NEW HAMPSHIRE BEST LOG SCALING PRACTICES GUIDE

INTRODUCTION

On June 21, 1999 twenty-two New Hampshire log scalers attended a workshop in Hillsboro, NH to discuss log-scaling practices. This group began the process of developing a voluntary log-scaling standard for NH. The knowledge and experience of this group of individuals combined with generally accepted industry standards described by the USDA, Forest Service in the "Log Scaling Handbook" and the Northeast Loggers' Association "Log Rules and Other Useful Information," will serve as the foundation for this guide.

Log scale is the basis for most business transactions between buyers and sellers of logs. A log scale, or rule, is an estimate of sawn lumber volume that can be obtained from a given log. Accurate, consistent and correct practices are essential for determining volume and fair market value. Log-scale can also be the source of confusion, frustration and suspicion. This guide will attempt to demystify the basics of log scaling by defining terms and working through the process of scaling a log.

New Hampshire does not currently license or certify log scalers, nor does the state have a law that specifically outlines log scaling procedures. However, the NH Division of Forests and Lands and NH Department of Agriculture, Weights and Measures Division have the authority to investigate inconsistent or deceptive log scaling practices.

INTERNATIONAL 1/4" LOG RULE:

In New Hampshire, the most common log rule used is the International 1/4" Log Rule. This rule measures to the nearest 5 board feet.

Top Diameter of Log in Inches	Contents in Board Feet						
	Length of Log in Feet						
	8	10	12	14	16	18	20
6	10	10	15	15	20	25	25
7	10	15	20	25	30	35	40
8	15	20	25	35	40	45	50
9	20	30	35	45	50	60	70
10	30	35	45	55	65	75	85
11	35	45	55	70	80	95	105
12	45	55	70	85	95	110	125
13	55	70	85	100	115	135	150
14	65	80	100	115	135	155	170
15	75	95	115	135	160	180	205
16	85	110	130	155	180	205	235
17	95	125	150	180	205	235	265
18	110	140	170	200	230	265	300
19	125	155	190	225	260	300	335
20	135	175	210	250	290	330	370
21	155	195	235	280	320	365	410
22	170	215	260	305	355	405	455
23	185	235	285	335	390	445	495
24	205	255	310	370	425	485	545
25	220	280	340	400	460	525	590
26	240	305	370	435	500	570	640
27	260	330	400	470	540	615	690
28	280	355	430	510	585	665	745
29	305	385	465	545	630	715	800
30	325	410	495	585	675	765	860
31	350	440	530	625	720	820	915
32	375	470	570	570	770	875	980
33	400	500	605	715	820	930	1045
34	425	535	645	760	876	990	1110
35	450	565	685	805	925	1050	1175
36	475	600	725	855	980	1115	1245

Source: *Forestry Handbook*, Wenger, Karl, 1984. Society of American Foresters.

LOG SCALING PROCEDURES

Log Lengths

It is important that buyers and sellers of sawlogs understand the specifications being used in the market place. Each log buyer may have different log specifications based upon individual product requirements. **Check with the mill first!**

Knowing the required log lengths and minimum trim allowances for each market is critical to receiving the best price. Standard sawlog lengths are 8' to 16'. Generally, sawlogs are bought and sold in 2' increments. Some mills purchase odd length logs and some mills purchase longer or shorter lengths. Trim allowances range from 4" to 6" in addition to the standard length. Veneer, pulp, boltwood and other markets have very different requirements.

It is essential to understand length requirements for each market prior to bucking.

- Sawlog length is the length of the log plus whatever trim allowance is required by purchaser.

- Angled cuts: length is measured from the short side.

- Open face felling method (70-90° notch angle), when properly applied, will not affect the scaling cylinder.

- Sawlogs that exceed maximum log rule length should be scaled as two or more segments.

- To determine odd lengths, average the two nearest even lengths (on the rule).
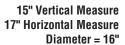
Log Diameters

When measuring the diameter of a sawlog, the scaler must:

- Measure log diameters inside the bark at the small end of the log.

- Measure through the true center of the log, not the center as indicated by growth rings.

- Measure as though the sawlog is a cylinder (as though bumps and depressions do not exist).

- Measure diameter by holding the scale stick flush to the end of the log when the sawlog is cut flush.

- Take two diameter measurements at right angles to each other. The first being the shortest axis.

- When averaging two measurements to determine the diameter round to the nearest inch. If both measurements are on the 1/2", round one down and the other up.

- If the average of two points for the diameter measures is calculated and results in a 1/2" round down, next time round up.

- Crotched logs or logs with branch whorls causing flare should be scaled as though the log were a true cylinder.

**20" Vertical Measure
18" Horizontal Measure
Diameter = 19"**

**15" Vertical Measure
17" Horizontal Measure
Diameter = 16"**

Scaling Deductions

Defects or log characteristics that will reduce the volume of usable lumber sawn require that log scale deductions be made. These defects can occur naturally or as the result of logging or transportation damage. Defects are also responsible for loss of grade yield. However, grade loss does not affect the volume of a log. **Grade indicates quality of wood, scale indicates volume of wood.**

Defects that result in scaling deductions include:

rot

rotten knots

fire scars

logging damage

pitch pockets

shake

sweep

crook (severe sidebend)

insect holes

crotch

severe checks

seams

breakage

shatter

stump pull
(fiber pulled from butt log during felling)

cracks

split

spider heart

white pine weevil damage

Sample Mill Scale Slip
Scale Date: 6/23/XX

Mill Na
Mill Add
Mill Teleph

Supplier
Name: John Q. Public

Trucker Name:
    Private Transport

Town: Muddville

Trip Ticket # _____

Log #	Species	Length	Diameter	Grade
1	RO	8	12	1
2	BO	10	12	2
3	WO	8	10	2
4	WP	12	14	1
5	HM	16	12	1
6	SM	10	16	3
7	RO	16	10	2
8	HM	8	10	2
9	YB	10	16	1
10	BB	12	10	P
11	RO	12	14	S
12	WP	14	10	2
13	RO	14	12	1
14	RO	14	14	S
15				
16				
17				
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44				

TOTALS: # LOGS   Gross
          14   102

Slip #: **123456**

Scaler: _____

ame
dress
one/ Fax

Haul Date: 6/23/XX

Logger: John Doe Logging _____

Woodlot: Lot 1 Anywhere _____

	Gross Vol	Deduction Vol	Deduction Code	Net Vol.
	45			45
	35	-5	ROT	30
	30			30
	100	-15	ROT	85
	95			95
	110			110
	65			65
	30			30
	110	-20	SWE	90
	45			45
	100			100
	55			55
	85			85
	115			115

Vol	Ded Vol	Net Vol
0	-40	980

Method for applying scale deductions:

The following formula is used to calculate deductions for interior defects when using the International 1/4" Log Rule:

$$\frac{W'' \times T'' \times L'}{16} = \text{Deduction in board feet}$$

W = width in inches
T = thickness in inches
L = length in feet (to the nearest 2 foot increment)

The length of an interior defect is always difficult to determine unless it projects through the entire length of the sawlog. Variations in species create further challenges in the assessment of volume deductions. Experienced scalers develop better judgement through practice and by observing logs as they are sawn.

Source: *National Forest Log Scaling Handbook,* USDA Forest Service, 1973.

Seam

Spider Heart

Spider Heart are decay infected cracks that occur in some standing trees. While not always visible in the standing tree, spider heart will result in a loss of lumber volume recovered in the butt log. The scaler will make a length deduction to compensate for lost lumber volume.
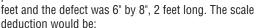
Shake

Shake is a separation of wood fiber along the growth rings. As the log is sawn into lumber the boards tend to fall apart. Obviously, shake is a serious defect and if detected in the log will result in rejection or severe volume deduction.

Butt rot

To determine the scale deduction for a distinct area of rot, square off the defect, as indicated in the picture. Use the formula from previous page (8): measure the length and thickness of defect area in inches, and estimate the length in feet. Divide the result by 16.

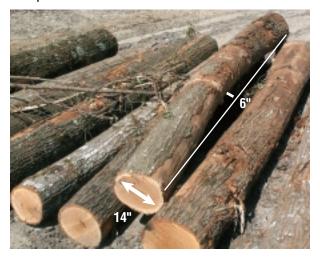Example: If the log in the picture scaled 100 board feet and the defect was 6" by 8", 2 feet long. The scale deduction would be:

6 x 8 x 2 ÷ 16 = 6' deduction

Split

Sweep

Sweep or sidebend requires a scale deduction. The formula for calculating the volume of the deduction is:

$$\frac{\text{Maximum departure"} - 2*}{\text{Diameter}} = \text{\% deduction from gross scale}$$

This example:

$$\frac{6" - *2}{14} = 29\%$$

*2" for slabs in 16', 1" for 8' log

Please refer to log sweep deduction quick reference charts on back pages.

White Pine Weevil Damage

The white pine weevil is an insect that attacks and kills the top of the main stem (leader) of the white pine. The result is that a side branch replaces the leader and causes a major deviation in the growth form. Many sawmills will cull (reject) weeviled logs, or the scale deduction will severely reduce the net volume. It is important to check with the mill to understand the treatment of weevil damage.

Crotch

Cracks, seams, splits:

Surface defects only affect scale if they penetrate enough to reduce the lumber yield of a sawlog. The orientation of a crack is critical. As an example, if a crack follows the grain of the sawlog the scaling volume may not be reduced. Conversely, a spiral seam or a crack that wanders around a sawlog may substantially reduce the scaling volume.

In this picture, the seam affects approximately 1/4 of the scaling diameter. Therefore 1/4 of the volume is deducted.

10' Log Seep Deductions

Diameter	Sweep in inches			
	4"	6"	8"	10"
6	5	X	X	X
8	10	15	X	X
10	10	20	25	30
12	15	25	30	40
14	15	30	40	50
16	20	35	50	60
18	25	40	55	70
20	25	45	60	80
22	30	50	70	90
24	30	55	75	95
26	35	60	80	105
28	40	65	90	115
30	40	70	95	125
32	45	75	105	130
34	45	80	110	140
36	50	85	115	150

12' Log Sweep Deductions

Diameter	Sweep in inches			
	4"	6"	8"	10"
6	5	10	X	X
8	10	15	20	X
10	10	20	30	40
12	15	25	40	50
14	20	30	45	60
16	20	40	55	70
18	25	43	60	80
20	25	45	70	90
22	30	55	75	100
24	30	60	85	110
26	35	65	95	120
28	40	70	100	130
30	40	75	105	140
32	45	80	115	150
34	45	85	125	160
36	50	90	130	170

16' Log Sweep Deductions

Diameter	Sweep in inches			
	4"	6"	8"	10"
6	5	15	X	X
8	10	20	X	X
10	15	25	40	50
12	15	30	50	65
14	20	40	60	75
16	25	45	70	90
18	25	50	75	100
20	30	60	85	115
22	30	65	95	130
24	35	70	105	140
26	40	75	115	155
28	40	85	125	165
30	45	90	135	180
32	50	95	145	195
34	50	105	155	205
36	55	110	165	215