

NZ Transport Agency (NZTA)
Private Bag 106602
Auckland 1143
New Zealand

20 April 2015

Attention: Kumaran Nair

Dear Kumaran,

AHB SkyPath Concept Structural Assessment Technical Report Comments

Further to our recent meeting to discuss SkyPath we have reviewed the letter received from AHB Pathway Trust dated 23 January on the latest load assessment of the effects of the proposed SkyPath on the bridge and have the following responses to the points in the letter.

1. a) The Southbound traffic loading applied in the latest assessment was the same as previously applied in the earlier assessment in 2011. Current loadings are tracking very close to the Southbound traffic loading used in the assessment.
b) "FP" noted on Bending Moment diagram in Appendix D is pedestrian loading as defined in loading standard BD37/01.
2. The latest assessment used loading that is appropriate for the current traffic load measurements. We note that traffic loading for the southbound extension bridge has increased since that reported in the 2011 Load Study.
3. Spans 3 to 7 can be strengthened using localised stiffening of steel box girder panels.
4. a) NZ Transport Agency standards refer to BS5400 for steel orthotropic box girders. BS5400-2:2006 is the latest version and includes amendments made in BD37/01. Temperature loading for steel box girders is the same as BD37/01.
b) Differential temperature is applied as per the above standard with a positive temperature difference of 24 °C.
c) Differential temperature was not measured in Span 2 by Ministry of Works, however, differential temperatures of 26 °C were measured at other locations.
d) We are not able to advise on annual variations of differential temperature.
e) Surfacing of the orthotropic deck uses Bolidt, a proprietary material that includes a bauxite anti-skid treatment which is light coloured when laid.
5. Extensive temperature monitoring has been carried out on the box girders in the past and reviews of this data indicated that the peak temperature differentials measured on the bridge were similar but slightly higher than those in BS5400. It was thus decided that design standards should be applied in the assessment of the bridge. If a departure from standards is acceptable to the Transport Agency this can be investigated during design development.
6. Agreed, the proposed detailed assessment will need to be carried out after wind tunnel testing.

7. Lane factors are based on measurements of traffic in each lane which varies over time. Current lane factors from the 2014 model show second lane factors of approximately 0.5, however, these will be reviewed for detailed design.
8. Loading for the AHB assessment has been applied in accordance with Transport Agency standards. The probability of combinations of different load effects is taken into account in the loading standard. If the Transport Agency accepts departures from standard then these can be agreed and applied during design development. It is anticipated that traffic loadings can be derived for different times of day and weekends as noted in the letter. This will require additional data acquisition, load modelling and analysis.
9. Please find a copy of the Auckland Harbour Bridge Pathway Concept Structural Assessment Technical Report Rev C dated 10 July 2012.
10. Noted.
11. The final version of the latest Skypath Concept Structural Assessment Technical Report dated 14 November 2014 reported on the assessment of the eastern extension bridge structure to the current Transport Agency standards. In the next stage of the project a more detailed assessment will be necessary and further review of potential departures can be addressed in design development.

We are not party to decisions on funding for the SkyPath project, however, it should be noted that the 2008 design of strengthening works allowed for a 2.5m deck level walkway on the eastern extension and a 2.5m cycleway on the western extension combined with the traffic loading at that time. This was the maximum that the bridge could be practicably strengthened to in the critical navigation span.

We hope this provides sufficient information for you to respond to the Pathway Trust. Please do not hesitate to contact us if you have any queries.

Yours sincerely

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on behalf of

Beca Ltd

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Nick Coxhill, NZ Transport Agency.