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TECHNICAL NOTES

LAKE STATES FOREST EXPERIMENT STATION
U.S. DEPARTMENT OF AGRICULTURE · FOREST SERVICE
No. 507

Tree Diameter at Breast Height in Relation to Stump Diameter
FORESTRY LIBRARY by Species Group

COPY 2

A stump tally is one method of determining the volume of timber previously removed from an area in a logging operation. To estimate volume of standing timber from stumps, foresters must first know the relationship between stump diameters and tree diameters at breast height (d.b.h.). The table on the reverse side shows the relationships for stumps from 4 to 36 inches in diameter (outside bark) by softwoods, hardwoods, and aspen. The broken line across the face of the table separates the figures for sawtimber trees from the smaller timber. To use the table, field measurements of sawtimber stumps should be made 12 inches above ground level, and those for poletimber and saplings at 6 inches above ground level.

A simple rule-of-thumb that might be used by fieldmen for making stump to d.b.h. conversion follows:

$$D = D_s - \left(\frac{D_s}{10} + 1 \right)$$

For example: Where diameter of stump (D_s) is 20 inches, the diameter at breast height is computed as follows:

$$D = 20 - (2 + 1) \text{ or } 17 \text{ inches}$$

For more accurate readings the ratio of d.b.h. to stump diameter should be used. As an example, a pine stump measuring 28.4 inches has a ratio of .871; the corresponding d.b.h. would be 24.7 inches.

The data on which the table is based were collected by the field crews of the Office of Iron Range Resources and Rehabilitation during 1956 and 1957. Stump and d.b.h. measurements were made in a number of widely scattered timber stands selected at random for each major timber type. Nearly all of the softwood and aspen measurements were made in the northern district of Minnesota, while the hardwood study areas were limited largely to the central and southern sections of the State.

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(Over)

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Diameter at breast height and stump diameter relationship

Stump 2/ diameter (inches)	Diameter breast height			Ratio 3/		
	Softwoods	Hardwoods	Aspen	Softwoods	Hardwoods	Aspen
4.0	3	3	3	.725	.775	.775
5.0	4	4	4	.760	.800	.800
6.0	5	5	5	.783	.800	.800
7.0	6	6	6	.800	.814	.814
8.0	6	7	7	.812	.825	.816
9.0	7	7	7	.822	.830	.822
10.0	8	8	8	.830	.833	.824
11.0	9	9	9	.836	.836	.827
12.0	10	10	10	.842	.842	.833
13.0	11	11	11	.846	.844	.834
14.0	12	12	12	.850	.845	.836
15.0	13	13	13	.853	.847	.838
16.0	14	14	13	.856	.850	.838
17.0	15	14	14	.859	.853	.839
18.0	15	15	15	.861	.854	.839
19.0	16	16	16	.863	.854	.842
20.0	17	17	17	.864	.855	.842
21.0	18	18	18	.865	.855	.843
22.0	19	19	19	.866	.855	.843
23.0	20	20	19	.866	.857	.843
24.0	21	21	20	.867	.858	.844
25.0	22	21	21	.868	.858	.844
26.0	23	22		.869	.858	
27.0	23	23		.870	.858	
28.0	24	24		.871	.859	
29.0	25	25		.872	.859	
30.0	26	26		.873	.860	
31.0	27	27		.874	.860	
32.0	28	28		.875	.860	
33.0	29	28		.876	.861	
34.0	30	29		.876	.861	
35.0	31	30		.877	.861	
36.0	32	31		.878	.861	

Basis:						
No. of trees	1,440	841	412	1,440	841	412

1/ Data were collected in 1956 and 1957 in Minnesota.

2/ Stump diameters were measured at 12 inches above ground level for sawtimber and 6 inches above ground level for smaller trees.

3/ D.b.h. as a percent of stump diameter. Based on stump and d.b.h. measurements to the nearest tenth inch (all measurements outside bark).

Note: Broken line separates sawtimber size from poletimber and sapling sizes.