FSH 2409.11

LOG SCALING HANDBOOK

PORTLAND, OREGON

FEBRUARY 1994

Region 6 Supplement No. 10

Page	No. of Sheets Superseded	New
Westside 1 thru 49		25
Supplement 7	27	
Supplement 8	3	

Digest:

This supplement is to be used when scaling **Westside** National Forest logs. It modifies and expands the Official Log Scaling and Grading Rules and provides scaling rules for **Fiber** and **Utility (Pulp)** products.

This supplement supersedes all previous supplements regarding Westside scaling procedures.

JOHN E. LOWE
Regional Forester

CHAPTER 10 - THEORY AND PRINCIPLES OF SCALING

12 - General Principles of Forest Service Scaling

The scaling of USDA Forest Service timber is performed in accordance with the procedures and instructions stated in FSH 2409.11 - National Forest Log Scaling Handbook.

Regional Foresters are responsible for supplementing FSH 2409.11 to accommodate particular Regional and Sub-Regional conditions.

When scaling west of the Cascade Mountains in the Pacific Northwest Region, scalers are instructed to follow scaling rules in the Official Log Scaling and Grading Rules and Supplement to the Official Log Scaling and Grading Rules except as modified and expanded by Forest Service supplements to FSH 2409.11 for Westside scaling.

This supplement is to be used when scaling Westside National Forest logs. It clarifies and expands the rules for taking log measurements and defect deductions. It defines and provides instructions for scaling fiber and utility (pulp) products.

The following notations and abbreviations are used throughout this supplement.

ML - Measured Length
RL - Recorded Length
SL - Segment Length
RD - Recorded Diameter
RGM - Recorded Gross Measurements

17 - Log Measurements

17.1 - Log Lengths.

17.11 - Maximum Scaling Lengths. A maximum scaling length of 40 feet is standard for National Forest logs scaled west of the Cascade Mountains.

17.12 - How to Measure Lengths. The scaler is responsible for accurate lengths on all logs scaled. Log lengths are obtained by measuring the length of the log's scaling cylinder on the short side of the log. Figure 1. Measure gross length in feet and inches with fractions of inches being dropped.

An example is a log that has a measured length of 27 feet 3/4 inches. The fraction of an inch is dropped and the measured length is 27 feet. With a maximum allowance of 12 inches trim, the recorded length is 26 feet. Figure 2. A log that has a measured length of 27 feet 1 inch has a recorded length of 27 feet.

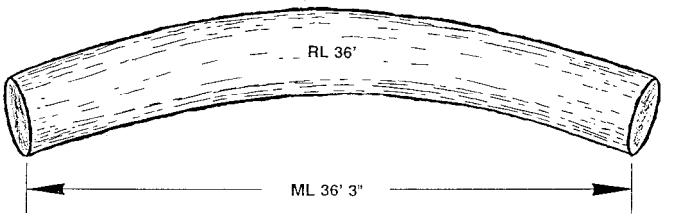


Figure 1.

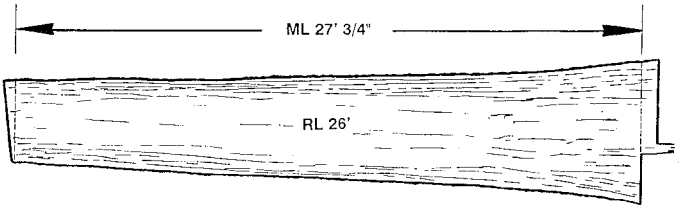


Figure 2.

Where one or both ends of a log are not bucked, determine the length between the broken ends in 2-foot multiples. Figure 3. The recorded length on logs with angular breaks shall be measured in 2-foot multiples at the point along the break where a full diameter across the break can be obtained. Figure 4. Partially bucked ends are considered bucked ends. Figure 5.

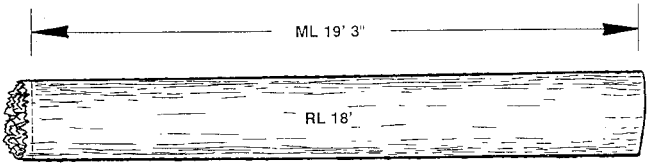


Figure 3.

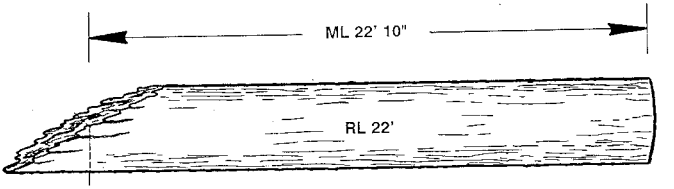


Figure 4.

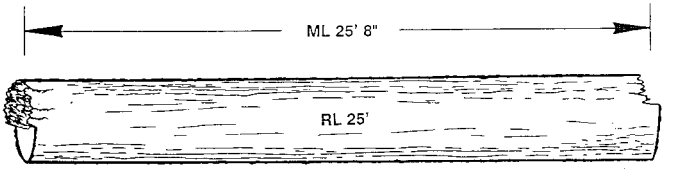


Figure 5.

17.3 - Log Diameters. The small end diameter is required for logs with a recorded length of 8 through 40 feet. Diameters for both the small and large end are required for logs with a recorded length exceeding 40 feet.

The diameter is obtained by averaging two measurements. Measure the shortest axis first, then take a second measurement at right angles to the first measurement. Any fraction over the inch shall be dropped to the next lower inch. Do not drop a full inch when the inch mark is flush with the edge of the log.

Butt Measurements. If the large end of a log exceeding 40 feet in length is a butt cut, the butt measurement will be obtained by projecting the actual taper of the log through the butt flare. To assist in determining actual taper a measurement may be taken across the log surface 4 feet above the large end or just above the butt flare allowing for bark thickness. Figure 6.

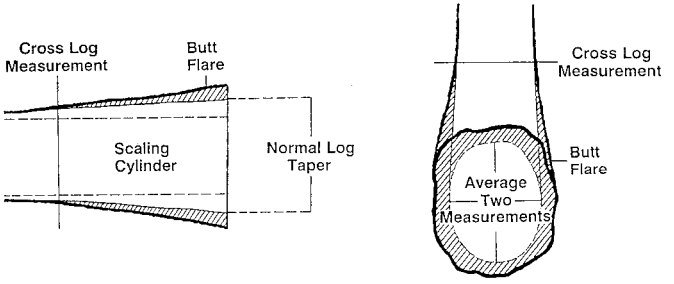


Figure 6.

Diameter Measurements on Sap Decayed Logs. The gross diameter measurements shall include the defective sap area when no portion of the sap decay has been sloughed off.

When any portion of the sap decay has been sloughed off the following shall apply.

1. If 50 percent or more sap decay is present on the log, reconstruct the missing defective area and measure the original diameter. Figures 7, 8.

2. If less than 50 percent of the sap decay is present, the gross diameter measurements shall be taken inside the defective area. Figures 9, 10.

3. If the decayed sap has been sloughed off only around the small end area, reconstruct the missing portion and include the decayed sap in the gross diameter measurements. Figure 11.

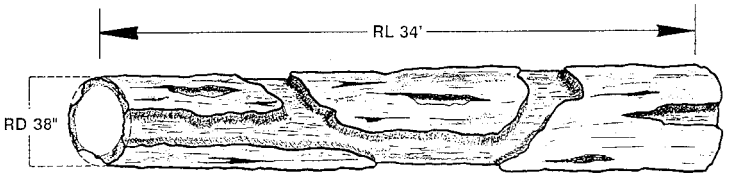


Figure 7.

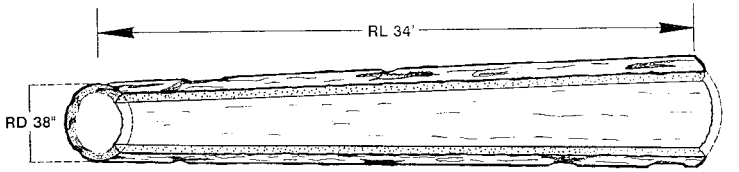


Figure 8.

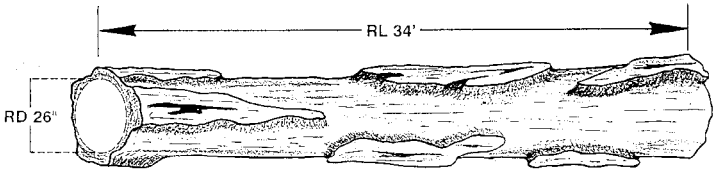


Figure 9.

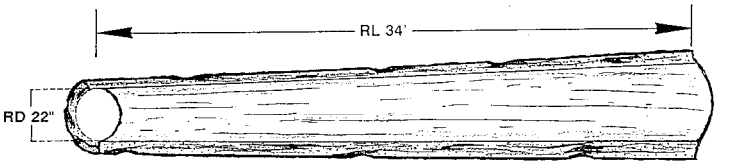


Figure 10.

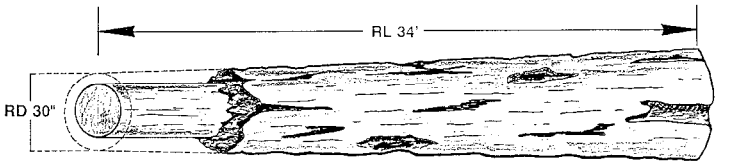


Figure 11.

17.31 - Gross Measurements on Forked / Crotched Logs. When forked logs are presented for scale the main stem and each fork that meets minimum contract specifications will be recorded separately as individual logs. If the stem or fork does not meet minimum specifications scale as described in section 17.5.

The main stem measured length is taken from the large end to the fork and recorded in 2-foot multiples allowing full trim. Forking begins at the point of daylight. The diameter of the main stem will be taken at the small end of the recorded length allowing full trim. The measured length of each fork is taken in 2-foot multiples beginning at the small end of the main stems recorded length. Full trim is not required when measuring the lengths of each fork. Figures 12, 13.

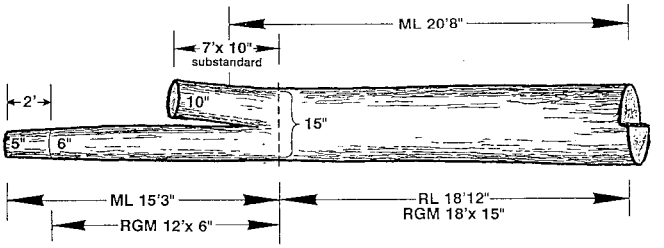


Figure 12.

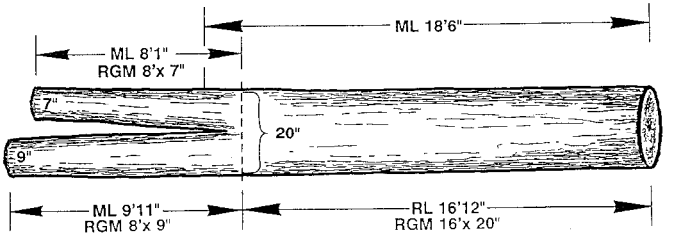


Figure 13.

17.4 - Taper in Long Logs. Actual taper is the difference between the two end diameters and is required for logs with a recorded length exceeding 40 feet. Logs with two or more segments may result in even or uneven taper.

17.41 - Distribution of Even Taper.

1. For two-segment logs, divide the total taper by 2. The result is the amount of taper added to the small end diameter to obtain the diameter of the second segment. Figure 14.

2. For three-segment logs, divide the total taper by 3. The result is the amount of taper added to the small end diameter to obtain the diameter of the second segment. Distribute the remaining taper as in a two-segment log and add that taper to the diameter of the second segment to obtain the diameter of the third segment. Figure 15.

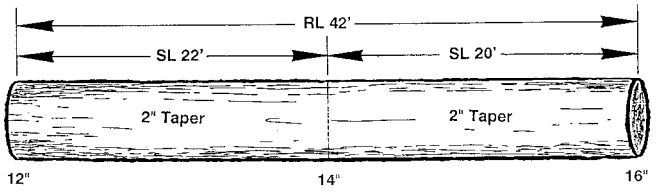


Figure 14.

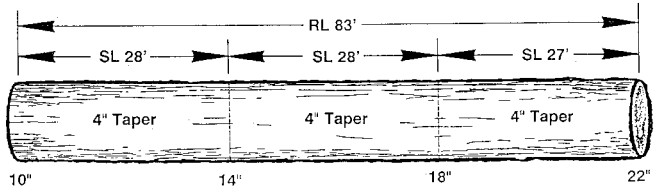


Figure 15.

17.42 - Distribution of Uneven Taper. Scale logs with uneven taper by applying the excess taper to the top segment.

1. For two-segment logs with taper not divisible by 2, add an inch to the total taper and divide by 2. The result is the amount of taper added to the small end diameter to obtain the diameter of the second segment. Figure 16.

2. For three-segment logs, raise the total taper to a number divisible by 3 and divide. The result is the amount of taper added to the small end diameter to obtain the diameter of the second segment. Distribute the remaining taper as in a two segment log and add that taper to the diameter of the second segment to obtain the diameter of the third segment. Figure 17.

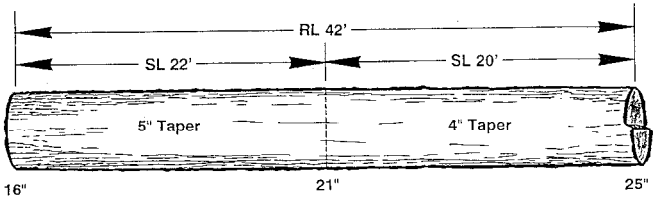


Figure 16.

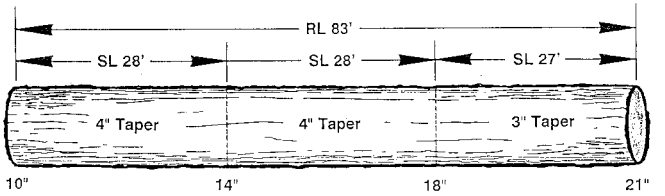


Figure 17.

17.5 - Measurements for Contract Specifications. Scaling specifications for each Forest Service timber sale contract are listed on the Scaler Information Form, R6-FS-2400-29. Specifications include minimum length, minimum diameter, minimum net volume and minimum percent merchantable.

Length. Scaler information forms list a minimum scaling length in feet. Trim is not required when measuring minimum scaling lengths. When a minimum length is listed as 8 feet a log measuring 8-foot zero inches will be recorded as an 8-foot log. Figure 18. Logs presented for scale less than the contract minimum for length shall be scaled as presented and recorded as substandard volume.

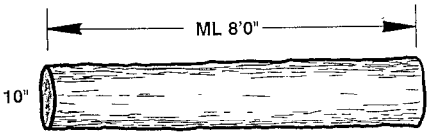
Diameters. When logs are presented for scaling with a small end diameter less than the contract minimum, the scaler will reduce the length from the top to a point where the contract minimum diameter can first be obtained. The point where the diameter is obtained is based on one measurement, taken inside the bark across the shortest axis of the log. Figure 19. The length of the log is recorded in 2-foot multiples. If the contract minimum diameter can not be obtained at any point on the log, scale as presented and record as substandard volume. Figure 20.

If the contract minimum diameter is measured at a 1-foot multiple length and by reducing the length to the next 2-foot multiple raises the gross diameter, record the shorter length and the larger diameter. Figure 21.

Volume. When the net volume of a log does not meet the contract minimum net volume the log will be recorded as substandard volume. Figure 22.

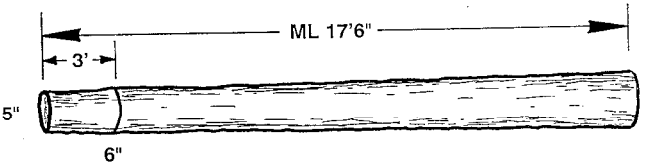
Percent Merchantable. When the net volume of a log or log segment does not meet the contract minimum for percent merchantable the log will be recorded as non-merchantable (cull) volume. Figure 23.

Minimum contract specifications for Figures 18 - 23 are:
8 feet, 6 inches, 20 board foot net, 33 1/3 percent merchantable.



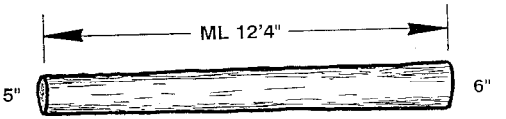
RGM - 8'x 10"
Volume - 30 bd. ft.
Merchantable Log

Figure 18.



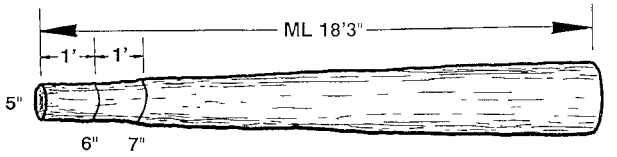
RGM - 14'x 6"
Volume - 20 bd. ft.
Merchantable Log

Figure 19.



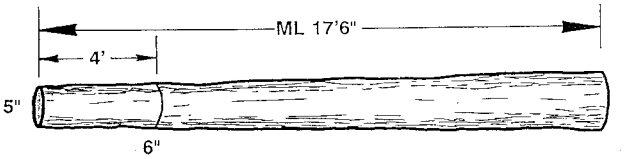
RGM - 12'x 5"
Volume - 10 bd. ft.
Substandard Log

Figure 20.



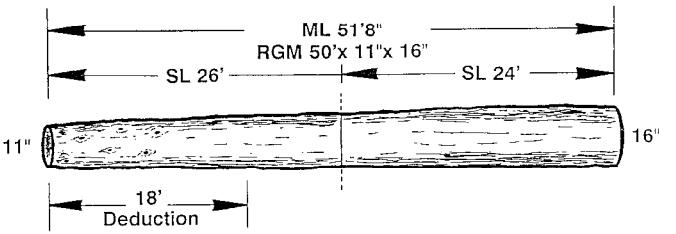
RGM - 16'x 7"
Volume - 30 bd. ft.
Merchantable Log

Figure 21.



RGM - 12'x 6"
Volume - 10 bd. ft.
Substandard Log

Figure 22.



Small End Segment
RGM - 26'x 11"
Volume - 110 bd. ft.
Defect Volume - 80 bd. ft.
Non-Merchantable - cull

Second Segment
RGM - 24'x 14"
Volume - 170 bd. ft.
Merchantable

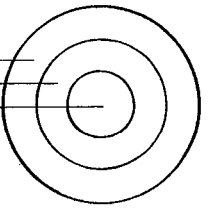
Figure 23.

CHAPTER 30 - LOG DEFECTS AND DEDUCTIONS

33 - Defect Types and Deduction Procedures

The most common defect types and deduction procedures are outlined in this chapter. Some defect deductions are made based on a portion of the log end and surface area affected by defect. Other defect deductions are based on the location of the defect within three circular areas of the log end. The areas are defined as:

outer area - outer 1/3 of log diameter
middle area - middle 1/3 of log diameter
inner area - inner 1/3 of log diameter



Heart Checks. The location of the heart check in the log end not the location within the scaling cylinder is the basis for determining the deduction. To provide a consistent procedure for determining deductions apply the following guidelines.

Deduction Guide

Heart Check Location	Deduction
drying or seasoning checks	none
inner 1/3; one end	none
inner 1/3; both ends	1"
middle 1/3; one end	1"
middle 1/3; both ends	2"
outer 1/3; one end	2"
outer 1/3; both ends	4"

If in the scaler's judgement the extent of the heart check causes a smaller or greater loss, deductions shall be made accordingly.

Examples of heart check deductions are shown in Figures 24, 25, 26, 27, 28, 29.

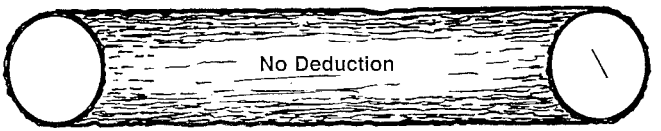


Figure 24.

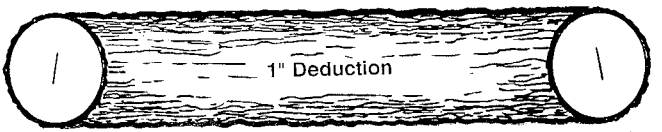


Figure 25.

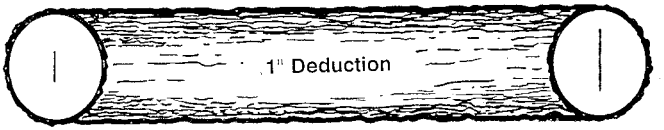
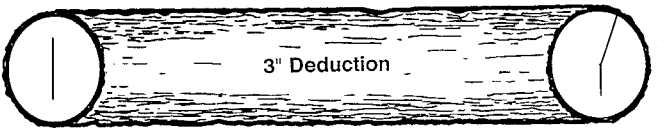


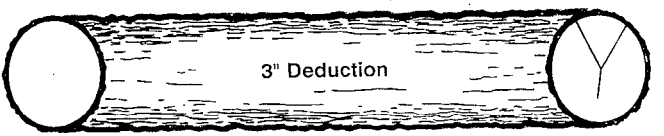
Figure 26.



Middle 1/3 - 1"

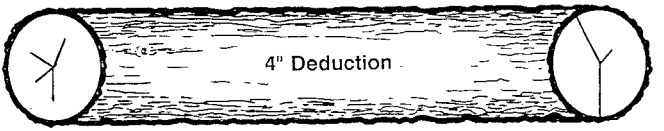
Outer 1/3 - 2"

Figure 27.



Outer 1/3 - 2"
Partial Check - 1"

Figure 28.



Middle 1/3 - 1"
Two Partial Checks - 1"

Outer 1/3 - 2"
Minor Check - None

Figure 29.

Rings. Consider the location of rings or partial rings in the log end not the location within the scaling cylinder. A partial ring is a half ring or less and a full ring is more than a half ring.

When determining deductions for rings apply the following guidelines.

Deduction Guide

Ring Location Middle or Outer 1/3	-	Deduction
partial ring; one end	-	1"
partial ring; both ends	-	2"
full ring; one end	-	2"
full ring; both ends	-	4"
Ring Location Inner 1/3	-	**Deduction**
partial ring; one end	-	none
partial ring; both ends	-	none
full ring; one end	-	1"
full ring; both ends	-	2"

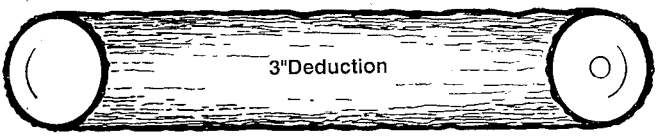
If in the scaler's judgement the extent of the ring(s) causes a smaller or greater loss, deductions shall be made accordingly.

If a full or partial "open" ring located in the outer 1/3 increases the volume loss, an additional inch for each end affected may be taken.

Perimeter Ring. A perimeter ring is a full ring located 3 inches or less from the perimeter of the small end of the log with evidence of the ring on the large end of the log or log segment.

The deduction is made by subtracting the small end ring diameter from the gross diameter. Taper is not considered when determining the deduction for a perimeter ring. If there is no evidence that the ring extends through the full length of the log or log segment it is not considered a perimeter ring and deductions will be made using the ring Deduction Guide.

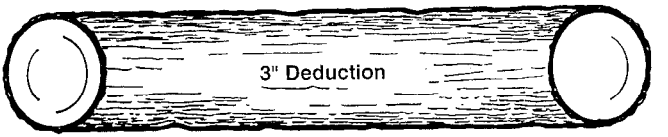
Examples of ring deductions are shown in Figures 30, 31, 32, 33, 34, 35.



Partial Ring - 1"

Full Ring Inner 1/3 - 1"
Partial Ring - 1"

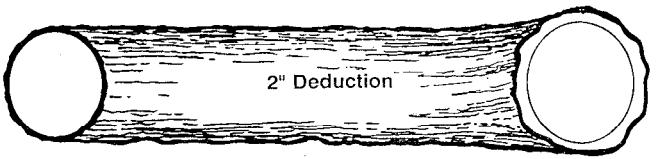
Figure 30.



Two Partial Rings - 2"

Partial Ring - 1"

Figure 31.



A full ring enters the scaling cylinder 4 feet from the large end.

Figure 32.

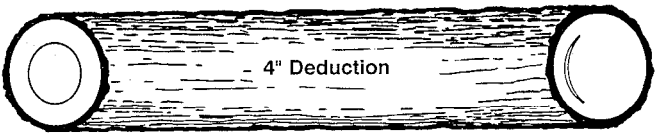


Figure 33.

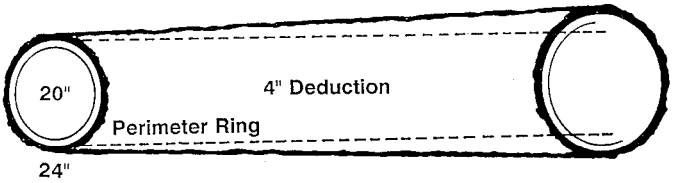


Figure 34.

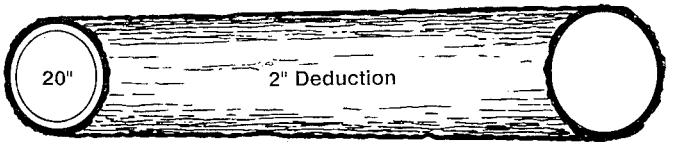


Figure 35.

Ring Break. Ring break is associated with ring defect. A deduction may be made for ring break in addition to the ring deduction. Depending on the location and the extent of ring break within the scaling cylinder, a deduction should be made which accurately represents the volume loss. In some logs a length deduction may be appropriate for the additional volume loss. Figures 36, 37, 38.

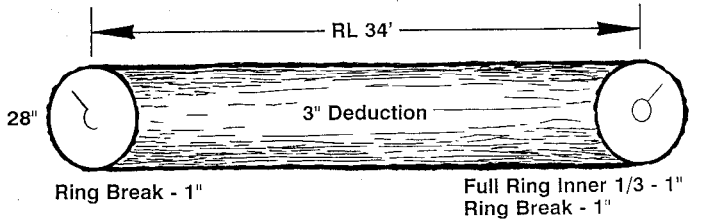


Figure 36.

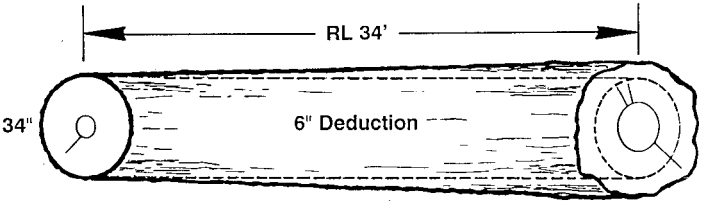


Figure 37.

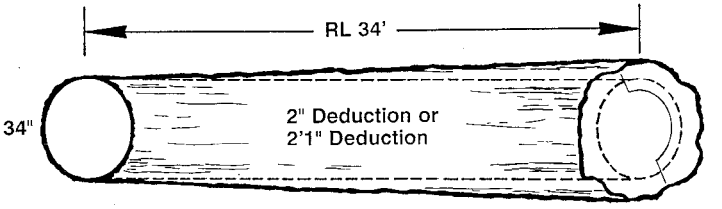


Figure 38.

Oversize Knots. Knots are considered oversize and are a deductible defect when they exceed 3 inches in diameter at a point where they enter the scaling cylinder. Knot size shall be determined by averaging the narrow and wide measurements of the center or hardened area of the knot, excluding the collarwood which holds the knot in place. Figure 39.

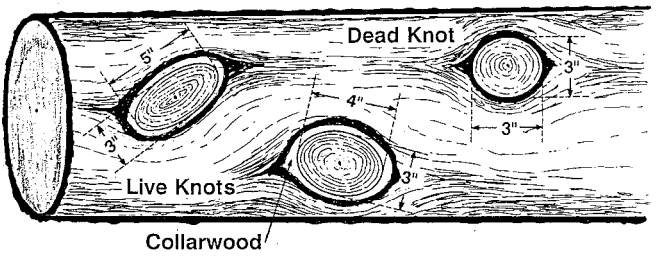


Figure 39.

The following deduction guide is to be used as a starting point for making deductions for oversize knots.

Deduction Guide

Log Diameters	Deduction
6" to 15"	1"
16" to 25"	2"
26" to 35"	3"
36" to 45"	4"
46" and over	scaler's judgement

Adjustments to the deduction guide for log taper and portions of the logs surface affected are as follows:

1. Consider the taper in the log and adjust the deduction outlined in the Deduction Guide to reflect the actual loss within the scaling cylinder. Figure 40.

2. If only a portion of the logs surface is affected with oversize knots adjust the deduction outlined in the Deduction Guide to reflect actual loss within the scaling cylinder. Figure 41.

3. When a log has a few scattered oversized knots or several oversized knots located in a short area of the scaling cylinder, a length deduction may be appropriate to eliminate actual volume loss. Figure 42.

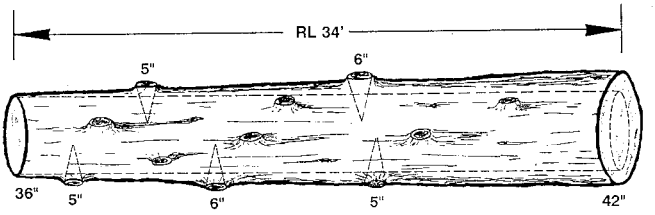


Figure 40. The knots exceed 3 inches in diameter where they enter the scaling cylinder. The entire scaling cylinder is affected with oversize knots. A deduction of 4 inches would be made using the oversize knot Deduction Guide.

If the log tapers and the knots no longer exceed 3 inches in diameter where they enter the scaling cylinder, reduce the deduction in the Deduction Guide to reflect only the log length affected by oversize knots. If 50 percent of log length is affected, reduce the deduction in the Deduction Guide by 50 percent.

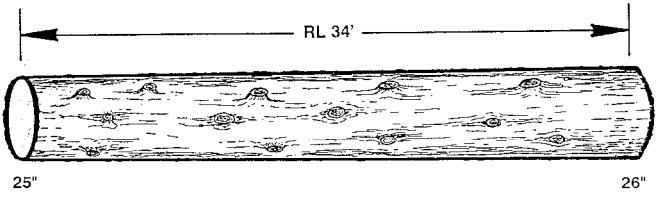


Figure 41. A log with a diameter of 25 inches has oversize knots on 50 percent of the scaling cylinder. The deduction should be half the deduction listed in the Deduction Guide for a 25 inch diameter log. A deduction of 1 inch would be made for oversize knots.

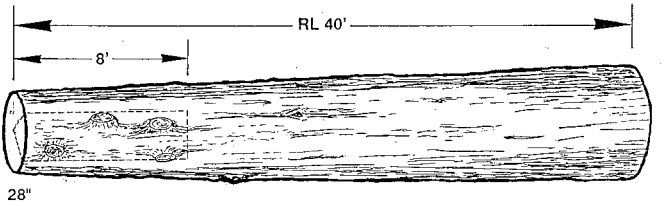


Figure 42. There are four oversize knots affecting 25 percent of the scaling cylinder for 8 feet. Total deduction of 2 feet would be made to eliminate the actual volume loss.

Rotten Knots. Decay in rotten knots may be confined to an individual knot or be an indication of additional decay in the heartwood area. Examine the log carefully to determine the extent of defect. Make deductions only for the affected portion within the scaling cylinder. Figures 43, 44, 45, 46.

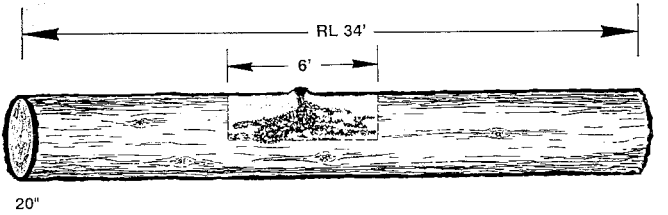


Figure 43. A large rotten knot with associated decay of the heartwood is located in the center of the log. Fifty percent of the scaling cylinder for 6 feet is affected by rot. A total deduction of 3 feet would be made.

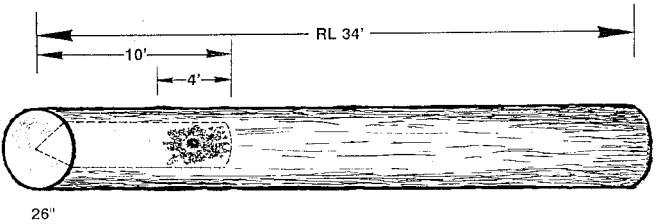


Figure 44. One isolated rotten knot is located 8 feet from the end of the log. Decay is estimated to affect 25 percent of the scaling cylinder for 4 feet. This deduction would not allow 8-foot lumber recovery between the end of the log and the rotten knot. Therefore, a total deduction of 25 percent of 10 feet, or a 3-foot deduction would be made.

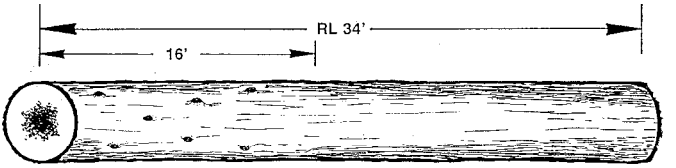


Figure 45. Rotten knots are scattered over the entire surface area and extend for 12 feet. The rot is estimated to extend 4 feet beyond the last rotten knot. A deduction of 16 feet would be made to eliminate the loss within the scaling cylinder.

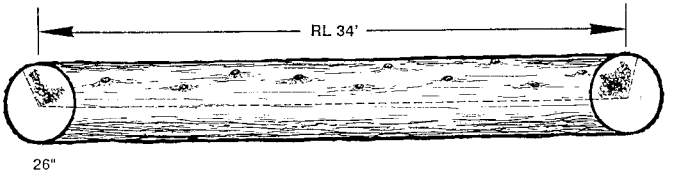


Figure 46. Rotten knots affect 30 percent of the surface area for the full length of the log. A deduction of 10 feet would be made to eliminate the loss within the scaling cylinder.

Surface Checks. Surface checks occur in dead trees or in live trees that have been felled and left in the woods for a period of time before removal.

1. Dead trees - the depth of the checks along the sides of the log are usually as deep as those in the log ends. Figures 47, 48.

2. Live trees - the depth of the checks along the sides of the log are usually one half the depth of the checks shown in the log ends. Figure 49.

Surface checks may affect the entire surface area or a portion of the surface area. Consider the taper of the log and the portion of the surface area affected and make deductions only for the surface checks within the scaling cylinder.

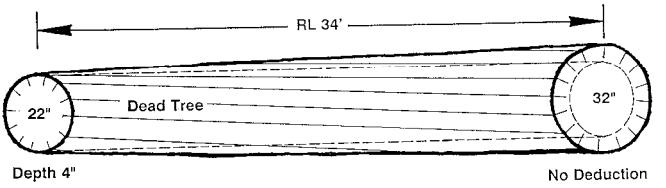


Figure 47. Surface checks affect the entire log surface and penetrate the scaling cylinder 4 inches on the small end of the log. Surface checks do not penetrate the scaling cylinder on the large end. Total log taper is 5 inches. Deduction on the small end of the log is 8 inches. There is no deduction necessary on the large end of the log. Average the two end deductions for a total deduction of 4 inches.

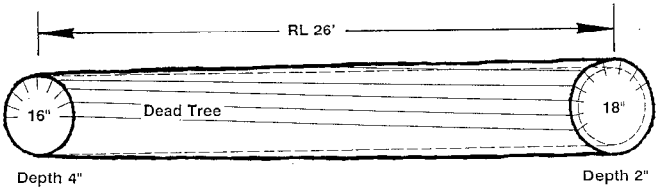


Figure 48. Surface checks affect one half of the log surface and penetrate the scaling cylinder 4 inches on the small end and 2 inches on the large end of the log. Total log taper is 2 inches. Deduction on the small end is 4 inches and 2 inches on the large end of the log. Average the two end deductions for a total deduction of 3 inches.

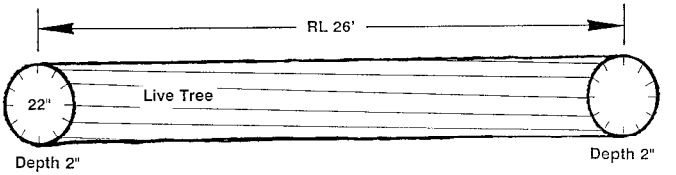


Figure 49. Surface checks affect the entire log surface and penetrate the scaling cylinder 2 inches on both ends of the log. There is no taper in the log. The deduction for surface checks on logs cut from live trees is one half the depth of the checks shown on the log ends. Total deduction would be 2 inches.

Sap Rot. Make deductions when the wood fiber has broke down and decay has occurred. Consider the taper of the log and the portion of the surface area affected and only eliminate the loss within the scaling cylinder. Sound blue stain affects lumber grade and is not a deductible defect.

Grubs/Worms/Beetles. Damage caused by grubs, worms or beetles is not deductible unless the damaged area will not produce Standard and Better grade lumber. The scaler should observe the manufacturing of this type of log to determine the extent of damage prior to making any deductions.

Bark Seams. In most cases bark seams are an extension of the root system on a butt log. A length deduction sufficient to eliminate the volume loss within the scaling cylinder maybe necessary. When bark seams do not penetrate the scaling cylinder, no deduction is made. Figure 50.

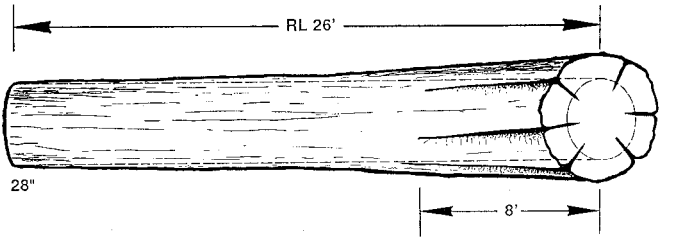


Figure 50. Bark seams extend for 8 feet on the surface of the log. It is estimated that 25 percent of the scaling cylinder is affected for 8 feet. A deduction of 2-foot would be made.

Break. Break may occur in the log ends or at any point along the log. The location and extent of break determines the length deduction needed. Deductions for break may be made in 1-foot multiples. Figures 51, 52, 53, 54.

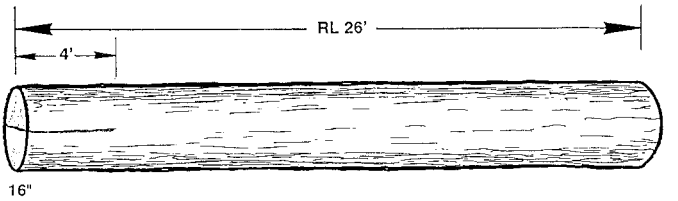


Figure 51. A straight break extends 4 feet into the log. A deduction of 25 percent of 4 feet or a 1-foot deduction would be made.

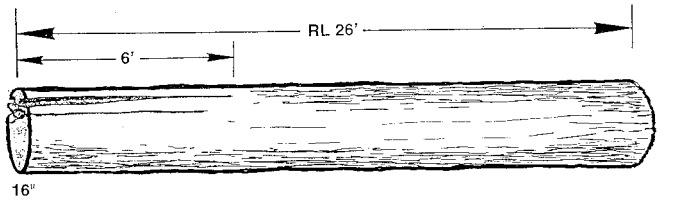


Figure 52. Break affects 30 percent of the end area and extends for 6 feet. A deduction of 2 feet would be made.

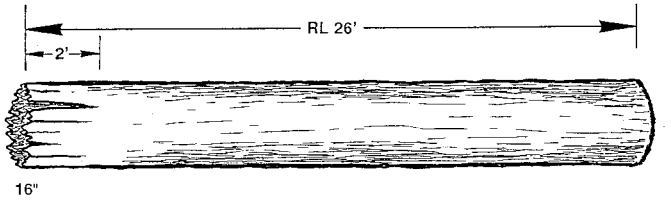


Figure 53. Break affects the entire end area and extends 2 feet into the log. A deduction of 2 feet would be made.

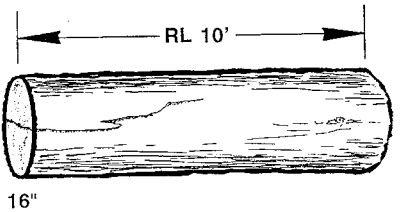


Figure 54. Fifty percent of the log will not produce 8-foot lumber. A deduction of 5 feet or half the gross log volume would be made.

Sweep.

1. Definition:

Sweep is a continuous curve that may affect the entire segment length or a portion of that length.

2. Sweep Guidelines:

   a. Scaling cylinder alignment shall be positioned within the log and/or the scaling cylinder length shall be adjusted so that maximum volume recovery can be achieved.

   b. At a minimum, a volume reduction equivalent to a one-foot length deduction shall be made each time the cylinder is redirected.

   c. The starting point of the redirected cylinder may start at the end of the preceding cylinder.

   d. When an overdeduction occurs due to the application of the preceding sweep guidelines, a deduction will be made that represents the actual volume loss.

   e. Consider cross grain material when making deductions for sweep.

Examples of sweep deductions are shown in Figures 55, 56, 57, 58, 61, 62.

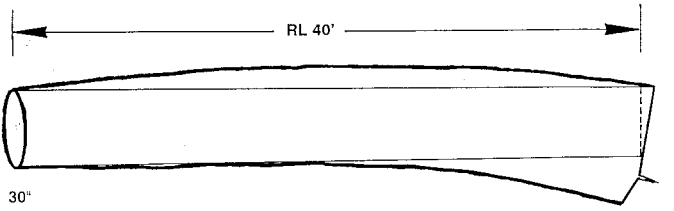


Figure 55. The scaling cylinder has been positioned within the full length of the log. No deduction is necessary.

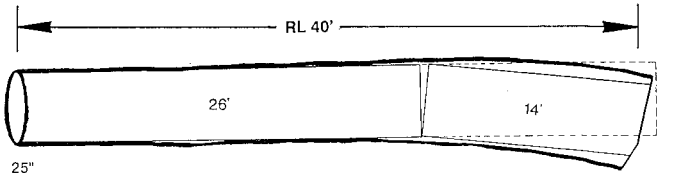


Figure 56. A continuous scaling cylinder can not be positioned within the full length of the log as illustrated by the broken line. The scaling cylinder length has been adjusted and redirected requiring a volume reduction equal to a 1-foot length deduction.

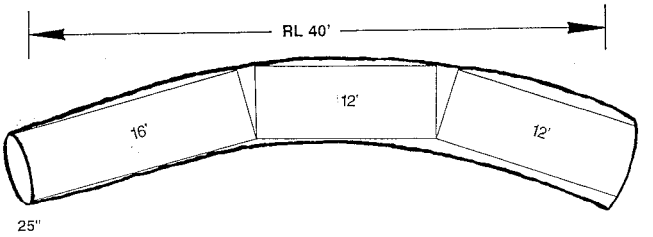


Figure 57. A volume reduction equal to a 1-foot length deduction is made for each cylinder redirection. Each redirected cylinder will start at the end of the preceding cylinder. The total deduction for sweep on this log would be a 2-foot length deduction for volume lost in redirecting the cylinder.

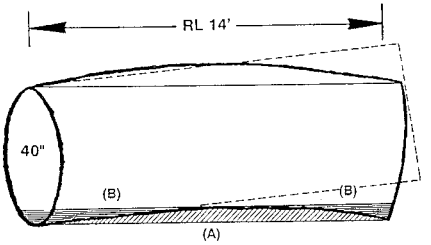


Figure 58. In some cases the application of the sweep guidelines may overdeduct for volume lost, as illustrated by the broken line. However, full length lumber can be sawn through a large portion of this log. A deduction should only be made for the void area inside the scaling cylinder, represented by shaded area (A), and that portion of the cylinder that will not produce 8-foot lumber recovery, represented by shaded area (B).

Approximately ten percent of the scaling cylinder will not produce 8-foot lumber recovery. The total deduction for volume lost on this log may be represented by either a 2-foot or 2 inch diameter deduction.

Crook.

1. Definition:

Crook is an abrupt curve or bend in a log, such as snowbreaks, sucker limbs and pistol butts.

2. Crook Guidelines:

   a. Make deductions only for that portion of the crook that will not produce merchantable lumber.

   b. After deductions are made for crook, any remaining portion of the scaling cylinder less than 8 feet in length shall be deducted.

   c. Consider cross grain material when making deductions for crook.

Examples of crook deductions are shown in Figures 59, 60, 61, 62.

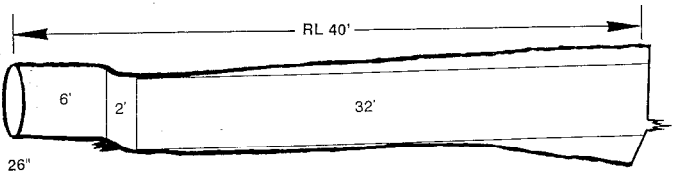


Figure 59. Crook in this log requires a 2-foot length deduction to eliminate cross grain and rot in the location of the sucker limb. A minimum 8 feet of merchantable length can not be obtained above the sucker limb. Total deduction for this log would be an 8-foot length deduction.

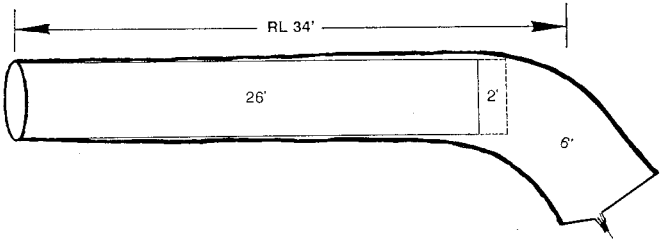


Figure 60. Cross grain material is associated with most pistol butt defect. When making a deduction for this defect an additional deduction may be necessary to eliminate cross grain material.

The scaling cylinder leaves the log at 28 feet. Due to cross grain an additional 2-foot deduction would be needed. Total defect results in an 8-foot length deduction.

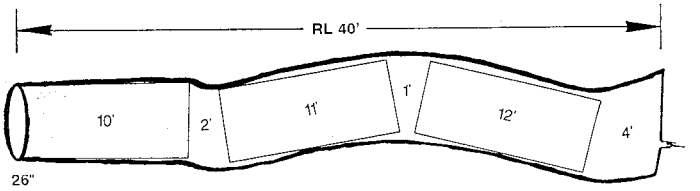


Figure 61. Sweep and crook can be found in the same log. Identify the defect and make appropriate deductions.

A deduction of 2 feet would be made to eliminate the snowbreak and a 1-foot deduction for sweep which includes cross grain material. The pistol butt is eliminated with a 4-foot length deduction. Total deduction for defect is 7 feet.

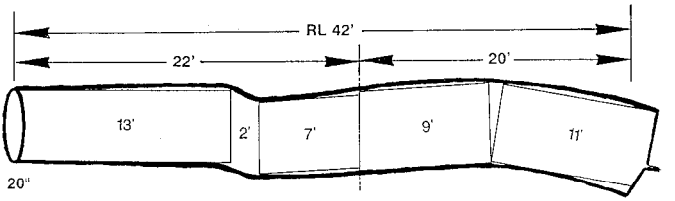


Figure 62. When deducting for sweep or crook in long logs, logs over 40 feet in length, it is important to remember to treat the log as two separate segments. Visualize the log as being bucked at the appropriate segment length. Make deductions separately for each segment affected.

This log contains crook in the first segment. A 2-foot length deduction will eliminate the defect but only 7 feet of segment length remains. Total deduction for the top segment would be 9 feet.

The second segment contains sweep. A volume reduction equal to a 1-foot length deduction is made on this segment for cylinder redirection.

Conk Rot. When making deductions for conk rot consider the following:

1. The severity of decay is determined by the various stages of conk rot. In the early stages the wood is only stained and requires no deduction. In later stages white speck appears as the wood fibers decay which requires a deduction.

2. Conk rot in second growth trees is not normally as severe as in old growth trees. A diameter deduction may be appropriate to eliminate the portion of the outer 1/3 affected by the conk rot.

3. Decay is normally more severe directly under conk knots.

4. Black massed pitch is sometimes found in the butt of logs containing conk. Black massed pitch is associated with conk rot much the same as stain but like stain should only be used to help determine the extent of the conk rot in the log.

5. Where conk rot shows in the same relative position on both ends of the log make deductions for the portion of the log affected. Figure 63.

6. Where conk rot shows in one end only deduct the portion of the defect in the end area for the length affected. Figure 64.

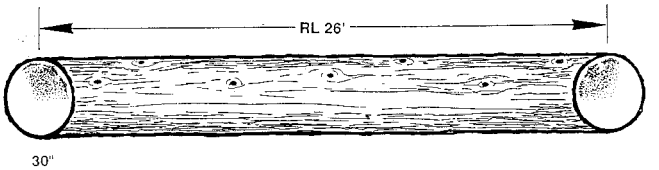


Figure 63. Conk rot affects the full length of this 26-foot log. Conk rot shows in the same relative position in both ends of the log. Approximately 40 percent of each end is affected. A deduction of 10 feet would be made.

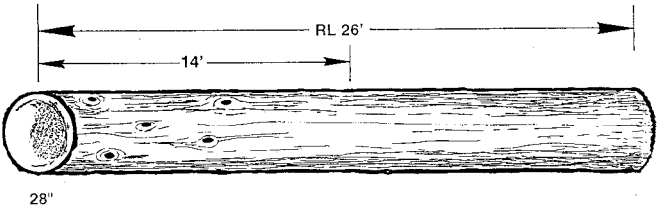


Figure 64. Conk rot appears in one end only and can be found on the side of the log at 8 feet. It is estimated that the conk rot affects 50 percent of the end area and extends 14 feet down the log. A deduction of 50 percent of 14 feet or a 7-foot deduction would be made.

Stump Rot. Stump rot begins in the base of the tree and extends upward. Generally, the length of the swell in the butt indicates the extent of the stump rot. When no swelling is present, stump rot may extend further up the tree. The deduction should take into consideration the recovery inside the scaling cylinder along the sides of the defect as it tapers out. Figure 65.

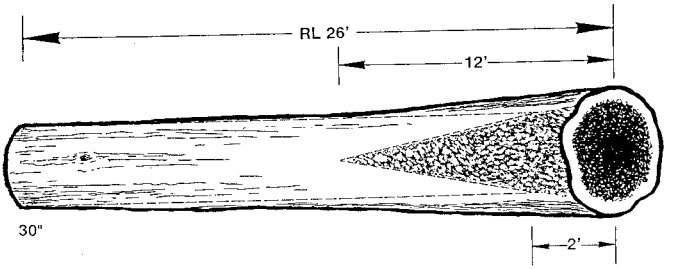


Figure 65. Stump rot extends 12 feet into the log. The first 2 feet is a 100 percent loss. Fifty percent of the remaining 10 feet is loss. A total deduction of 7 feet would be made.

Logs Containing Metal. Logs containing metal, such as nails, staples, or wire shall have a length deduction made to eliminate 100 percent of the length affected. Any portion of a log that does not meet the minimum of 8 feet shall be eliminated. The scaler should flag the log to insure safe processing. Figure 66.

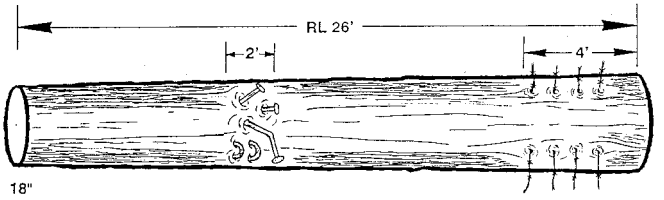


Figure 66. Metal is found in two locations on this 26-foot log. There are nails located approximately 10 feet from the small end. A 2-foot deduction is made to eliminate 100 percent of the length affected. Eight feet remains above the deducted area. The large end has wire embedded in the log 4 feet from the end. A deduction of 4 feet will eliminate 100 percent of the length affected. Total deduction for the log is 6 feet.

Test Cuts. Test cuts are used to determine the extent of defect prior to bucking the log. Deductions shall be made for test cuts unless otherwise stated on the Scaler Information Form. Figure 67.

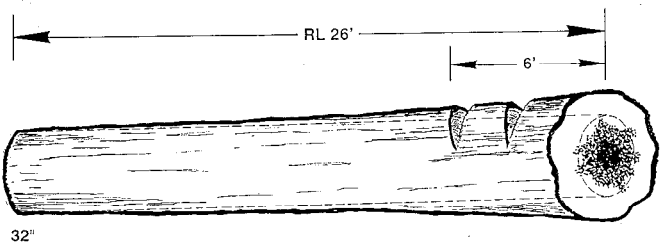


Figure 67. Stump rot and test cuts are located in the butt portion of the log and extend for 6 feet. A deduction of 80 percent of 6 feet or a 5-foot deduction would be made.

33.1 - Defect Types and Deduction Procedures for Scaling Firmwood Fiber. Firmwood Fiber (Fiber) scaling is the determination of sound wood content not related to a specific product. The following rules and methods apply for making fiber defect deductions.

33.11 - Fiber Defects. Fiber defect is unsound wood that results in a loss of firmwood content within the scaling cylinder. Deductible fiber defects are:

1. Soft rot resulting from advanced decay.

2. Voids which is an absence of wood fiber.

3. Char resulting from heat causing a change in the chemical composition of the wood.

4. Massed pitch in such concentration that the wood fiber becomes unusable.

33.12 - Basic Fiber Defect Deduction Rules. Use the defect deduction methods described in the Official Log Scaling and Grading Rules except as modified and expanded by Forest Service supplements to FSH 2409.11 for Westside scaling. Include the following five requirements when making fiber defect deductions.

1. Deduct only for the actual fiber loss within the scaling cylinder without consideration for specific end product recovery.

2. Determine the defect length in 1-foot increments considering defect shape (cylinder, cone).

3. Consider the portion of length affected and make deductions only for the percent of length actually affected by defect within the scaling cylinder.

4. Consider the taper of the log and the portion of the surface area affected and make deductions only for the loss within the scaling cylinder.

5. Consider circular interior defects that extend through the entire log as a defect core. Volume loss will equal a log with dimensions of the defect core.

33.2 - Assessing Fiber Defect in Logs and Deductions Methods. Use the following guidelines as applicable deduction methods for common types of fiber defects.

33.21 - Soft Rots.

33.21a - Sap Rot. Use the diameter deduction method for perimeter sap rot defect. Make deductions when the wood fiber has broke down and decay has occurred. Consider the taper of the log and the portion of the surface area affected and only eliminate the loss within the scaling cylinder. Figure 68.

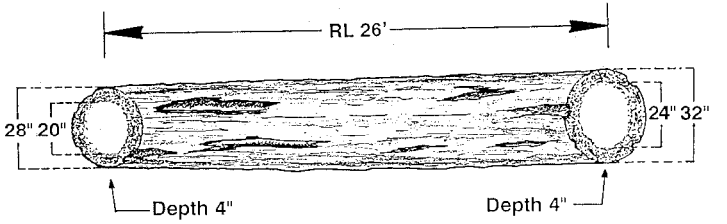


Figure 68. Sap rot affects the entire log surface and penetrates the scaling cylinder 4 inches on the small end and 2 inches on the large end of the log. Total log taper is 4 inches. Deduction on the small end is 8 inches and 4 inches on the large end of the log. Average the two end deductions for a total deduction of 6 inches.

33.21b - Heart Rot. When rot is circular in shape and extends through the entire log length average the two end defect diameters. Use the average defect diameter and the log length as the dimensions of the defect core. The deduction would be equal to the volume of a log with dimensions of the defect core. Figure 69.

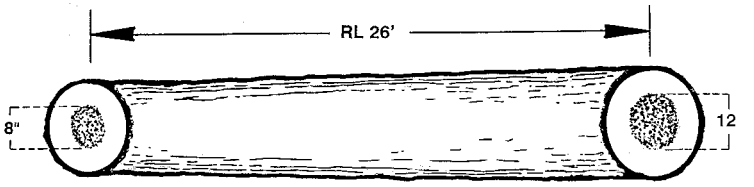


Figure 69. The average defect diameter is 10 inches. Defect extends 26 feet. The volume of the defect core is 9 dec. C. Make a length or diameter deduction equal to the volume of the defect core. A length deduction of 2 feet or a diameter deduction of 1 inch would be made.

Use the length deduction method when heart rot does not extend through the entire log. Figure 70.

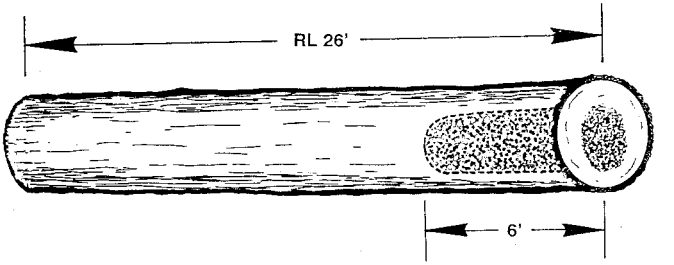


Figure 70. Heart rot extends 6 feet. The deduction should take into consideration the fiber recovery inside the scaling cylinder along the sides of the defect. Deduct two thirds of the length affected. A deduction of 4 feet would be made.

33.21c - Stump Rot. Stump rot may be cone shaped. The deduction should take into consideration the fiber recovery inside the scaling cylinder along the sides of the rot as it tapers out. Figure 71.

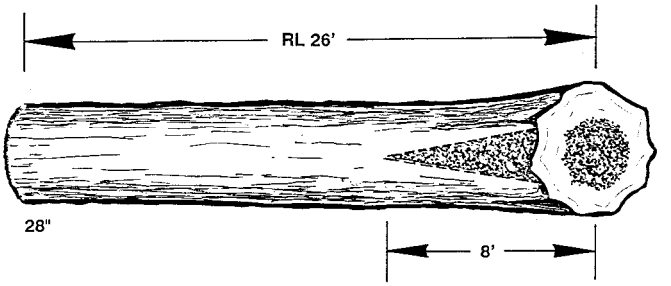


Figure 71. Stump rot extends 8 feet into the log. Deduct one half of the length affected. A deduction of 4 feet would be made.

33.22 - Voids.

33.22a - Break. Make deductions for voids created by break. Figure 72.

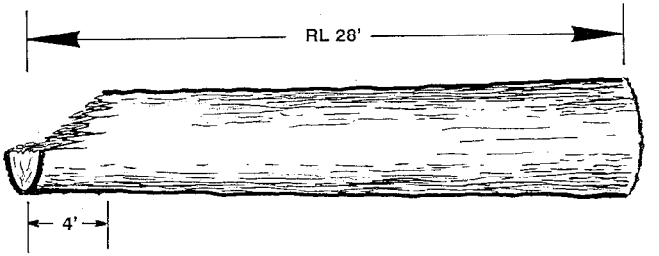


Figure 72. Break affects 4 feet of log length. One fourth of the defect length is void. A deduction of 1-foot would be made.

33.22b - Stump Pull. Determine the actual fiber loss considering the shape and extent of the void. Figure 73.

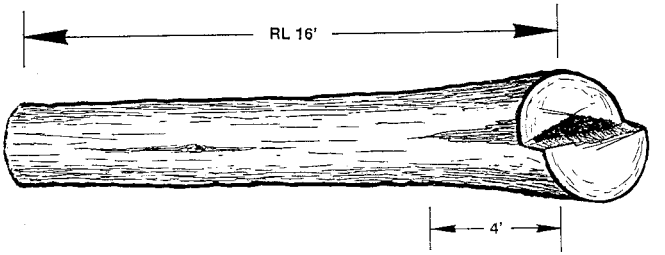


Figure 73. Stump pull extends 4 feet and voids 25 percent of the scaling cylinder. A deduction of 1-foot would be made.

33.22c - Bark Seams. The actual fiber loss should be determined by the length and extent of bark seam within the scaling cylinder. Figure 74.

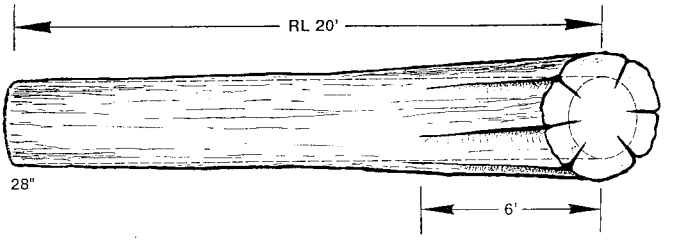


Figure 74. Bark seams extend 6 feet and affect 10 percent of the scaling cylinder. A deduction of 1-foot would be made.

33.23 - Char.

33.23a - Fire Scar. Deduct the portion of length affected when making deductions for fire scar. Deduction should include the char and void portion within the scaling cylinder. Figure 75.

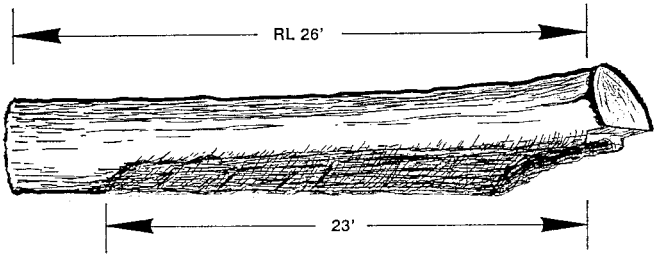


Figure 75. Fire scar extends 23 feet. The portion of void and char is 50 percent at the large end tapering to zero percent. Percent of loss within the scaling cylinder is 30 percent. Thirty percent of 23 feet or a 8-foot length deduction would be made.

33.23b. - Charred Log. Use the diameter deduction method when the surface of the log is charred. Consider the taper of the log and the portion of the surface area affected and only eliminate the loss within the scaling cylinder. Figure 76.

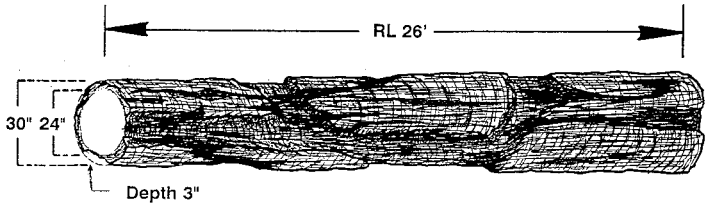


Figure 76. Char affects the entire log surface and penetrates the scaling cylinder 3 inches on the small end of the log. Char does not penetrate the scaling cylinder on the large end. Total log taper is 6 inches. Deduction on the small end is 6 inches and no deduction is necessary on the large end of the log. Average the two end deductions for a total deduction of 3 inches.

33.24 - Massed Pitch. Massed pitch causes fiber loss. Eliminate the volume loss due to massed pitch. Figure 77.

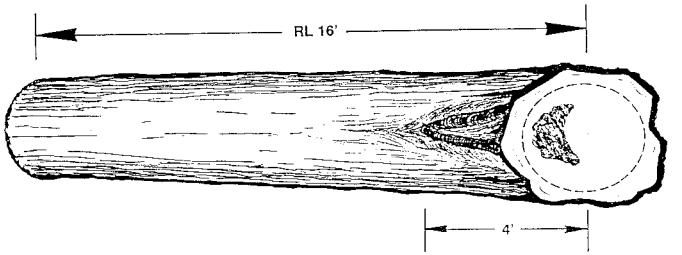


Figure 77. Often massed pitch occurs in connection with fire scar. Scar extends 4 feet and massed pitch affects 25 percent of the scaling cylinder. A deduction of 1-foot would be made.

33.3 - Defect Types and Deduction Procedures when Scaling Pulp Logs. Utility (Pulp) logs are logs that are suitable for production of usable pulp chips. Determine pulp chip volume when the timber sale contract specifies pulp chips as a product and is indicated on the Scaler Information Form.

Pulp logs will be scaled in accordance with the rules for Firmwood Fiber scaling, Section 33.1, except for certain defect considerations as described in Section 33.41.

33.41 - Assessing Defect in Pulp Logs and Deduction Methods. Defective logs or log segments that will breakup under normal debarking operations and logs or log segments with char that cannot have 100 percent of the affected length eliminated are not considered pulpable. The portion of a log or log segment that cannot be mechanically debarked due to breakage, or contains charred wood will have 100 percent of the affected length deducted.

33.41a - Non-debarkable Breakage. When non-debarkable breakage affects a portion of a log or log segment use a length deduction to eliminate 100 percent of the length affected. Figure 78.

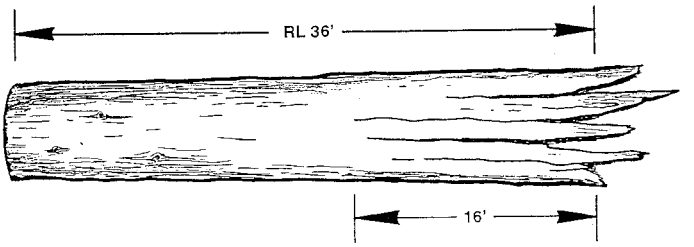


Figure 78. Break affects 16 feet of this 36-foot log. A deduction of 16 feet would be made to eliminate 100 percent of the length affected.

33.41b - Char. If char affects any portion of the log or log segment use a length deduction to eliminate 100 percent of the length affected. When the entire log length is affected by char the log is a cull. Figures 79, 80.

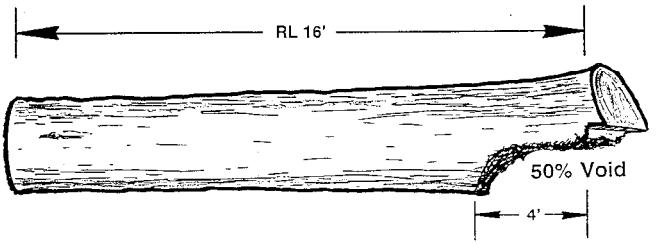


Figure 79. Void and char affects 50 percent of 4 feet. A deduction of 4 feet would be made to eliminate 100 percent of the length affected.

Figure 80. Char affects 100 percent of the log length. The log is a cull.