THE INTERNATIONAL RESEARCH GROUP ON WOOD PROTECTION

Section 2   **Testing Methodology and Assessment**

Radiata pine sap/heartwood

Natural durable timber – Field test results
IRG/WP Durability Database

Singh, T.

AIMS AND SCOPE OF THE IRG-WP DURABILITY DATABASE

The overall aim of the IRG-WP durability data base is the allocation of wood durability test results for comparative studies and re-analyses. The data base shall serve as pool for service life prediction and modelling and shall contribute to an enhanced understanding of wood durability. It is an open web-based platform for scientific exchange in the field of wood durability and wood protection.

It is NOT the aim of the data base to promote or denigrate any product or material. The data base will contain raw data only; no statistical evaluation will be included. Thus it will be the exclusive responsibility of the user to interpret the test results published in the data base.

For each data set, the full range of information about the test method, the test material, and other relevant parameters, is required to guarantee reliability of the data. For this reason every data set submitted is reviewed and checked for completeness of all relevant data.

The database allows submission of assessment data from all kinds of standardized and non-standardized wood durability tests.

Records of the IRG/WP Durability data base shall be cited as in the following example:

Brischke C., Meyer L. (2013) Douglas fir. Natural durable timber - Field test results. IRG/WP Durability Database. Stockholm: The International Research Group on Wood Protection, IRG/WP/DDB 13-00001.

INFORMATION

AUTHOR

Corresponding author   Tripti Singh

Email   tripti.singh@scionresearch.com

Institution   Scion

Street/PO Box   New Zealand Forest Research Institute

City   Rotorua

Zip Code   3046

Country   New Zealand

TESTED/REFERENCE TIMBER

Trade name   Radiata pine

Botanical name   *Pinus radiata* D. Donn.

Origin   New Zealand

Number of replicates   10

Timber quality (optional)   Sample from 27 years old, flat sawn timber (mixed sap/heartwood)

TEST METHODS

Standard method   Decking test based on ASTM – International as described in Australasian Protocols for Assessment of Wood Preservatives by AWPC (Australasian Wood Preservation Committee)

Reference

Specimen dimension and shape   35 x 90 x 1000 mm³ clear mainly sapwood, but some boards with heartwood

Rating scheme (Decay)	Separate assessment of untreated road end bearer and nursery end treated (H3 CCA specification)
	Rating as per ASTM D 1758: 10 = No decay T = Trace, discolouration or softening, not positively identified as decay 9 = First stages of decay or damage up to 3% of cross-section 8 = Lightly established decay, 3-10% of cross-section 7 = Well established decay, 10-30% of cross section 6 = Deep established decay, 30-50% of cross section 4 = Severe decay, nearing failure, more than 50% of the cross section 0 = Failed
Rating scheme (Mould)	Rating as per ASTM D 1758: 1 = No perceivable mould 2 = Light mould patches or a few widely scattered spots 3 = Numerous spots or widespread light mould 4 = Severe mould, up to 50% coverage 5 = Severe mould, >50% coverage
Rating scheme (Surface checks)	1 = No surface checks, fine knot checks not visible in damp weather 2 = Minor checks to 0.5mm wide, not obvious in damp weather 3 = Well established checks to 1mm wide and 50% board thickness 4 = Many or deep and severe checks over 1mm wide 5 = Board completely split and allowing obvious water egress
Address of test site	Whakarewarewa Rotorua New Zealand
Geographic coordinates (optional)	38°09'16.6''S 176°15'58.0''E
Start of test	September 10 1998
Last evaluation	September 10 2007
Status of test	Terminated

RESULTS

Assessment – Fungal decay - Road end untreated bearer

Material	*Pinus radiata* D.Donn.					
Date	10.09.1999	10.09.2000	10.09.2001	10.09.2002	10.09.2003	10.09.2004
Assessment	1	2	3	4	5	6
Replicate ID	[10-0]	[10-0]	[10-0]	[10-0]	[10-0]	[10-0]
1	10	7	7	4	4	4
2	10	9	8	4	4	4
3	10	9	7	4	4	4
4	9	9	8	6	4	4
5	10	9	9	6	4	4
6	9	7	6	4	4	4
7	9	7	7	4	4	4
8	8	7	6	4	4	0
9	8	8	7	6	4	4
10	8	7	7	6	4	4

Material	*Pinus radiata* D.Donn.					
Date	10.09.2005	10.09.2006	10.09.2007			
Assessment	7	8	9	10	11	12
Replicate ID	[10-0]	[10-0]	[10-0]	[10-0]	[10-0]	[10-0]
1	4	4	0			
2	0	0	0			
3	0	0	0			
4	0	0	0			
5	4	0	0			
6	0	0	0			
7	0	0	0			
8	0	0	0			
9	0	0	0			
10	0	0	0			

Assessment – Fungal decay - Nursery end treated bearer

Material	*Pinus radiata* D.Donn.					
Date	**10.09.1999**	**10.09.2000**	**10.09.2001**	**10.09.2002**	**10.09.2003**	**10.09.2004**
Assessment	1	2	3	4	5	6
Replicate ID	[10-0]	[10-0]	[10-0]	[10-0]	[10-0]	[10-0]
1	10	9	9	8	7	7
2	10	9	9	8	7	7
3	10	9	9	8	7	6
4	10	9	9	8	7	7
5	10	10	9	8	7	7
6	10	9	9	7	6	6
7	9	10	9	8	7	7
8	10	9	9	7	4	0
9	10	9	9	8	7	7
10	9	9	9	7	7	7

Material	*Pinus radiata* D.Donn.					
Date	**10.09.2005**	**10.09.2006**	**10.09.2007**			
Assessment	7	8	9	10	11	12
Replicate ID	[10-0]	[10-0]	[10-0]	[10-0]	[10-0]	[10-0]
1	7	4	0			
2	0	0	0			
3	0	0	0			
4	0	0	0			
5	7	0	0			
6	0	0	0			
7	0	0	0			
8	0	0	0			
9	0	0	0			
10	0	0	0			

Assessment – Decay types - Road end untreated bearer

Material	*Pinus radiata* D.Donn.					
Date	10.09.1999	10.09.2000	10.09.2001	10.09.2002	10.09.2003	10.09.2004
Assessment	1	2	3	4	5	6
Replicate ID						
1			W	W	WS	W
2			W	W	W	W
3			W	W	W	W
4			W	BW	W	W
5			W	W	W	W
6			W	W	W	W
7			W	W	W	W
8			W	W	WB	W
9			W	W	W	W
10			W	W	W	W

W = White rot, B = Brown rot, S = Soft rot

Material	*Pinus radiata* D.Donn.					
Date	10.09.2005	10.09.2006	10.09.2007			
Assessment	7	8	9	10	11	12
Replicate ID						
1	W	W	W			
2	W	W	W			
3	W	W	W			
4	W	W	W			
5	W	W	W			
6	W	W	W			
7	W	W	W			
8	W	W	W			
9	W	W	W			
10	W	W	W			

W = White rot, B = Brown rot, S = Soft rot

Assessment – Decay types - Nursery end treated bearer

Material	*Pinus radiata* D.Donn.					
Date	**10.09.1999**	**10.09.2000**	**10.09.2001**	**10.09.2002**	**10.09.2003**	**10.09.2004**
Assessment	1	2	3	4	5	6
Replicate ID						
1			W	W	SB	WS
2			S	S	SB	SB
3			S	S	SB	SB
4			W	W	WB	WB
5			W	W	W	WB
6			S	S	SB	SB
7			S	S	SB	SB
8			S	S	WB	WB
9			W	W	W	W
10			W	W	W	WB

W = White rot, B = Brown rot, S = Soft rot

Material	*Pinus radiata* D.Donn.					
Date	**10.09.2005**	**10.09.2006**	**10.09.2007**			
Assessment	7	8	9	10	11	12
Replicate ID						
1	WS	WS	WS			
2	SB	SB	SB			
3	SB	SB	SB			
4	WB	WB	WB			
5	WB	WB	WB			
6	SB	SB	SB			
7	SB	SB	SB			
8	WB	WB	WB			
9	W	W	W			
10	WB	WB	WB			

W = White rot, B = Brown rot, S = Soft rot

Assessment – Mould

Material	*Pinus radiata* D.Donn.					
Date	**10.09.1999**	**10.09.2000**	**10.09.2001**	**10.09.2002**	**10.09.2003**	**10.09.2004**
Assessment	1	2	3	4	5	6
Replicate ID	[1-5]	[1-5]	[1-5]	[1-5]	[1-5]	[1-5]
1	2	3	4	4	4	4
2	2	3	4	4	4	4
3	2	3	4	4	4	4
4	2	3	4	4	4	4
5	2	3	4	4	4	4
6	2	3	4	4	4	4
7	2	3	4	4	4	4
8	2	3	4	4	4	DF
9	2	3	4	4	4	4
10	2	3	4	4	4	4

DF = Failure due to decay

Material	*Pinus radiata* D.Donn.					
Date	**10.09.2005**	**10.09.2006**	**10.09.2007**			
Assessment	7	8	9	10	11	12
Replicate ID	[1-5]	[1-5]	[1-5]	[1-5]	[1-5]	[1-5]
1	4	4	DF			
2	DF	DF	DF			
3	DF	DF	DF			
4	DF	DF	DF			
5	4	DF	DF			
6	DF	DF	DF			
7	DF	DF	DF			
8	DF	DF	DF			
9	DF	DF	DF			
10	DF	DF	DF			

DF = Failure due to decay

Assessment – Surface checking

Material	*Pinus radiata* D.Donn.					
Date	**10.09.1999**	**10.09.2000**	**10.09.2001**	**10.09.2002**	**10.09.2003**	**10.09.2004**
Assessment	1	2	3	4	5	6
Replicate ID	[1-5]	[1-5]	[1-5]	[1-5]	[1-5]	[1-5]
1	1	2	2	2	2	2
2	3	3	4	4	4	4
3	3	3	4	4	4	4
4	2	2	3	3	3	3
5	3	4	4	4	4	4
6	3	3	3	3	4	4
7	3	3	4	3	3	3
8	3	3	3	3	3	DF
9	3	3	4	4	4	4
10	2	2	3	2	2	3

DF = Failure due to decay

Material	*Pinus radiata* D.Donn.					
Date	**10.09.2005**	**10.09.2006**	**10.09.2007**			
Assessment	7	8	9	10	11	12
Replicate ID	[1-5]	[1-5]	[1-5]	[1-5]	[1-5]	[1-5]
1	3	3	DF			
2	DF	DF	DF			
3	DF	DF	DF			
4	DF	DF	DF			
5	4	DF	DF			
6	DF	DF	DF			
7	DF	DF	DF			
8	DF	DF	DF			
9	DF	DF	DF			
10	DF	DF	DF			

DF = Failure due to decay