

Technical Note

Project Number: J15028.00 Project Name: Esperance Jetties Condition Assessments

Date: 24/04/2018 Doc Ref: Tn-J15028-6

Client: Shire of Esperance – Mr. Alun Hughes

Subject: Esperance Tanker Jetty – Stabilisation Proposal Bent 67

Background

BMT has provided the Shire specialist condition advice on the timber Tanker Jetty condition over a number of years, the most recent being Document Reference Tn-J15028-5 *Esperance Tanker Jetty - Feasibility of preventing potential collapse of the Tanker Jetty superstructure* which references several other reports listed at the end of this Technical Note for reference.

The report concluded that the structure is now considered totally failed and at the end of its functional life requiring each individual component to be replaced, in engineering terms it would not be considered feasible to repair or even stabilise the structure economically due to the scale and technical difficulties with such a task. Significant safety risk was identified with the fragile nature of the structure and consequences of failure that could be initiated during works.

Since that time, the Shire sought and received confirmation that management actions required to remove collapsed Pile Group 66 materials and mitigate the consequence of partial failures of the structure was consistent with the Conservation Order. The Shire provided clarifications including regarding not mooring marine plant to the structure such that it was not loaded and the inability to safely work beneath the structure. It is understood that removal was carried out in late March 2017.

The purpose of this note is to provide an engineering opinion on a proposal from Friends of the Tanker Jetty Group (FTJG) in a letter dated 15 April 2018 detailing splicing sagging Stringer members in the vicinity of the removed Pile Group 66 to:

1. Stop the gap between the stringers widening,
2. Reduce any further weight transfer onto pile 67S.

Rev	Issue	Prepared by	Submitted to	Date	Copies
A	Issued for Client Review	B.Saunders	Shire of Esperance	19/04/2018	1 Elec.
0	Issued for Client Use	B Saunders	Shire of Esperance	24/04/2018	1 Elec.



Figure 1 Pile Group 66 (missing) & 67 07/04/18

Assessment

Firstly, significant Safety in Design challenges exist for any works on the structure as recent management works have shown.

Structurally, we have the following comments:

- the stringers are separating as the deck drapes between adjacent pile bents to Group 66 as a result of complete loss of bolt section to all connections on the structure
- joining of the stringers to prevent them separating would resolve the above failure of the bolted connection and allow them to support the deck as the structure settles or across lost pile groups as has been noted in previous reports
- this would however increase loads on adjacent groups rather than reduce it as noted in the query and therefore not provide the intended solution
- it is deemed unsafe to work beneath the structure in this condition
- the analogue of failure and structure fragility is well established in past collapses over time
- the current condition of the structure in practice means that work other than management actions to prevent escape of floating debris (carried out clear of beneath the deck) is not considered feasible unless it is in the context of complete structural system replacement which in our view would require complete demolition given the deck condition being rated as failed

Conclusion

The conditions leading to the current state of the stringer is widespread in the structure deck. The condition of the piles that led to the failure of Pile Group 66 and 67 is also widespread within the structure. It is likely that additional loading of adjacent bents will continue to fail them resulting in a progressive collapse in time as was predicted previously. This could occur at any time and particularly the risk increases with winter storm wave events.

Mitigating actions to preserve the fabric remaining would be to remove sections of deck when they show this level of distress. This would decrease loading of adjacent bents until such time as either of the piles failed, but would not prevent failure over time.

Reference Documents

1. *Tn-J15028-5 Esperance Tanker Jetty - Feasibility of preventing potential collapse of the Tanker Jetty superstructure*
2. *Tn-J15028-3 (Rev 0) - Esperance Tanker Jetty - Condition of Jetty Superstructure Components for Re-use, 19/05/2017*
3. *P-J15028-1 Rev0 Tanker Jetty Condition Inspection – Initial Findings 20/11/2016*
4. *Tn-J15028-4 - Esperance Tanker Jetty - Impact of potential collapse of the Tanker Jetty superstructure, 01/08/2017*
5. *BG&E, 2010 - Esperance Tanker Jetty Structural Assessment*

Attachments

1. *Friends of the Esperance Tanker Jetty Association Inc Letter 15 April 2018*