

30013602

19 February 2024

Alex Labrosse
Transport for NSW

Dear Alex,

RE: Terania Street Bridge – Structural soundness following impact on 07 February 2024

Background

The existing disused rail bridge over Terania Street is a timber rail bridge with 12 spans in Lismore NSW. Due to impact damage and very poor condition, SMEC was engaged to design a propping system and barrier system to both protect the bridge and to help support damaged piers.

Each span consists of timber corbels over the piers with pairs of two timber beams. Each pier consists of 5 timber columns with timber cross bracing and timber headstocks.

The bridge superstructure of span 5 was recently hit (07/02/2024) by a truck. The bridge was closed to allow for assessment of damage. Video footage showed that the truck was travelling slowly (approx. 20km/h) and it appears that only the exhaust stacks have hit the superstructure. This follows another truck impact that occurred in January which was discussed in a separate letter dated 19/01/2024.

SMEC inspected the structure and the propping system jointly with TfNSW on 09/02/24 to determine whether the bridge condition and stability were unchanged since the props were installed.

Observations

Overall, the condition of the bridge appears mostly the same as from previous inspection in September 2023. With the following exceptions.

1. Bottom girder on western side of span 6 is split longitudinally from a truck impact (as discussed in SMEC's letter dated 19/01/24). Refer Photo 1 below.
2. Middle girder in span 5 appears to have displaced laterally. At one end it is slightly displaced from the corbel at the other end, the corbel has rotated (in plan) and provides less bearing support to the middle girder. Refer Photo 2 below.
3. Girders in spans over the traffic lanes and the footpath are generally sound (except the girder mentioned in item 1).
4. It appears that Pier 5 may have been displaced by approximately 10 mm. A holding down plate appears to have recently been bent. Comparing to previous photos it is hard to determine if this has definitively occurred. Refer Photo 3 below.

SMEC
52 Victoria Street
Grafton NSW 2460

E Grafton@smec.com

www.smec.com



Photo 1: Split in bottom beam from impact in Jan 2024



Photo 2: corbel displaced (far end) and damage to side of girder.



Photo 3: pier 4 column appears to be displaced in relation to plate

The propping system was observed to be unaffected by the impact. There were no signs that it had moved or suffered damage.

Based on the inspection, the key concerns identified were:

1. As before the bridge is stable when just standing, but a large impact would likely cause progressive collapse of the structure. The stability of the piers is the main concern. While they are protected by barriers, if the superstructure is hit by a large enough impact, a pier may fail. Once one pier fails, progressive collapse of the bridge is likely. The magnitude of such an impact is difficult to stipulate without undertaking some analysis.
2. The corbel mentioned in item 2 above has minimal restraint and therefore if it or the girder it supports are hit with sufficient force, the corbel could fall out, causing the middle beams to also fall. This obviously presents a risk to any vehicles passing underneath (if the road were reopened).
3. There remains a risk that the bridge could be hit again.

Actions

It was understood on the day of the inspection that the road under the bridge was to remain closed until TfNSW Bridge Assessment Committee could assess the bridge. Therefore, no remediation actions were discussed or agreed.

It is understood that a load rating assessment is to be done to quantify the impact that might cause collapse of the bridge. SMEC will undertake this load rating assessment.

Recommendations

Given the regularity that this bridge is hit and the poor condition, it is our view that the spans of the bridge over the road should be removed. However, the stability of the bridge as a whole would need to be determined through a demolition assessment as it may be necessary to demolish the entire structure if individual spans are removed due to global stability issues.

Any minor remediation to enable the road to be reopened is delaying the inevitable and plans need to be put in place to remove the spans over the road and footpath (as a minimum). The previous work undertaken by SMEC were intended to make the bridge safe to enable the road to be reopened. They were intended to be a temporary solution (i.e 6 months) while efforts were made to gain approval for the demolition of the structure.

Yours sincerely,



Brendan Keane

Associate Engineer – Structures (CPEng NER)

Phone: 02 6644 2650

Mobile: 0450 692 719

Email: Brendan.Keane@smec.com