NZ TRANSPORT AGENCY WAKA KOTAHI

Structures maintenance/ renewal funding request form

WSP | OPUS

Network area	Structure name	Highway	RP	BSN
South Canterbury	Ashburton (Hakatere) River Bridge	1S	430/0 6	4306

Priority	Work category				
High (year 1)	215B Structural Bridge Component Replacements	Year constructed:	1931	Map ref. (easting):	1498819
		One Network Road Classification (ONRC):	Secondary Collector	Map ref. (northing):	5137422
		Vehicles per day:	23,904	Owner:	NZTA
		% heavy vehicles:	8.7%	RCA:	NZTA

Proposed Works

Inject cracks in beam ends. Jack all beams at every second sliding pier (i.e. every fourth pier) and install an elastomeric bearing pad to reinstate 'sliding'/movement ability. Undertake conventional joint repairs with a sealant.

Structure description

342m long, 32 span, two lane reinfroced concrete T-beam bridge founded on reinforced concrete wall piers and driven RC piles. Simply supported detailing with 'sliding' joint over every second pier (although high friction interface may be resulting in some beams no longer 'sliding'). Timber decked and steel joist clip-on footway on the upstream side.

Problem description

Failure and leaking of the expansion joints and breakup of the surfacing within the joints. This is starting to cause driver discomfort and the water leakage is exascerbating the cracking in the beams ends (caused by thermal movement). Freeze-thaw effects presents the risk of further damage to the ends of the beams.

s 9(2)(b)(ii)

Option assessment

Option	Brief details of option considered	Recomm. Option?	Life	Effectiveness	Risk assessment (see Risk Rating worksheet for details) Risk category	Consequence	Likelihood	Risk level
Do nothing:	Continue to monitor the bridge allow the joints to leak.	No	0-5 yrs	Not effective	Stakeholders	Severe	Possible	High
Do minimum:	Repair leaking deck joints (PMB) and monitor cracks in beam ends.	No	5-10 yrs	Not effective	Stakeholders	Severe	Possible	High
Option 1:	Repair leaking deck joints and inject cracks in beam ends.	No	5-10 yrs	Not effective	Stakeholders	Severe	Unlikely	Medium
Option 2:	Inject cracks in beam ends. Jack all beams at every second sliding pier (i.e. every fourth pier) and install an elastomeric bearing pad to reinstate 'sliding'/movement ability. Undertake conventional joint repairs with a sealant.	Yes	10-20 yrs	Effective	Stakeholders	Severe	Rare	Low
Option 3:	Inject cracks in beam ends. Jack all beams at every sliding pier (i.e. every second pier) and install an elastomeric bearing pad to reinstate 'sliding'/movement ability. Undertake conventional joint repairs with a sealant.	No	10-20 yrs	Effective	Stakeholders	Severe	Rare	Low

Recommended option

Option 2: Inject cracks in beam ends. Jack all beams at every second sliding pier (i.e. every fourth pier) and install an elastomeric bearing pad to reinstate 'sliding'/movement ability. Undertake conventional joint repairs with a sealant.

Reason for recommendation:

Joints are in poor condition and will continue to break up and deteriorate, resulting in driver discomfort. Leakage is also exacerbating the cracking and spalling of the beam ends. Repairing the cracks in the beam ends alone does not address the cause of the cracking and it is expected that the repaired cracks will reopen due to thermal movement. Installing an upgraded bearing at every second sliding pier is recommended initially. The elastomeric pads would be designed to cater for the thermal movement of four spans. The beam ends at the untreated sliding piers would continue to be monitored. If these beam ends start to deteriorate, the beams at these untreated piers can be jacked and bearings upgraded in the future as required.

Proposed works and methodology

Crack seal the joints with PMB (low cost). Jack all beams at every second sliding pier (i.e. every fourth pier) and install an elastomeric bearing pad to reinstate 'sliding'/movement ability. Undertake conventional joint repairs with a sealant.

Prioritisation (see Prioritisation Tables worksheet for details)

Category	Safety	Level of service	Cost deferral	Legal/ environment
Priority	Medium (years 2-4)	High (year 1)	High (year 1)	Low (year 5+)

Justification

If the joints continue to deteriorate, there will be a higher cost for repairs and increased driver discomfort. Safety and capacity of the bridge could also be compromised if the end of the beams spall off and their seating is reduced. In the worst case, this could cause a beam to settle, which has occurred on other similar bridges in the past.

Consequences of not doing work

If repairs are not undertaken, beam end failure similar to observed on the SH67 Orowaiti River Bridge is possible. This could result in the ends of the beams spalling off and possibly failure and settlement of the beams due to their limited seating. Joint leakage is exacerbating this, and is also starting to lead to breaking up of the ashphalt and driver discomfort.

Document preparation

Prepared by	s 9(2)(a)	Title	Service Line Leader Bridge Asset Manager	Date	1/10/2019
Approved by	s 9(2)	Title	Senior Bridge Engineer	Date	3/10/2019

Summary

Highway	BSN	Asset name	Network area	Work category	Proposed works	Cost	Life	Effectiveness	Priority	Prioritisation category
1S	4306	Ashburton (Hakatere) River Bridge	South Canterbury	215B	Inject cracks in beam ends. Jack all beams at every second s iding pier (i.e. every fourth pier) and insta l an elastomeric bearing pad to reinstate 'sliding'/movement ability. Undertake conventional joint repairs with a sealant.	$ 550,000	10-20 yrs	Effective	High (year 1)	Level of service

Document review - RAPT response

Reviewed by	s 9(2)(a)	Title	Principal Structures Engineer	Date	24/02/2020
Outcome		Comments			

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215B Structural Bridge Component Replacements	**One Network Road Classification (ONRC):**	Secondary Collector	**Map ref. (northing):**	5137422	
Proposed Works:	**Vehicles per day:**	23,904	**Owner:**	NZTA	
Inject cracks in beam ends. Jack all beams at eve	**% heavy vehicles:**	8 7%	**RCA:**	NZTA	

Photos/plans

Figure 1 - Typical deterioration of deck joints

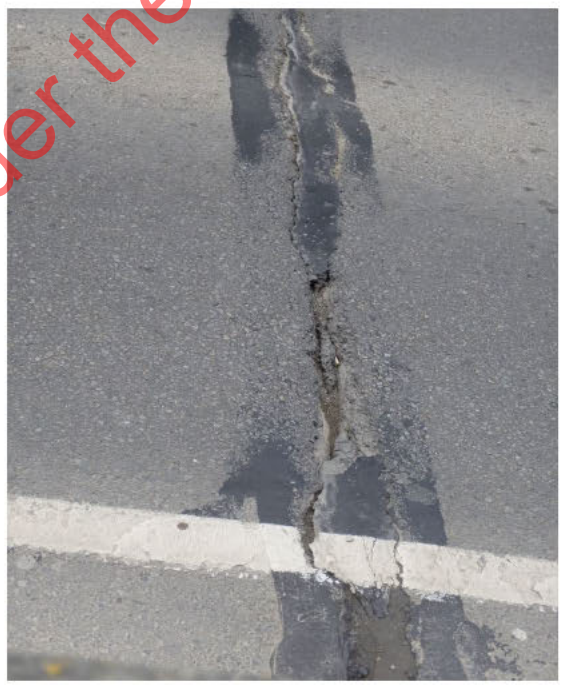

Figure 2 - Typical deterioration of deck joints, showing breakup and leakage.

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Figure 3 - Cracking at beams ends like due to thermal movement (lack of appropriate sliding surface) and exacerbated by water leakage

Figure 4 - Cracking at beams ends like due to thermal movement and exacerbated by water leakage. Could lead to spalling and seating

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Photos/plans

Figure 5 - Typical corrosion of footway joints. Will require recoating in a few years (at risk of section loss in a few areas.

Figure 6 -