SUSTAINABLE RESOURCE DEVELOPMENT

ALBERTA SCALING MANUAL

SCALING DECKED OR STACKED TIMBER

10.0 Scaling Decked or Stacked Timber

Alberta allows the use of scaling methods to scale Crown timber (Smalian, Cube Scale and limited application of tree length scale), but there are many other methods used to estimate the volume of sound wood in a load, stack, or pile. The following two methods may not be used for scaling for the purpose of Crown dues determination, but they are sometimes used when other methods are not feasible.

Written authorization from the office of the Timber Scaling Supervisor is required before these methods can be employed, and such authorization will only be considered when it can be proven that the three standard methods are not feasible.

10.1 Tree-Length Scaling

Tree length scaling has had limited application in Alberta due to the inherent variation experienced with this form of scaling. There have been situations however where a volume of decked tree length logs may be required and mass scaling or total log scale is not feasible.

These situations include:

1. Determining the volume of a trespass cut or unauthorized harvest,
2. Estimating the volume to be offered up as a result of decked industrial salvage,
3. Determining the volume for harvest contractor payment, or
4. Determining an estimate of on hand yard inventory.

This manual later details procedures for scaling for such situations through the development of a local volume table.

10.1.1 Accuracy

This method of scale is on average close to three times the variation experienced by mass scaling. The results of tree length scale are further dependent on variables such as:

1. Desired accuracy.
2. Availability of applicable local volume tables.
3. The number of stems involved.

4. Introduced bias in measurement or sampling procedures.
5. Uniformity of the timber in terms of species, length, size, and taper.

This scale method can involve a significant amount of work and evaluation to ensure a statistical sample particularly where a local volume table is intended to be constructed. However if the objective is just to obtain a quick rough volume estimate with no statistical validity, then this can be accomplished with much less effort. The key to this scale approach is to answer the following questions:

1. What is the purpose of the scale? Is the application going to be long or short term?
2. How defensible must the volume determination be?
3. To what extent am I prepared to scale in order to achieve the desired results?

In general, this scale method is considered to be more accurate than a block or stacked scale but much less accurate than a scale involving measurement of bucked logs from the tree length pieces.

10.1.2 Procedures

Tree length scale involves the collection or use of four pieces of information:

1. Determining the total number of stems;
2. Determining the distribution of butt sizes;
3. Calculating a table for the average gross volume per stem by butt diameter; and;
4. Calculating the percent of cull.

10.1.3 Stem Count

The purpose for having a total stem count is to project the total volume where sampling occurs. If you measure 20 out of 100 trees then the total volume would be five (20/100) times the volume of the sampled trees. If the number of stems involved in the scale is under 300 then all stems should be measured and a separate stem count is not necessary. However, where not all stems are to be measured, and sampling of the decks is to occur, then a total stem or tree count is required.

10.1.4 Butt Size Distribution

A volume table will either be used or constructed based on the diameter at the large end (butt) of the tree length piece. Although there is generally larger error in measuring butt diameters, for decked tree length timber this is the only accessible diameter available for measurement on all pieces. In choosing the method for butt distribution, the amount of work and the desired accuracy must be considered.

One of the following methods may be used.

1. **Total Tally**. If the total number of pieces is relatively small or a high accuracy is required, measure and tally the butt diameter on all the stems.

2. **Samples of Butt Distributions**. Sample areas are blocked out on the face of the pile (see Figure 11.1). The butt diameters in the area are measured and tallied.

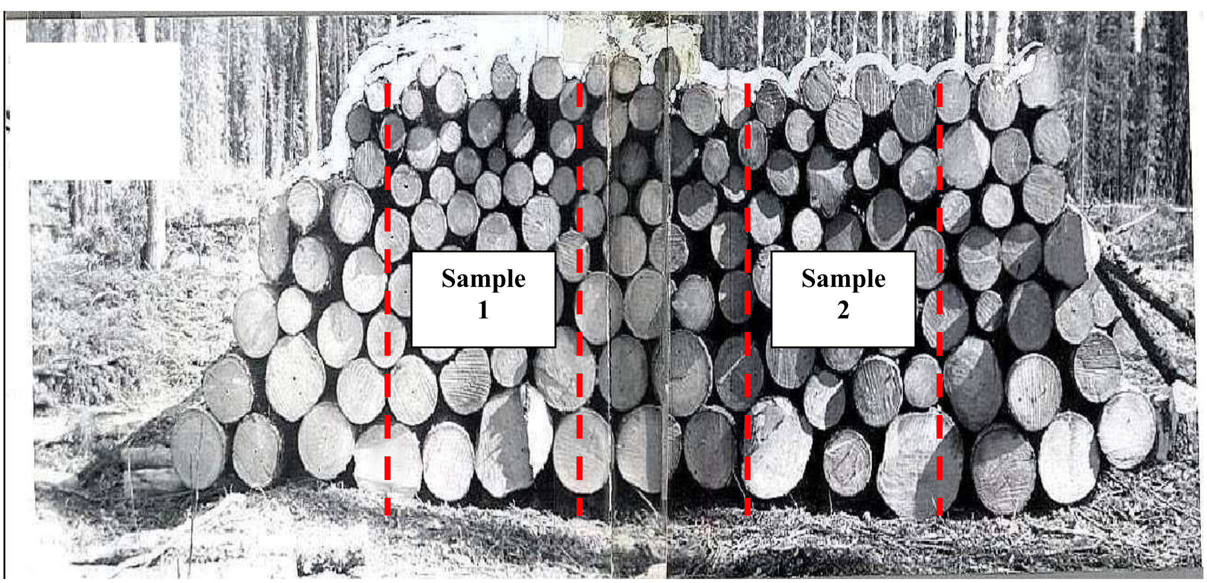

Figure 10.1 - Samples of Butt Distributions

Consider the following when determining butt distribution samples:

To reduce the possibility of bias, the sample area should enclose a block extending from the bottom to the top of the pile.

Sample areas should be at least 1 m in width and established at fixed intervals along the pile. The 2-m width is considered optimum. The number of samples depends on the variation in log sizes from one sample to the other.

Note: Only butt diameters where the face is more than halfway into the sample area are to be considered as part of the sample.

When measuring butt diameters, remember to reduce the diameter for butt swell. As outlined in the individual log scaling procedures, this is done by projecting the normal taper to the large end of the log.

The amount of sampling that is required depends on the following:

1. For small groups (under 300 pieces), the distribution should be developed by measuring all logs.

2. When the number of pieces is greater than 300 and fewer than 2000, a 50% sample is suggested to determine the butt distribution. An alternative is to assess the amount of variation and then calculate the number of samples required.
3. A tentative sample should be taken for larger groups. Then the variation can be calculated and the correct amount of sampling can be determined. Remember that in cases of uniform groups, calculating the variation and the required number of samples may save considerable fieldwork. Refer to Appendix 4 for an example of how to calculate the sampling intensity for butt distributions.

10.1.5 Volume Table Creation

Once you have established the butt diameters of the tree length pieces then it is necessary to attach a volume to each. Keep in mind the top diameter to which you must determine the volume for. Common top diameters, which will be used, will be 10 or 11 cm. In instances of crown timber seizures, the top diameter corresponding to the timber disposition is used. The volume for each tree length piece may be obtained from a few different sources:

1. Historical regional or local volume tables.
2. PLFD "Ecologically Based Individual Tree Volume Tables"
3. Development of a volume table based on the timber being scaled.

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Historical tables – Use such tables with some caution. Ensure the tables were constructed with sufficient data to ensure statistical validity and the scale method to derive the tables was conducted by an approved methodology. The species, and top diameters must also be consistent with the timber to be scaled. In addition, it is common to construct a series of such tables based on the average length of the trees to the specified top diameter. This requires establishing the same variable and using the appropriate table.

PLFD Tree Volume Tables- These series of tables were constructed from several thousand trees sectioned throughout the province. The tables are built for various species, regions, and top diameters. The tables were compiled based on taking butt diameters outside bark at the 0.3 metre height and measured total tree height. In order to use these tables, adjustments must be made to address butt diameter measurements taken inside bark at the point of felling as well as the possibility that the trees have been cut at a minimum top diameter. The complexity of these adjustments may render these tables unusable for your purpose.

Development of a Local Volume Table

Although it takes a little extra work, volume tables prepared from the trees being scaled will probably give you the best accuracy. This data may be used later for adjacent areas or to develop regional volume tables.

When collecting tree volume information, consider the following:

1. The diameters of the trees for volume samples should be collected in about the same proportion as the butt diameter distribution in the butt distribution samples.

2. The number of samples may be calculated as follows:

$$n = \frac{(N \times t^2) \times (C^2)}{(N \times E^2) + (t^2 \times C^2)}$$

Where: N = total number of stems in the group
n = number of samples required
t = 2 (probability)
E = 5 (allowable sampling error)
C = Coefficient of variation (%)

If the coefficient of variation is unknown, the average of 23% may be used. However, as groups are sampled, the coefficient of variation should be calculated for future reference in determining the samples required.

The sampling percentage may be calculated as follows:

$$\%\,sampling = \frac{n \times 100}{N}$$

Apply this percentage to the tally on each butt class to arrive at the number of samples required for each class.

Consider the following when measuring the trees for volume tables:

1. When measuring the trees for volume tables, it is best if trees are bucked. However, as this is not always possible, the measurements may be taken along the tree using calipers. Allow for bark thickness (1 cm) if a caliper is used. For ease of measurement, measure the diameter at fixed intervals up the tree (i.e., 4.8 m or 5.0 m).

2. Use the Smalian Scale for calculating volumes. Figures 10.2 and 10.3 illustrate the use of the Log Scale Tally Sheet to tally and calculate the volume for each tree.

3. If the trees are in decks, select trees along the top of the pile where they can be measured properly.

Once the gross volumes are calculated for each tree, the butt to gross volume relationship can be determined by plotting the average volume for each butt diameter on a graph and drawing a curve. It is, however, faster and probably more accurate to calculate the curve using a regression formula that is part of a computer program.

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TM 32S
(Rev. 10/04)

SMALIAN LOG SCALE TALLY SHEET

DISPOSITION HOLDER	MILL NAME OR LOCATION	MILL NO.	DISPOSITION	SUB-DISP	SOURCE (Non Disp)
Tree Length Logging	Anywhere	M004891	CTPF010091		

LOAD NO.	DATE WEIGHED Year	M	D	POP	TOP	NET WEIGHT (KG)	TM9 NUMBER	PRIMARY CODES SP	CD	PR	LGTH	BLOCK	TREES	MILL CODE	PAGE
96	2004	6	10	3 0 5	14			SP	GR	01					1

LOG NO.	GROSS SP	CD	PR	BUTT	TOP	LGTH	VOL	DEDUCTIONS T	M	C1	C2	C3	VOL	F
1	SP	GR	01	24	20	4.8	109 / 75							
2				20	18	4.8	75 / 61							
3				18	14	4.8	61 / 37							
4							418			3	2	4		
5														
6	SP	GR	01	28	24	4.8	148 / 109	1	6	10	12	48	46	
7				24	20	4.8	109 / 75	1	6	10	10	48	19	
8				20	16	4.8	75 / 48							
9				16	14	2.4	24 / 18							
0							606			5	4	2	65	
1														
2	SP	GR	01	32	26	4.8	193 / 127							
3				26	24	4.8	127 / 109							
4				24	20	4.8	109 / 75							
5				20	16	3.0	47 / 30							
6				16	14	2.4	24 / 18							
7							859			7	6	0		
8														
9														
0														

LOG NO.	GROSS SP	CD	PR	BUTT	TOP	LGTH	VOL	DEDUCTIONS T	M	C1	C2	C3	VOL	F
1	SP	GR	01	32	24	4.8	193 / 109							
2				24	20	3.0	68 / 47							
3				20	20	3.0	47 / 47							
4				20	16	3.6	57 / 36							
5				16	14	3.6	36 / 28							
6							608			7	6	0		
7														
8	SP	GR	01	36	24	4.8	244 / 109							
9				24	22	4.8	109 / 91							
0				22	18	4.8	91 / 61							
1				18	14	4.8	61 / 37			9	7	8		
2							803							
3														
4	SP	GR	01	36	26	4.8	244 / 127							
5				26	24	3.6	96 / 81							
6				24	22	3.6	81 / 68							
7				22	18	3.6	68 / 46							
8				18	14	3.0	38 / 23							
9							872			9	7	8		
0														

LOG GROUP 1	SPGR01	1883	SUMMARIZE	65	LOG GROUP 1	SPGR01	2283	F- Incomplete tree or log flag
LOG GROUP 2			TOTALS ON		LOG GROUP 2			
LOG GROUP 3			REVERSE		LOG GROUP 3			T - Defect Type
LOG GROUP 4			SIDE OF		LOG GROUP 4			
LOG GROUP 5			LAST PAGE		LOG GROUP 5			M - Deduction Method
LOG GROUP 6					LOG GROUP 6			
TOTAL					TOTAL			

SPECIES CODES

Aspen	A	Other Deciduous	OD
Aspen/Balsam Poplar	AB	Pine	P
Birch	B	Balsam Poplar	PB
Douglas Fir	DF	Limber Pine	PF
Balsam Fir	F	Whitebark Pine	PW
Alpine Fir	FA	Spruce	S
Incidental Conifer	IC	Black Spruce	SB
Incidental Deciduous	ID	Engelmann Spruce	SE
Incidental Fir	IF	White Spruce	SW
Larch	LT	Spruce and Pine	SP
Other Coniferous	OC		

CONDITION CODES

Blowdown	BD
Beetle killed	BK
Dead	D
Endangered	EN
Fire killed	FK
Green	GR
Insect Damaged	ID
Interior Rot	IR
Industrial Salvage	IS
Other Damaged	OD
Timber Damage	TD

PRODUCT CODES

Sawlog, Conif. Pulp	01
Deciduous pulp	02
Small Stem Conifer	06
Veneer	14
Oriented Strandboard	18
Laminated Veneer Lbr.	19
Fuelwood	20
Undersize	99

DEFECT TYPES

Heart Rot	1	Crook or Sweep	5
Butt Rot	2	Shake or Crack	6
Sap Rot	3	Crotch or Fork	7
Cat Face	4		

DEDUCTION METHODS

Reduce diameter	1	Reduce length	2
Percent	3	Fraction	4
Blocking Out	5	Interior Cylinder	6
Cube Deduction	7	End Rot Options	8

Figure 10.2 – 1St Log Scale Tally Sheet for Tree Length Volumes

SUSTAINABLE RESOURCE DEVELOPMENT

TM 32S
(Rev. 10/04)

SMALIAN LOG SCALE TALLY SHEET

DISPOSITION HOLDER	MILL NAME OR LOCATION	MILL NO.	DISPOSITION	SUB-DISP	SOURCE (Non Disp)
Tree Length Logging	Anywhere	M004891	CTPF010091		

LOAD NO.	DATE WEIGHED Year	M	D	POP			TOP	NET WEIGHT (KG)	TM9 NUMBER	PRIMARY CODES SP	CD	PR	LGTH	BLOCK	TREES	MILL CODE	PAGE
96	2004	6	10	3	0	5	14			SP	GR	01					2

LOG NO.	GROSS SP	CD	PR	BUTT	TOP	LGTH	VOL	DEDUCTIONS T	M	C1	C2	C3	VOL	F
1	SP	GR	01	40	28	4.8	302 / 148							
2				28	26	4.8	148 / 127							
3				26	14	4.8	127 / 75							
4							75 / 37			11	9	7		
5							1039							
6														
7	SP	GR	01	40	30	4.8	302 / 170							
8				30	28	4.8	170 / 148							
9				28	24	4.8	148 / 109							
0				24	18	3.6	81 / 46							
1				18	14	2.4	31 / 18							
2							1223			11	9	7		
3														
4	SP	GR	01	40	34	4.8	302 / 218							
5				34	28	4.8	218 / 148							
6				28	24	3.6	111 / 81							
7				24	18	4.8	109 / 61							
8				18	14	3.6	46 / 28							
9							1322			11	9	7		
0														

LOG GROUP 1	SPGR01	3584	SUMMARIZE
LOG GROUP 2			TOTALS ON
LOG GROUP 3			REVERSE
LOG GROUP 4			SIDE OF
LOG GROUP 5			LAST PAGE
LOG GROUP 6			
TOTAL			

LOG NO.	GROSS SP	CD	PR	BUTT	TOP	LGTH	VOL	DEDUCTIONS T	M	C1	C2	C3	VOL	F
1	SP	GR	01	44	36	4.8	365 / 244							
2				36	32	4.8	244 / 193							
3				32	28	4.2	169 / 129							
4				28	20	3.6	111 / 57							
5				20	14	3.6	57 / 28							
6							1597			14	1	5		
7														
8														
9														
0														
1														
2														
3														
4														
5														
6														
7														
8														
9														
0														

LOG GROUP 1	SPGR01	1597	F- Incomplete tree or log flag
LOG GROUP 2			
LOG GROUP 3			T - Defect Type
LOG GROUP 4			
LOG GROUP 5			M - Deduction Method
LOG GROUP 6			
TOTAL			

SPECIES CODES

Aspen	A	Other Deciduous	OD
Aspen/Balsam Poplar	AB	Pine	P
Birch	B	Balsam Poplar	PB
Douglas Fir	DF	Limber Pine	PF
Balsam Fir	F	Whitebark Pine	PW
Alpine Fir	FA	Spruce	S
Incidental Conifer	IC	Black Spruce	SB
Incidental Deciduous	ID	Engelmann Spruce	SE
Incidental Fir	IF	White Spruce	SW
Larch	LT	Spruce and Pine	SP
Other Coniferous	OC		

CONDITION CODES

Blowdown	BD
Beetle killed	BK
Dead	D
Endangered	EN
Fire killed	FK
Green	GR
Insect Damaged	ID
Interior Rot	IR
Industrial Salvage	IS
Other Damaged	OD
Timber Damage	TD

PRODUCT CODES

Sawlog, Conif. Pulp	01
Deciduous pulp	02
Small Stem Conifer	06
Veneer	14
Oriented Strandboard	18
Laminated Veneer Lbr.	19
Fuelwood	20
Undersize	99

DEFECT TYPES

Heart Rot	1	Crook or Sweep	5
Butt Rot	2	Shake or Crack	6
Sap Rot	3	Crotch or Fork	7
Cat Face	4		

DEDUCTION METHODS

Reduce diameter	1	Reduce length	2
Percent	3	Fraction	4
Blocking Out	5	Interior Cylinder	6
Cube Deduction	7	End Rot Options	8

Figure 10.3 – 2nd Log Scale Tally Sheet for Tree Length Volumes

10.1.6 Percent Cull Calculation

When gathering data for the tree volume tables, make the best estimate for defects on each log as it is measured. A percentage deduction for defects may be made using the volume table data.

To arrive at the percent deduction, multiply the total deductions by 100 and divide by the gross scale to get the percent of defect.

10.1.7 Tree Length Volumes

Form TM 256 "Tree length Scale Sheet" or a comparable document/spreadsheet is used to compile either the total volume or a sample volume. The load identifier information is completed similar to the TM32S " Log Scale Tally Sheet.

Figure 10.4 represents one sample block and Figure 10.5 a second sample block where not all stems are measured but rather sampling occurs. This is indicated by the "By Pieces" box checked under the Prorating Method. The TM257" Tree Length Scale Summary Sheet" is completed.

Butt diameters have been dot tallied and the number of pieces has been tabulated for each diameter class. The volume per piece is added for each diameter class and the total gross volume for butt diameter is determined by multiplying the number of pieces by the volume per piece. The total volume for the sample is then the sum of volumes for each butt diameter.

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TM 256
(Rev. 10/86)

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TREE LENGTH SCALE SHEET

LESSEE, LICENSEE OR PERMITTEE	MILL	DISPOSITION CTP/CTL F MU NO.	MILL NO	PILE NO.
TREE LENGTH LOGGING	ANYWHERE	CTPF 0100 91	M004891	196

DATE WEIGHED Y Y Y Y M M D D	TOP	PRORATING METHOD	TOTAL LOGS	SAMPLE NUMBER	SCALER
2004 06 10	14	Total Logs ☐ By Pieces ■	103	1	JOE SCALER

SP: SP CD: GR PR: 01

BUTT DIA.	TALLY	PIECES	VOL. PER PIECE	TOTAL VOLUME
16				
18				
20				
22				
24	•	1	324	324
26				
28	•	1	542	542
30				
32	•••	3	760	2280
34				
36	•••	3	978	2934
38				
40	•••	3	1197	3591
42				
44				
46				
48	•	1	1633	1633
50				
TOTALS		12		11304
DEDUCTION 0.7 %				79
NET VOLUME				11225

SP: CD: PR:

BUTT DIA.	TALLY	PIECES	VOL. PER PIECE	TOTAL VOLUME
16				
18				
20				
22				
24				
26				
28				
30				
32				
34				
36				
38				
40				
42				
44				
46				
48				
50				
TOTALS				
DEDUCTION ___ %				
NET VOLUME				

Figure 10.4 - Tree Length Tally (Sample Block 1)

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TM 256
(Rev. 10/86)

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TREE LENGTH SCALE SHEET

LESSEE, LICENSEE OR PERMITTEE	MILL	DISPOSITION CTP/CTL F MU NO.	MILL NO	PILE NO
TREE LENGTH LOGGING	ANYWHERE	CTPF010091	M004891	196

DATE WEIGHED YYYYMMDD	TOP	PRORATING METHOD	TOTAL LOGS	SAMPLE NUMBER	SCALER
20040611	0.14	Total Logs ☐ By Pieces ■	103	2	JOE SCALER

SP: SP CD: GR PR: 01

BUTT DIA.	TALLY	PIECES	VOL. PER PIECE	TOTAL VOLUME
16				
18				
20				
22				
24				
26				
28				
30				
32	••	2	760	1520
34				
36	••• ••	5	978	4890
38				
40	•• ••	4	1197	4788
42				
44				
46				
48				
50				
52	••	2	1851	3702
TOTALS		13		14900
DEDUCTION	0.7 %			104
NET VOLUME				14796

SP: CD: PR:

BUTT DIA	TALLY	PIECES	VOL. PER PIECE	TOTAL VOLUME
16				
18				
20				
22				
24				
26				
28				
30				
32				
34				
36				
38				
40				
42				
44				
46				
48				
50				
TOTALS				
DEDUCTION	%			
NET VOLUME				

Figure 10.5 - Tree Length Tally (Sample Block 2)

The information for each TM256 sample is transferred to the TM257 "Tree Length Scale Summary Sheet". In the example there were two samples, which measured 25 butt diameters in total and for a volume of 26.034 cubic metres. The total tree length count was 103 therefore the volume estimate for all trees would be 103/25 x 26.034 = 107 cubic metres.

TM 257

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ENERGY AND NATURAL RESOURCES

TREE LENGTH SCALE SUMMARY SHEET

LESSEE, LICENSEE OR PERMITTEE	MILL	DISPOSITION CTP/CTL F MU NO.	MILL NO.	YEAR/MONTH YYYYMM
TREE LENGTH LOGGING	ANYWHERE	CTP F 010 091	M00489 1	200406

TOTAL PIECE COMPILATION

PILE 196
– 103 TREES

103

LOAD OR PILE NUMBER	SAMPLE NUMBER	SAMPLE PIECES	NET SAMPLE VOLUME (Designate Species, Condition, Product) SP GR 01		
196	1	12	11.225		
196	2	13	14.796		

LINE NO.						
1.	This Months Totals	103	25	26.021		
2.	Last Mths Accumulated Totals (from last mths Line No. 3)	–	–	–		
3.	This Mths Accumulated Totals (Line No. 1 + Line No. 2)	103	25	26.021		
4.	Multiplier (A ÷ B) (Take to 3 Decimals)	4.120				
5.	Total Converted Volume (Line No. 4 x C; x D; x E)			107.2		
6.	Last Months Converted Volume (From Line No. 5 Of Last Month)			–		
7.	This Months Volume (Line No. 5 Minus Line No. 6)			107.2		

Figure 10.6 - Tree Length Tally Summary (Sample Blocks 1 and 2)

10.2 Stacked Wood Scaling

Stacked wood scaling is perhaps the quickest means of obtaining a volume estimate but by the same token it is often the least accurate. This method of scale is not acceptable for scaling sample scale loads associated with mass scaling. The procedures in this section may be used when the timber is cut into bolts of the same length (up to 2.6 m) and stacked. Estimating volumes of firewood is the most common application of this scale method.

10.2.1 Unit of Measure

A stacked cubic metre (symbol: m^3 [stacked]) is defined as the total amount of wood, bark and airspace contained in a stack of roundwood that has external dimensions equal to 1 m^3. Unless otherwise stated, a stacked cubic metre implies rough wood or wood that still has the bark on it.

The relationship between a cubic metre and a stacked cubic metre is as follows:

Coniferous:

1 m^3 (roundwood) = 1.506 m^3 (stacked)
1 m^3 (stacked) = 0.664 m^3 (roundwood)

Deciduous:

1 m^3 (roundwood) = 1.795 m^3 (stacked)
1 m^3 (stacked) = 0.557 m^3 (roundwood)

Note: These relationships are averages. The solid wood content of stacked wood is influenced by many factors. These factors include species, length and diameter of bolts, method of piling, number of knots, and whether the wood is peeled or rough. Measurement of the dimensions of a stack result in a m^3 (stacked) volume however as Crown charges are based on the solid or roundwood m^3 volume then a conversion factor is applied.

10.2.2 Piling

The scaler or check scaler may refuse to scale wood that is poorly piled. The wood must then be re-piled for scaling within the period specified by the scaler or the check scaler. The scaler will not make any reductions of the apparent volume for faulty piling. A cleared lane at least 1 m wide must be left between piles so the pile can be scaled on either side. The bottom of each pile must be as level and horizontal as possible.

10.2.3 Measurements and Volume Calculations

Information for the pile or load should be recorded on a tally sheet or spreadsheet similar to that shown in figure 10.7. The form to use will change depending on the species and width of the stack. This is determined by the volume per piece formula which is:
basal area (diameter of defect) x width of stack x conversion factor (for species group) for 1 m^3 roundwood to m^3 (stacked). In addition, the value for converting Net m^3 (stacked) to m^3 roundwood for the final volume shall be 0.557 for deciduous and 0.664 for coniferous.

To determine the number of stacked cubic metres in a pile, the height and length are multiplied together to give the area of the face of the pile. The width of the pile (i.e., the length of the bolts) is multiplied by the face area of the pile to calculate the stacked cubic metres in the pile.

Length and height measurements may be obtained from one or both sides of the stack. If measurements are taken on one side of the stack, defects are taken on the same side, and it is assumed they extend through the full width of the stack. If measurements are taken on both sides of the stack, defects are assumed to extend half way through the width of the stack.

Volume in m^3 (stacked) = (H x L) x W

Where H = height of pile in metres to the nearest 0.02 m

L = length of pile in metres to the nearest 0.02 m

W = width of pile (or length of bolts) in metres to the nearest 0.2 m.

The following figure is an example of a stacked wood tally sheet:

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**STACKED WOOD
SCALE TALLY SHEET**
(Deciduous)

LESSEE, LICENCEE OR PERMITTEE				SOURCE	
SPECIES	COND.	PROD.	LOAD NO.	FORM TM 9 NO.	DATE

MEASUREMENTS

Lengths	Heights	Widths
A Total Length	B Ave. Height	C Ave. Class

m³ (stacked) A x B x C (2 decimals)	
Deduction Line D	
E Net m³ (stacked)	

m³ (roundwood) Line E x .557 2 decimals	

TRUCKER
SCALER

DEDUCTIONS (m³ stacked) 2.6 m Lgth

Dia	Vol/Pc.	Defects	Voids	Volume
8	0.023			
10	0.037			
12	0.053			
14	0.072			
16	0.094			
18	0.119			
20	0.147			
22	0.177			
24	0.211			
26	0.248			
28	0.287			
30	0.330			
32	0.375			
34	0.424			
36	0.475			
38	0.529			
40	0.586			
42	0.647			
44	0.710			
46	0.776			
48	0.845			
50	0.916			
Total (D) Deductions				

Vol/Pc = Basal Area x 2.6 x 1.795

Figure 10.7 – Stacked Wood Tally Sheet

SUSTAINABLE RESOURCE DEVELOPMENT

10.2.3.1 Stack Length

The length of a pile is measured to the nearest 0.02 m using a tape. One measurement is necessary.

When a stack of roundwood drops off in height at one or both ends to form a slope, measure the length where half the height of the stack intercepts the line of the slope (figure 11.5).

On hillsides or slopes, the length of a stack is measured parallel to the slope of the stack.

When exceedingly long stacks of roundwood are encountered, they are recorded as separate sections not exceeding 25 m in length. Each section is measured, recorded and marked as a separate stack.

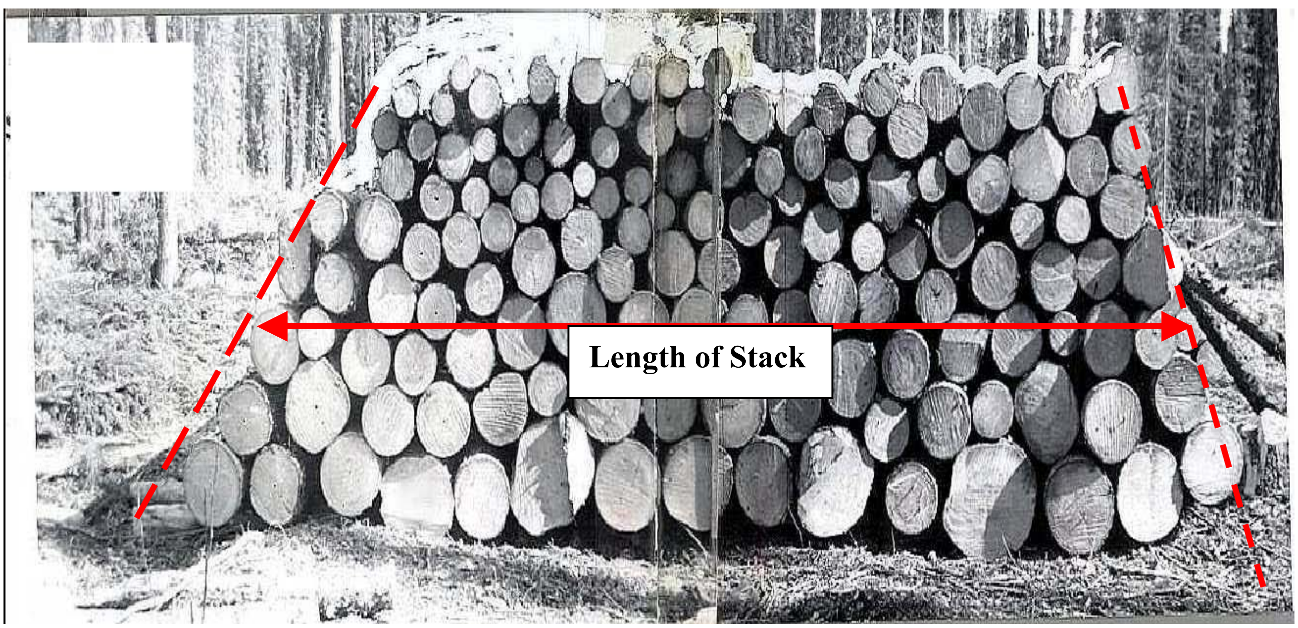

Figure 10.8 - Length of stack

SUSTAINABLE RESOURCE DEVELOPMENT

10.2.3.2 Stack Height

The height of a pile is measured to the nearest 0.02 m.

Take the height measurements of the stacks at equal intervals of 1 m along the pile, starting at the midpoint of the first interval (Figure 11.5). Note: The first interval starts at the point to which the length was measured. The height of the pile is the average of the heights that were measured at established intervals and rounded to a 0.02-m class. The exact heights are recorded as measured then the average is computed to the nearest 0.02 in box B.

If the pile is irregular, more heights should be recorded at closer intervals.

On hillsides or slopes, heights are measured at right angles to the length measurements of the stack.

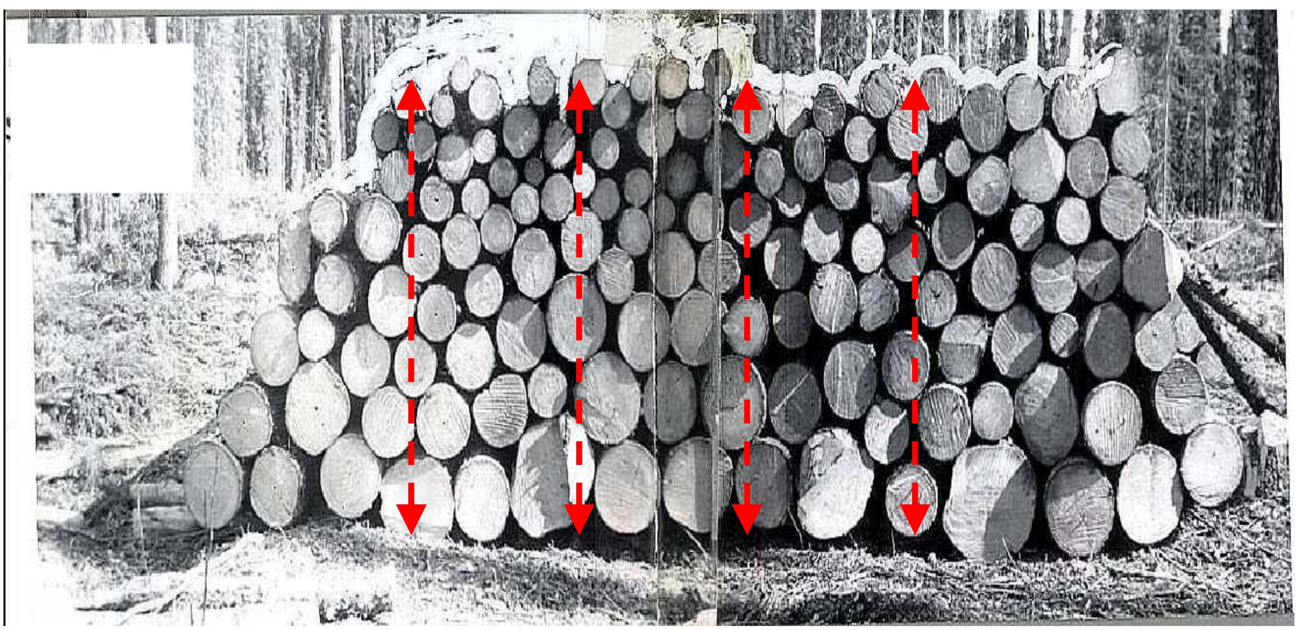

Figure 10.9 - Stack Height

SUSTAINABLE RESOURCE DEVELOPMENT

10.2.3.3 Stack Width

The width of the stack is the length measured for the bolts piled in the stack. The exact measurements are recorded as measured and then the average computed to the nearest 0.2 in box C. Note: It is this value that is used on the tally sheet.

Each pile of roundwood contains only bolts of the same length. Measure a sufficient number of bolts to ensure they are within the same length class. Note: Do not allow for trim when measuring stacked wood.

10.2.3.4 Deductions

Deductions are allowed for soft rots, missing wood or voids. Voids are unnecessary airspace in a stack of roundwood. The void must be large enough to accommodate the average-sized bolt in the stack.

Measure for defects and voids on the same side that was measured for height and width.

Measure the void to estimate the diameter of bolt that could fit into the space. Make a deduction equivalent to the volume for that diameter of bolt.

If the basal area of the defect is greater than 50% of the basal area of the bolt, deduct the entire bolt. If it is less than 50%, make no deduction.

The total number of defects and voids for each diameter class is then multiplied by the vol/pc to determine the defect volume for each diameter. The total defect volume is then calculated. This value is then rounded to two decimals and transferred to Deduction Line D (under the gross m^3 (stacked) entry).

ALBERTA SUSTAINABLE RESOURCE DEVELOPMENT

10.2.3.5 Compilation

The gross m^3 (stacked) is compiled by multiplying boxes A x B x C. The net m^3 (stacked) is the gross volume reduced by the total defect volume. The net m^3 (stacked) is converted to solid volume by multiplying by using the appropriate conversion factor for m^3 (stacked) to m^3 roundwood.

LESSEE,LICENCEE OR PERMITEE STACKED WOOD SCALING				SOURCE CTLK010009	
SPECIES	COND.	PROD.	LOAD No.	FORM TM 9	DATE
A	GR	02	104	A134068	91/08/10

MEASUREMENTS		
LENGTHS	HEIGHT	WIDTHS
6.44	1.36	2.52
	1.38	2.53
	1.34	2.54
	1.38	2.53
A	B	C
Total Length 6.44	Ave. Height 1.36	Ave. Class 2.6

m3 (stacked) AxBxC (2 decimals)	22.77
Deduction Line D	0.65
Net m3 (stacked)	22.12
m3 (roundwood) Line E x 0.557 2 decimals	12.32

DEDUCTIONS (m3 stacked) 2.6 m Lgth				
DIA	VOL/PC	DEFECTS	VOIDS	VOLUME
8	0.023			
10	0.037			
12	0.053			
14	0.072			
16	0.094			
18	0.119			
20	0.147	2	1	0.441
22	0.177			
24	0.211	1		0.211
26	0.248			
28	0.287			
30	0.330			
32	0.375			
34	0.424			
36	0.475			
38	0.529			
40	0.586			
Total (D) Deductions		3	1	0.652

Vol/PC = Basal Area x 2.6 x 1.795

Figure 10.10 – Sample of Stacked Wood Tally Compilation