

30013602

19 January 2024

Bradley Heard
Transport for NSW

Dear Bradley,

RE: Terania Street Bridge – Structural soundness following impact

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 as indicated in Photo 1 below.

The bridge superstructure was recently hit by a truck, causing damage to one of the timber beams in Span 6. The lane under this span was closed to allow for assessment of the damage. It is thought that the truck had previously passed through Span 5 without incident and therefore assumed that it was safe to pass through Span 6. However, span 6 lower vertical clearance than Span 5.

SMEC inspected the damage to the structure and the propping system jointly with TfNSW on 18/01/24 to determine whether the lane under the Span 6 was safe to reopen to traffic.

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Photo 1: Span Arrangement

Observations

It appears that the truck caught one or more of the bolts protruding from the underside of the beam. This has resulted in a longitudinal split (see Photo 2 below).



Photo 2: Split in bottom beam

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. The damaged beam can no longer be relied upon to support any load.
2. In its current state, the damaged beam may drop debris onto vehicles.
3. The split in the beam reduces the bearing area of the beam at the support.
4. There remains a risk that the bridge could be hit again.

Actions

To address each of these concerns the following actions were agreed between SMEC and TfNSW.

1. SMEC is to undertake a load capacity check of the top beam (ignoring any support from the bottom beam) to determine if the top beam is sufficient to carry the current loading.
2. Clamp the damaged beam together with threaded rod to close the split and strap the beam at intervals with packing straps to prevent falling debris and tie the bottom and top beams together.
3. Clamp the damaged beam together with threaded rod to close the split and restore the bearing area at the supports.
4. Update clearance signs to show that clearances differ between Span 5 and Span 6.

SMEC has undertaken the load capacity check and demonstrated that the top beam is adequate to carry the loading. The load capacity check was based on the following assumptions:

- Dimensions taken by TfNSW on site on 18/01/24 (attached)
- F22 timber grade (as recommended by the RTA timber bridge manual)
- Damaged beam assumed to be dead load only and not contributing to the capacity.
- Loads considered were – self weight of beams, sleepers, steel angles, steel rails. No live load considered as access to the top of the bridge is blocked.
- Load factors were as per AS5100.2.

Impact loading was not checked but it is highly unlikely that the bridge can resist the impact load case specified in AS5100.2. SMEC note that this is not a change and it is also unlikely that the bridge could resist this loading before it was damaged.

SMEC understands that TfNSW have undertaken the strapping and clamping works and these have been completed, in addition it is noted that the new clearance signs have been installed.

Recommendations

Given the poor condition of the bridge and the damage sustained from repeated truck impacts, SMEC recommends that the spans over the road be demolished as a matter of urgency.

Yours sincerely,



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Attachment 1 – Dimensions

