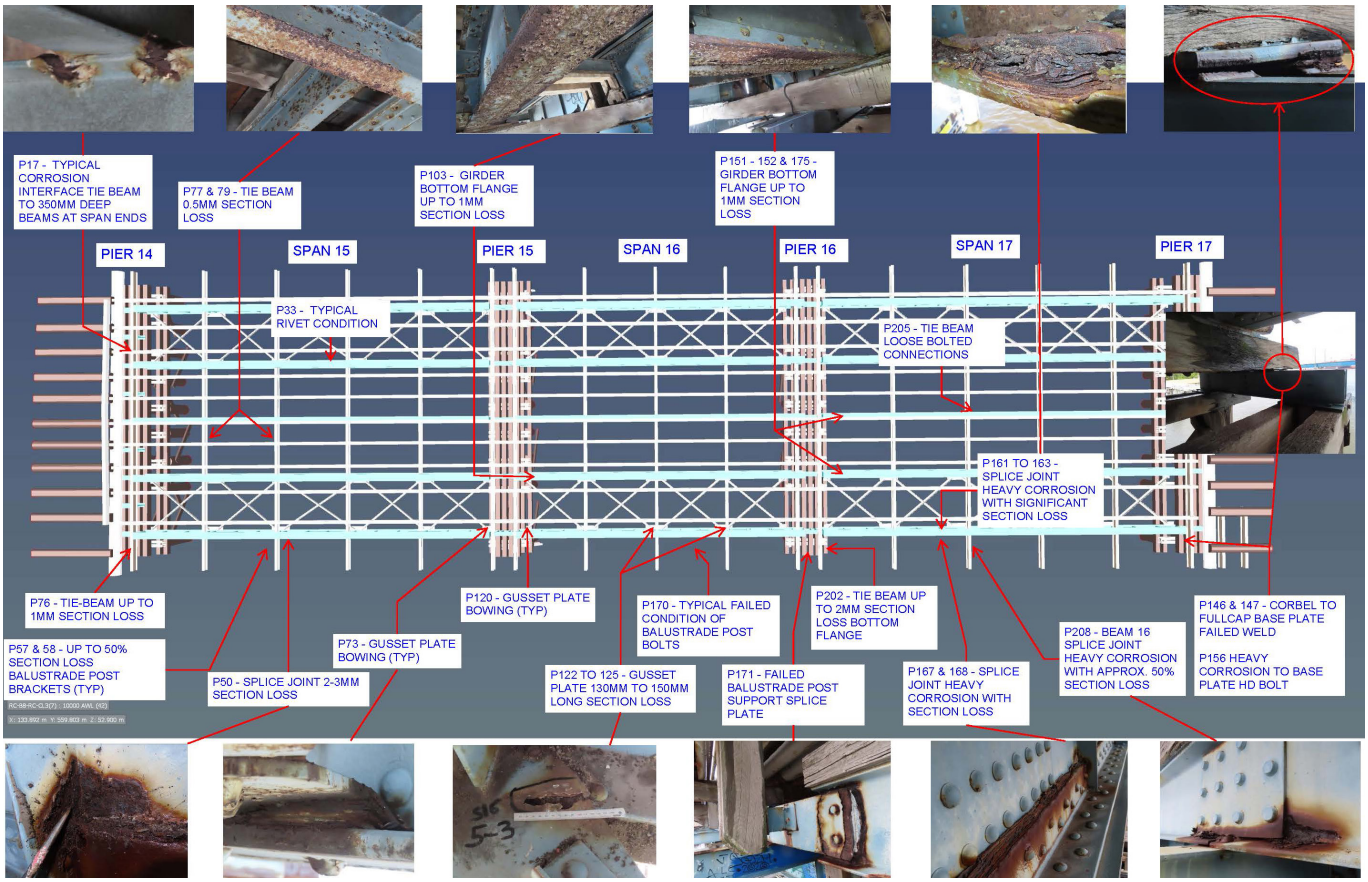
Heavy corrosion.

Corrosion of bolts and rivet heads.

Main girder, transverse support and stringer.

Span 17 stringer 11 loss of section.

NAVIGATION SPANS KEY AND TYPICAL DEFECTS



Piles Above Water

The piles above water level have had concrete pile pot repairs near water level. These are showing cracking and rusting of the supporting repair bands.

Above the pot is a splice in the pile. The bolts are rusting, causing splitting to the splice zone. This rust induced splitting is also affecting the bracing and waling, which are important structural elements due to the very tall piles at this bridge.

In the navigation spans, the piles support a series of timber capping beams, those exposed to the weather are deteriorating.

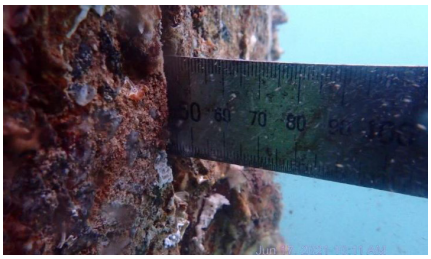
Piles Underwater

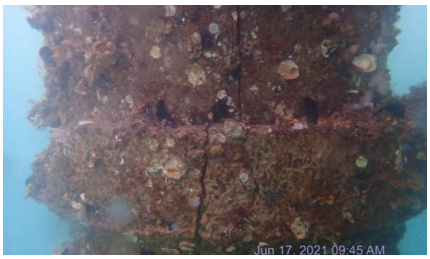
A below the waterline inspection has been completed which included visual observations and taking core samples from the timber piles.

In 2014, significant upgrades to the pier protection for both the traffic and the rail bridges were carried out, and the existing timber fender system at the navigation channels on the bridge was upgraded.

In 2016, a structural concrete encasement was cast directly around the timber piles in the navigation span piers, used to strengthen and protect the wood from marine borers (Teredo). Scour at the site resulted in loss of pile support, requiring the piles to work harder.

In other piers, the timber was historically protected using non-structural casings around the timber pile, with the gap filled with sand. Some of these casings are now cracked with sand leaching out. Without the protection of the sand, then Teredo worms have the ability to enter through the small concrete cracks and attack the timber piles. Core samples taken show Teredo worm attack is not significant at this time, however the reduction in the timber pile protection is a concern.





Cracks in the concrete protection jacket allowing sand to leach out

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