Oberon Tarana Heritage Railway

Engineering Manual

Track

OTCS 203

TRACK INSPECTION FORMS

Version 1.0

Issued August 2018

Approved by:

Document control

Revision	Date of Approval	Summary of change
1.0	August 2018	First Issue. Developed specifically for BBRC.

Summary of changes from previous version

Section	Summary of change

Contents

1 Purpose scope and application

The Track Inspection forms contained in this Manual have been developed specifically for the Byron Bay Railroad Company and cover the following inspections and examination of civil infrastructure found on the OTHR.

EOL	Examination of Length
SIGN	Inspection of Signs
DEFECT	Defect Summary Report
SDG	Siding Inspection
GIJ	Inspection of Glued Insulated Joints
LX	Level Crossing Examination
PLAT	Platform Clearances Examination
WTSA-1	WTSA Manual Analysis Input – LWR
WTSA-2	WTSA Manual Analysis
SBE	Steel Bridge Examination
T/O	Turnout Examination

2 Completion of Inspection Forms

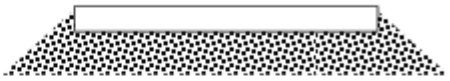
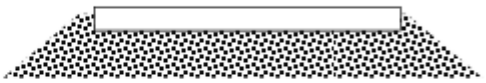
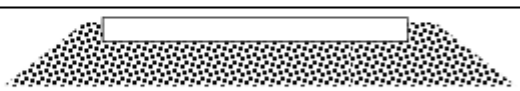
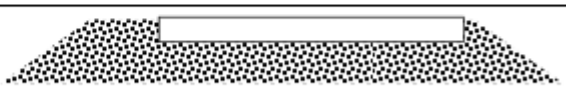
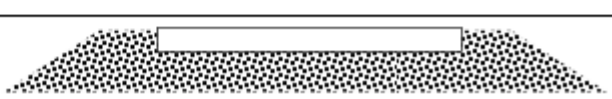
Where appropriate the Inspection forms contain details of acceptable limits to assist the examiner in identifying defect conditions.

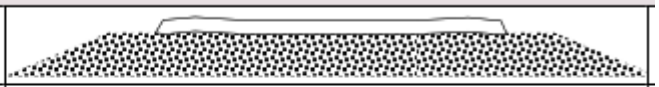
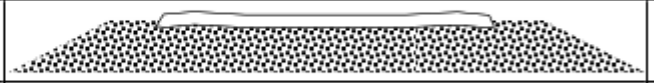
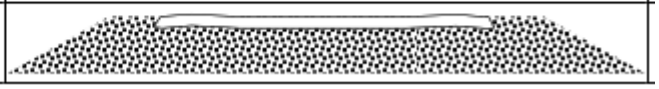
2.1 Welded Track Stability Analysis

The Welded Track Stability Analysis requires a number of tables of data to complete the manual analysis. These are contained below.

2.1.1 Ballast Examination

Identify locations where ballast deficiencies exist. Using the Tables below record the worst condition is each 500m section.

For Ordering Ballast	SHOULDER - CONCRETE STEEL AND TIMBER SLEEPERS	
16t/20m	Nil each Side	
12t/20m	Half Shoulder one side - Nil other side	
8t/20m	Half shoulder both sides	
4t/20m	Full Shoulder one side - Half other side	
-	Full Shoulder both sides	

CRIB - STEEL SLEEPERS		
10/20m	Nil in Crib and pod	
5t/20m	Half Full Crib and pod	
-	Full Crib and pod	

Add the crib result and the shoulder result to determine the stability loss.

Loss of Track Stability (% of total stability)					
Crib				Shoulder	
Ballast required (Tonnes/20m)	% Stability Loss	Ballast required (Tonnes/20m)	% Stability Loss	Ballast required (Tonnes/20m)	% Stability Loss
1	7	7	30	1	5
2	14	8	30	2	10
3	19	9	30	3	14
4	24	10	30	4	17
5	27	11	30	5	19
6	29	12+	30	6	20
				7	20
				8+	20

Table 17 - Influence of Ballast Deficiencies

2.1.2 Rail Adjustment Stability Loss

Calculate the Rail Temperature Error.

The Rail Temperature Error for the 500m section will be the difference between the Actual Measured Rail Temperature and the Theoretical Measured Temperature from Table 10.

Rail Temp Error = Actual Measured Temp - Theoretical Measured Temp.

If the Rail Temperature Error is a minus number then the effective neutral temperature for the rail has been reduced by poor adjustment. In other words, there is likely to be an excess of steel. The Rail Temperature Error is a suitable means of comparing sections of Track Adjustment.

Example:
Actual measured rail temp = 28°C
Theoretical temperature = 32°C
Rail Temperature Error = 28-32 = –4°C
Effective Neutral Rail Temperature = 35-4 = 31°C
(35°C is the design neutral temperature.)

Theoretical Measured Temperature (°C)														
AVERAGE RAIL LENGTH (m)		No. Gaps /500m	Average Rail Gap (mm)											
			2	3	4	5	6	7	8	9	10	12	15	20	25
	33	(15)	45	43	40	38	35	32	30	27	25	20	12	0	0
	36	(14)	45	42	40	37	35	33	30	28	25	21	13	0	0
	38	(13)	44	42	39	37	35	33	31	28	26	22	15	4	0
	42	(12)	43	41	39	37	35	33	31	29	27	23	17	6	0
	45	(11)	43	41	39	37	35	33	31	29	27	24	18	9	0
	50	(10)	42	40	38	37	35	33	32	30	28	25	20	11	3
	56	(9)	41	40	38	37	35	33	32	30	29	26	21	13	6
	63	(8)	40	39	38	36	35	34	32	31	30	27	23	16	9
	71	(7)	40	39	37	36	35	34	33	31	30	28	24	18	12
	83	(6)	39	38	37	36	35	34	33	32	31	29	26	21	16
	100	(5)	38	38	37	36	35	34	33	32	32	30	27	23	19
	125	(4)	38	37	36	36	35	34	34	33	32	31	29	25	22
	167	(3)	37	37	36	36	35	34	34	33	33	32	30	28	25
	250	(2)	36	36	36	35	35	35	34	34	34	33	32	30	29
	500	(1)	36	36	35	35	35	35	35	34	34	34	33	33	32

Table 10 - Jointed Welded Rail - Gap Analysis

For all positive values of rail temperature error (CWR and JWR) % Stability Loss = 0

Loss of Track Stability (% of total stability) (based on single rail only)					
Rail Temperature Error	Jointed Welded Rail	Continuous Welded Rail	Rail Temperature Error	Jointed Welded Rail	Continuous Welded Rail
-1	3	2	-16	53	40
-2	7	5	-17	57	43
-3	10	8	-18	60	45
-4	13	10	-19	63	48
-5	17	13	-20	67	50
-6	20	15	-21	70	53
-7	23	18	-22	73	55
-8	27	20	-23	77	58
-9	30	23	-24	80	60
-10	33	25	-25	84	63
-11	37	28	All positive values	0	0
-12	40	30			
-13	43	33			
-14	47	35			
-15	50	38			

Table 11 - % Loss of Track Stability

2.1.3 Track Disturbance

Track Disturbance Stability Loss		
Months since work	Resleepering	Resurfacing
>6	0	0
5 to 6	0	9
4 to 5	0	15
3 to 4	0	20
2 to 3	11	22
1 to 2	17	24
0 to 1	20	24

2.1.4 Track Condition

Good Track	0% loss
Fair Track	5% loss
Poor track	10% loss

2.1.5 Location Factor

Location Factors						
Curvature	0 - 400m		0.20	Increased stability loss		
	400 - 800m		0.12	"	"	"
	800 - 1600m		0.07	"	"	"
	1600 +		0.00	"	"	"
Grade	> 1:60		0.05	"	"	"
	between 1:60 and 1:120		0.02	"	"	"
	< 1:120		0.00	"	"	"
Single line (traffic in both directions)		Yes	0.00	"	"	"
		No	0.02	"	"	"
Braking	Heavy braking zone		0.05	"	"	"
	Steady braking zone		0.02	"	"	"
	Non braking zone		0.00	"	"	"
Rail bunching points in section eg. crossovers, level crossings, fastening type changeover, bridges, etc.		Yes	0.10	"	"	"
		No	0.00	"	"	"
Location Factor = 1.0 + Sum of relevant items						

Table 21 - Location factor

Appendix 1 Inspection Forms