

# **A VOLUME TABLE FOR RED BEECH POSTS : RANGATAUA FOREST.**

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An investigation was made recently in the Rangataua State Forest near Ohakune to ascertain the number of posts that an efficient operator would obtain from mature red beech (*Nothofagus fusca*) in this locality.

A large number of trees had been felled and the posts split from each tree stacked at the stump so that it was possible to tally these and with reasonable accuracy reconstruct the trees from which they came. The range of diameters was good but the number taken in some classes was not quite sufficient to give reliable data. This was particularly so in the largest trees, but as they formed only a small proportion of those being split it was not of great significance.

## **Field Work.**

The opportunity was taken to secure as many data as possible and the measurements taken at each tree were as follows: Actual butt diameter, thickness of bark and sapwood, length of log utilised for splitting, length of millable log, bark and sapwood thickness at top end of log, extent of rot pockets, number of split posts, their average length and section.

## **Cubic Content Used.**

The gross cubic content used in each tree was obtained by the Smalian formula. Average per tree was 199 cubic feet. This cubic content is greater by 8.2% than the volume given in the North Island Rimu volume table for trees of the same size.

## **Posts.**

These varied in size from a mean section of 4 x 3.4 ins. to 6 x 5.3 ins. with an average of 4 x 5.76 ins. or 23.04 square inches. Length averaged 6 ft. 4 ins. and cubic content 1.008 cubic feet. A red beech post of this size is quite heavy enough for all general fencing.

Table I shows the number of posts that average trees in each diameter class will yield in each post length of trunk.

## **Millable Volume.**

The average tree contained a milling log of 40 ins. D.B.H. 28 ft. long with a volume of 221.8 cubic feet.

## Bark and Sapwood.

Bark and sapwood thickness was reasonably constant throughout the range of diameters. The bark averaged 0.5 ins. or 5.7% of the gross millable volume. Sapwood averaged 2 ins. in thickness, 18.1% of gross millable volume or 40 cubic feet per tree.

## Rot.

Rot averaged 13 cubic feet or 5.9% of the gross millable volume and was a very variable factor. The majority of large *N. fusca* have some pockets of decay but its presence is not always readily apparent in a standing tree and no reliable estimate of the amount of rot present in any mature tree can be made until the tree has been felled and cut into lengths.

## Waste and Breakage.

This may be divided into two classes. The first is largely unavoidable consisting chiefly of large knots, spiral grain and, to a lesser degree, the spoiling of a post length by small pockets of rot. This type of waste accounts for 6.8% of the gross millable volume or 15 cubic feet per tree.

The second and major source of waste of millable log occurs through the top end being discarded by the splitter because its length is insufficient for posts. In this case no attempt was made to secure closer utilization by splitting battens out of good top lengths and in some cases the careless measurement of lengths gave extra inches to some posts and left the last length just too short. The average millable length was 27.9 feet with a volume of 221.83 cubic feet; but on an average only 21.8 feet with a volume of 198.65 cubic feet were utilized for splitting: a waste of 23.18 cubic feet per tree or 10.4% of the gross millable volume. The last two columns of Table II show the volume and percentage of top inside the sapwood, as the bark and sapwood of this top are included elsewhere in the table.

Wastage from both sources averaged 38 cubic feet per tree or 17% of the gross millable volume.

## Stump Height.

Many of the larger trees have extremely rough and flangy butts and it is the usual practice to "jigger up" and cut the tree where it is reasonably clean. This results in some waste of timber but the flangy butts are not suitable for splitting. Stump height measurements gave the following averages:

D.B.H. inches.	Stump height feet.
Up to 30	4.0
30 to 40	5.3
40 to 50	6.6
50 to 60	7.2

### Minimum Diameter.

Because of the excessive percentage of sapwood in small trees it is not in the interests of good utilisation to convert into posts any tree under 30 ins. D.B.H. Trees up to this size are usually sound and where possible should be reserved for milling.

**TABLE I. — Post Volume Table for Red Beech: Rangataua Forest.**

The top line in each diameter class shows the gross volume of the logs over bark in cubic feet. The second line shows the number of posts obtainable.

D.B.H. Inches	LOG LENGTH							
	6' 6"	13'	19' 6"	26'	32' 6"	39'	45' 6"	52'
32	36	61	87	112	138	163	189	214
	18	34	50	67	82	99	115	131
34	43	73	103	133	163	193	223	253
	22	42	61	81	100	120	140	159
36	51	85	120	154	189	223	257	292
	26	49	72	95	118	141	164	187
38	58	97	136	175	214	253	292	331
	30	56	83	109	136	162	188	215
40	66	109	153	196	240	283	327	370
	34	64	93	123	153	183	212	242
42	73	121	169	217	265	313	361	409
	38	71	104	137	170	204	236	269
44	81	133	186	238	291	343	396	448
	42	79	115	151	188	225	260	297
46	88	145	202	259	316	373	430	487
	46	86	125	165	205	245	285	325
48	96	157	219	280	342	403	465	526
	50	93	136	180	223	267	310	353
50	103	169	235	301	367	433	499	565
	54	101	147	194	241	288	334	381
52	111	181	252	322	393	463	534	604
	58	108	158	208	258	308	358	408
54	118	193	268	343	418	493	568	643
	62	115	169	222	275	329	382	435
56	126	205	285	364	444	523	603	682
	66	123	179	236	293	350	406	463
58	133	217	301	385	469	553	637	721
	70	130	190	250	310	370	430	490
60	141	229	318	406	495	583	671	760
	74	137	201	264	327	390	454	517

D.B.H.—inches	No. of Trees	Millable Length—feet	Gross Millable Volume—cubic feet.	Length Utilised for Posts—feet.	Gross Volume Utilised for Posts—cubic ft.	Gross Spittable Volume as % of Millable Volume.	Number of Posts.	Nett Volume of Posts—cubic feet.	Volume of Posts as % of Gross Millable Vol.	Volume of Posts as % of Gross Spittable Volume.	Bark.			Sapwood			Rot			Breakage			Top inside Sapwood		
											Volume—cubic feet.	% of Millable	Log.	Volume—cubic feet.	% of Millable	Log.	Volume—cubic feet.	% of Millable	Log.	Volume—cubic feet.	% of Millable	Log.	Volume—cubic feet.	% of Millable	Log.
28	4	26.5	102.15	22.6	85.78	84.0	38	36.24	35.5	42.2	7.78	7.7	23.70	23.2	0.79	0.8	22.98	22.5	10.57	10.0					
30	2	32.4	129.65	32.4	129.65	100.0	74	69.95	54.0	54.0	9.59	7.4	29.17	22.5	7.50	5.8	13.44	10.3	...	...					
32	8	35.1	152.89	25.7	125.73	82.2	70	70.56	46.2	56.1	10.86	7.1	33.33	21.8	14.00	9.2	7.63	5.0	16.51	10.3					
34	8	30.3	165.21	27.1	147.57	89.3	88	84.35	51.1	57.2	11.40	6.9	34.86	21.1	5.28	3.2	12.88	7.7	16.44	10.0					
36	19	25.7	174.59	23.9	146.13	83.7	93	91.44	52.4	62.5	11.52	6.6	35.62	20.4	5.58	3.2	10.35	5.9	20.08	11.5					
38	17	25.4	173.07	23.3	158.15	91.4	99	103.22	59.6	65.3	10.90	6.3	34.09	19.7	12.33	7.1	1.49	0.9	11.04	6.4					
40	24	27.9	207.90	25.6	189.65	91.2	127	131.84	63.4	69.5	12.47	6.0	39.50	19.0	9.12	4.4	1.17	0.6	13.80	6.6					
42	18	32.2	261.32	30.6	249.60	95.5	158	156.03	59.5	62.5	15.16	5.8	47.82	18.3	18.50	7.1	16.52	6.0	8.29	3.3					
44	14	29.6	262.44	26.0	233.88	89.1	149	153.90	58.6	65.8	14.43	5.5	46.19	17.6	15.80	6.0	8.10	3.1	24.12	9.2					
46	8	23.9	241.77	22.4	225.89	93.4	138	134.61	55.7	59.6	12.57	5.2	40.86	16.9	9.38	3.9	30.38	12.5	13.98	5.8					
48	9	25.3	267.53	22.0	233.18	87.2	155	144.65	54.1	62.0	13.38	5.0	43.34	16.2	4.27	1.6	35.12	1.1	26.77	10.0					
50	8	31.9	372.07	30.2	352.31	94.7	210	214.44	57.6	60.9	17.49	4.7	57.67	15.5	38.83	10.4	27.81	7.5	15.82	4.3					
52	2	16.3	203.34	16.3	203.34	100.0	140	156.14	76.8	76.8	8.95	4.4	30.09	14.8	4.96	2.4	3.20	1.6	...	...					
54	1	26.7	364.05	12.7	173.16	47.6	40	38.80	10.6	22.4	15.29	4.2	51.33	14.1	6.25	1.7	97.75	26.9	154.63	42.5					
56	2	20.8	292.41	19.3	268.55	91.8	174	188.26	64.4	70.1	11.40	3.9	39.18	13.4	20.93	7.2	13.32	4.6	19.32	6.5					
58	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...				
60	1	21.0	352.80	19.0	319.20	90.5	223	172.83	49.0	54.1	12.00	3.4	42.34	12.0	7.44	2.1	90.37	25.5	27.82	8.0					
62	2	22.1	363.67	22.1	363.67	100.0	106	109.82	30.2	30.2	11.27	3.1	41.05	11.3	126.10	4.7	75.43	20.7	...	...					
Tls	147	4,107.7	32,608.53	3,204.6	29,201.07	...	18,267	18,357.94	...	...	1,858.53	...	5,903.00	...	1,913.23	...	2,223.71	...	2,352.12	...					
Average per Tree		27.9	221.83	21.8	198.65	89.6	124	124.88	56.3	62.9	12.64	5.7	40.16	18.1	13.02	5.9	15.1	6.8	16.00	7.2					