LOG GRADING BASICS

Thursday, June 11, 2015
Profitable Firewood Workshop

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Website = http://outreach.cnr.ncsu.edu/ncwood
Wood Education and Resource Center

- Is the focus of the US Forest Service effort of support of the hardwood forest industry in the states east of the Great Plains
- Our WERC projects websites = www.cnr.ncsu.edu/woodworkshops
  and www.cnr.ncsu.edu/usalocalwood

The work upon which this workshop is based was funded in whole or in part through a grant awarded by the Wood Education and Resource Center, Northeastern Area State and Private Forestry, U.S. Forest Service.

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Log Grading Basics

• Visually scan the outer surfaces of a log to estimate a log’s potential for sawing grades of lumber—value of a board depends upon its value

• Diameter and length to estimate gross bf volume

• Deduct for defects
  • Sweep
  • Knots
  • Splits
Log Grading Basics—simple for small sawmill operations

• Common to deduct for defects that reduce volume and grade

• Many buy logs based on a two or three grade system
  • Diameter and length determines volume
  • May be “Uppers and Lowers”, “Uppers, Middles, Lowers”
  • Prices paid based on species and grade
USFS Log Grading System—a system with a 200+ instruction manual

![Table showing grading factors and log grades for hardwood factory lumber logs.](image)

- **Grading Factors**
  - **Position in tree**
  - **Scaling diameter, inches**
  - **Length without trim, feet**
  - **Required clear cuttings of each of 3 best faces**

- **Log grades**
  - **Butts only**
  - **Butts & uppers**
  - **Butts & uppers**
  - **Butts & uppers**

- **Maximum sweep & crook allowance**
  - For logs with less than \( \frac{1}{4} \) of end in sound defects
  - For logs with more than \( \frac{1}{4} \) of end in sound defects

- **Maximum scaling deduction**
  - 40% 
  - 50% 
  - 50%

- **End defect:** See special instructions (page 18)
USFS Has Many Publications on Hardwood Log Grading

- Website for searches on the topic of log grading = http://www.fs.fed.us/publications/
USFS Log Grading-Sweep

Sweep \( \% = \frac{\text{Inches offset } - 2}{\text{DBH}} \)
Sweep \( \% = \frac{5 - 2}{20} = 0.15 \text{ or } 15\% \)

Figure 6. Example of sweep in the butt-log of a tree.
Log Grading-bucking is important

(a) Incorrect
Correct

(b) Incorrect
Correct

Source: Joe Denig
Log Grading-selecting log faces
Log Grading-
grade 2

Position  Upper log
Size  Length 36”, diameter 11” at small end
Straightness  Straight
Soundness  Sound
Cuttings  More than 1/2 of its grading-face length is clear in two sections each 6 feet long

Position  Upper log
Size  Length 36”, diameter 12” at small end
Straightness  Straight
Soundness  Sound
Cuttings  More than 1/2 of its grading-face length is clear in two sections 4 and 3 feet long

Position  Upper log
Size  Length 36”, diameter 13” at small end
Straightness  Deduction of 20 percent for 6” inches of absolute sweep (sweep less than 30 percent maximum allowance)
Soundness  Sound
Cuttings  More than 1/2 of its grading-face length is clear in two sections 5 and 4 feet long

Position  Upper log
Size  Length 36”, diameter 18” at small end
Straightness  Deduction of 20 percent for 4 inches of absolute sweep
Soundness  Deduction for rot (sweep and rot deductions less than 30 percent maximum permitted)
Cuttings  Rot limits cutting on grading face, but clear cuttings of 4, 3, and 4 feet give more than the required 1/2 of grading-face length
Log Grading-
grade 3

Position: Upper log
Size: Length 8', diameter 8" at small end
Straightness: Straight
Soundness: Sound
Cuttings: One-half of its grading-face length is clear in two sections, each 2 feet long.

Position: Upper log
Size: Length 10', diameter 14" at small end
Straightness: Straight
Soundness: 15 percent rot deduction (less than 50 percent maximum permitted)
Cuttings: More than 1/3 of its grading-face length is clear in two sections, 4 and 3 feet long.
Comments: Interior rot outside the rot zone limits cuttings.

Position: Upper log
Size: Length 14', diameter 22" at small end
Straightness: 12 percent deduction for 6" x 3" of crook on both ends of log
Soundness: 15 percent rot deduction (crook and rot less than 20 percent maximum deduction)
Cuttings: More than 1/3 of its grading-face length is clear in three sections, 3.3 and 2 feet long.

Position: Upper log
Size: Length 16', diameter 29" at small end
Straightness: Straight
Soundness: Sound
Cuttings: More than 1/3 of its grading-face length is clear in two sections, 5 and 4 feet long.